



Original Research Article

An Epidemic Investigation of Cholera Outbreak in Ratanpur Village at Kheroj Primary Health Center of Khedbramha Taluka of Sabarkantha District, Gujarat State, India

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ABSTRACT

A rapid response multidisciplinary team investigated cases and deaths due to cholera at Ratanpur Village and Kheroj Primary Health Center of Khedbramha Taluka of Sