Original Research Paper

VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

Investigation of an outbreak of cholera in an urban area of Kerala state

Medicine

KEYWORDS:

Dr Anupa Lucas — Assistant Professor Department of Community Medicine Government Medical College , Thrissur

Dr Togy Thomas Zacharia — Assistant Professor Department of Pathology Government Medical College , Thrissur

ABSTRACT

Introduction Cholera is an acute diarrheal disease causing high mortality and morbidity in the Indian subcontinent .On July 11th of 2014 a case of cholera was confirmed by bacteriological examination from Ettumanoor town area.. An outbreak investigation was conducted with the objective of describing the epidemiological characteristics of the outbreak. Methodology:A house to house survey was conducted for active case searching and identifying socio demographic factors which lead to the outbreak. A spot map was constructed to identify clustering of cases. An epidemic curve was drawn to characterise the time trends. Water from suspected sources was tested for cholera. Results .The epidemic curve had a sharp rise and fall with no further cases.. Attack rates among individuals consuming food from Restaurant A was 25% and Restaurant B was 33.3%. Conclusion The outbreak is a single exposure epidemic and failed to propagate possibly because of effective control measures. The high attack rates among people who ate from suspected food outlets indicate the source of infection to be either food or water consumed. A common food item which was served raw and sourced from the same supplier could have been the source of infection.

INTRODUCTION

Cholera is an acute diarrheal disease caused by ingestion of food or water containing the bacteria Vibrio cholerae. Patients present with acute watery diarrhaea and signs and symptoms of dehydration. (1)Though it is self limiting in most cases, it can cause death in patients who do not receive timely oral rehydration therapy. Mortality and morbidity is associated with cases where there is a delay in diagnosis. Very often there is also a failure to identify and contain outbreaks early.(2) Provision of safe water and sanitation are the key to prevention of control of cholera.(3) Unplanned urbanisation and population migration to urban areas has led to a situation where most of the urban dwellers lack a safe sanitary toilet and safe drinking water supply. The water supply is intermittent adding to the contamination of water by the negative suction pressure. There is the added problem of solid waste disposal promoting fly breeding sites. It is estimated that annually there are 1.3 to 4.0 million cases of cholera worldwide leading to and 21 000 to 143 000 deaths. In India, cholera is endemic in many states. During 1997–2006, India reported 68 outbreaks with 37,783 cases and 84 deaths.(4)

No major cholera outbreaks have been reported in the state of Kerala since 2005.(5). The disease surveillance system under the Integrated disease surveillance programme (IDSP) and State PEID (Prevention of Endemic Infectious Diseases) cell collects data on Acute diarrheal diseases from all levels of health care system. In spite of that very few cases of cholera are reported probably because of the stigma associated with it linking it to the breakdown of safe water supply and sanitation.(2)

MATERIALS AND METHODS

A case of cholera was reported from Ettumanoor on 11-07-2013 after allegedly taking food from one of the restaurants of town area. The index case was picked by the IDSP. The patient was a 50 year old rubber tapper presenting with acute diarrhea to the infectious disease unit of the nearby Government Medical college and was diagnosed to have cholera after bacteriological examination of stools.(6)

Objectives of the investigation

1. To describe the epidemiological characteristics of the outbreak
2. To identify the risk factors associated with the outbreak
3. To provide recommendations to prevent further occurrence of outbreaks

Ethical clearance

Since the study was investigation of an outbreak and obtaining an ethical approval from the Institutional Ethics committee required time, permission was obtained from the Administrative Medical Officer of the Primary health centre and the Secretary of the Ettumanoor Panchayat .

Steps of outbreak investigation

Confirmation of existence of the outbreak

Ettumanoor has no reported cases of cholera in the last ten years. However since the surveillance system was not in operation till 2005, and there is always a failure to diagnose cholera in cases presenting with watery diarrhoea. Hence we cannot conclusively say whether there is already existing endemicity of cholera in the population. We could not see any evidence of any rumour register placed in the community or a line listing of ADD cases in the community. So a single case of Cholera diagnosed can be considered as an outbreak.

Verification of diagnosis

The case was confirmed by bacteriological examination of the stool as El Tor Ogawa strain at the Microbiology Department of Medical College Kottayam.

Case definition

A case of cholera was defined as a patient above the age of five years presenting with watery diarrhea with/without history of consuming food from Ettumanoor town area

Active case finding

A house-to-house survey was performed by trained health workers in the area using a questionnaire to identify cases with acute diarrhea. They collected basic demographic information, place of job, history of eating out or buying cooked food from outside home .The questionnaire contained information regarding the date of diarrhea onset, associated symptoms and nature of treatment undertaken. Residents were also questioned about and similar illnesses in other family members or co workers in the preceding week. The questionnaire also inquired into the source of drinking water, the method of drinking water purification, hand washing practices and the use of sanitary latrines for individual households. When a case was identified the health worker collected water sample from the suspected source of drinking water before chlorinating the source. When a case was identified and had a history of eating out at a restaurant in Ettumanoor town, an attempt was made to collect food samples from the suspected food served at the restaurants. But no samples could be obtained since much time had elapsed from the time of intake . All the private practitioners were alerted and were given instructions to report any case of ADD. The medical officers, staff nurse and interns of the PHC was briefed and kept on high alert about any ADD especially those fitting the case definition. The IDSP

surveillance system was utilized to identify ADD cases fitting the case definition seeking treatment in government and private hospitals in the nearby Panchayats

RESULTS

Descriptive epidemiology

A total of 52 trained health workers including Junior Public Health Nurse (JPHN) , Junior health inspectors (JHI) and ASHA (Accredited Social Health Activist) conducted a house to house survey for five days. 1800 individuals living in 220 households were covered by the survey.A total of 8 cases of acute watery diarrhea were identified in the five days .All the patients presented with acute watery diarrhea with no history of vomiting and no signs of dehydration .

Table 1 Age distribution of the Cholera cases

Age group	No	%
< 5 years	-	-
6 to 20	2	25%
21 to 45	6	75%
>45 years	-	-
Total	8	100%

Table 2 Gender distribution of the cholera cases

Gender	No	%
Male	7	85.8%
Female	1	14.2%
Total	8	100%

A total of 134 people among the surveyed population gave a history of intake of food or buying food from the restaurants in the town area. All the affected individuals had taken food from one of the two restaurants. Food outlet specific attack rate was calculated.

Table 3 Food outlet specific attack rates

	Population	No of cases	Attack rates
Restaurant A	8	2	25%
Restaurant B	18	6	33.3%
Others	108	0	0%
Total	134	8	58.3%

Time distribution

Out of the eight cases of cholera reported, all cases occurred on the first three days. An epidemic curve was constructed with days and no of cases.

Epidemic curve

Spot map

Because of the rapid urbanisation, the maps of the Ettumanoor town which were available were outdated. A map was constructed including the recently opened food outlets and a spot map was drawn including the sources of water.

Environmental inspec

Both the restaurants which were suspected to have been involved in the outbreak were inspected. Both had permanent employees and contract employees. No individual working in these restaurants suffered from any diarrheal disease in the recent past. The sanitation of the kitchen, washing area, storage and the hotel premises were unsatisfactory in both the restaurants. Both the restaurants lacked a sanitary latrine.The sources of water for both the restaurants were wells. The wells did not satisfy the criteria for a sanitary well. Water samples were drawn before chlorination from both the restaurants in sterile containers. One restaurant had a license procured from the Panchayat and the other did not have any license . Both the restaurants had permanent employees and contract employees. The permanent employees were certified food handlers while the contract employees had no certificates. No individual working in these restaurants had suffered from any diarrheal disease in the recent past. Since the time of consumption of food was more than 24 hours before the reporting and business was closed for the day no food samples were found in the restaurants.

Control measures:

The district and state authorities were notified and all districts in the states were put on alert . . Official communication regarding the outbreak was communicated to Panchayat , Public Works Department , Water Authority, Department of Food safety ,Education Department Labour Department and registered Merchant's Association All the food outlets in the PHC area was inspected and those not meeting the standards prescribed by the FSSA act was either closed down or given notice .

Intensified surveillance on ADD and line listing of ADD was done on a daily basis. All hospitals and General practitioners including those coming under AYUSH both in the private and government sectors were alerted. Daily reporting of ADD cases from all was ensured.Drinking water surveillance was intensified and ten water samples were collected from selected sources and send to Regional Analyst Lab. Sources of water for the water supply system under the Water Authority including the pumping stations were inspected. Well chlorination and distribution of chlorine tablets was conducted by the heath workers on a daily basis.IEC activities included and dissemination of information regarding ADD in Local newspapers, radio, local television channels. Other activities were distribution of pamphlets, mike announcement, announcements in places of worship and posters .

DISCUSSION

The epidemic curve suggests a common source epidemic which failed to be propagated in the community. The epidemic curve is not typical of a cholera outbreak because the curve has a peak and fall without any further propagation. This might be because of the immediate response to the outbreak. All the food outlets in the town area were inspected within twelve hours of the reporting the outbreak. The water sources were chlorinated. Both restaurant A and B were closed down. The food outlets including street vendors which did not meet safety standards were also closed down. This would have prevented further propagation of the infection. The attack rates among individuals who consumed food and water from both the restaurants , Restaurant A (25%) and Restaurant B (33.3%) suggest that the source of infection could be food or water consumed at these restaurants. But the water samples from both the restaurants tested negative for cholera. Samples of food and raw ingredients which could be the other possible source could not be collected. Isolation of cholera vibrio from the food or any raw ingredient would have supported the hypothesis but since samples were not available it could not be done.

Transmission of cholera through raw vegetables have been reported else were. Cabbage irrigated with raw waste water has also caused outbreaks of cholera. The spot map revealed clustering of cases in the two restaurants. The restaurants are almost a kilometre apart and has different sources of drinking water .There is no water supply system or sewage system common to both the restaurants. This again

VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

suggests the source of infection to be a food item served or a raw ingredient which has been sourced from a same supplier by both the restaurants. The sanitary conditions in many outlets including the suspected restaurants were unsatisfactory. There is no system to ensure certification of food handlers who are contract workers in restaurants and street vendors who can very effectively transmit food borne infections.

CONCLUSION

The epidemic was a single exposure without any propagation. As evident from the attack rates the food consumed from the restaurants could be the source of infection. Since samples were not collected this could not be proved by isolation of cholera vibrio from food .The control measures were highly effective since the outbreak was contained within three days of reporting of the index case. However the sanitary conditions of the food outlets in the area was not satisfactory. Hence there should be increased focus on food safety surveillance, licensing of hotels, and certification of employees for prevention of further outbreaks

AKNOWLEDGEMNTS

I express my gratitude to staff of PHC Ettumanoor and Faculty of Department of Community Medicine , Government Medical College ,Kottayam

REFERENCES

1. Cholera [home page on the internet]. Available at: http://www.who.int/mediacentre/factsheets/fs107/en/ index.html; 2011 [updated October 2017/cited 16.02.17
2. John TJ, Rajappan K, Arjunan KK. Communicable diseases monitored by disease surveillance in Kottayam district, Kerala state, India. Indian J Med Res. 2004;120(2):86–93.
3. Fredrick T, Ponnaiah M, Murhekar M V, Jayaraman Y, David JK, Vadivoo S, et al. Cholera outbreak linked with lack of safe water supply following a tropical cyclone in Pondicherry, India, 2012. J Health Popul Nutr [Internet]. 2015 Mar [cited 2016 Feb 28];33(1):31–8. http://www.pubmedcentral.nih.gov/
4. Kanungo S, Sah BK, Lopez AL, Sung JS, Paisley AM, Sur D, et al. Cholera in India: an analysis of reports, 1997-2006. Bull World Health Organ [Internet]. World Health Organization; 2010 Mar [cited 2016 Sep 25];88(3):185–91. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20428385
5. Kerala GOF, Of D, Services H. Government of Kerala Directorate of Health Services [Internet]. 2013. Available from: http://dhs.kerala.gov.in/docs/spark/ataglance13.pdf
6. K.Park. Park'S Text Book of Preventive and Social Medicine. In: 21 st edit. Bhanot Publishers; 2005. p. 18–20.
7. Kigutha H. Guidelines for cholera control By World Health Organisation (Ed.) [Internet]. Vol. 27, Health Policy. 1993. 197 p. Available from: http://linkinghub.elsevier.com/retrieve/pii/0168851094900833
8. Cholera Epidemic Associated with Raw Vegetables --- Lusaka, Zambia, 2003--2004 [Internet]. [cited 2017 Feb 21]. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5334a2.htm
9. Of cabbages and chlorine: cholera in Peru. Lancet (London, England) [Internet]. 1992 Jul 4 [cited 2017 Feb 21];340(8810):20–1. Available from: http://www.ncbi.nlm.nih.gov/pubmed/1351603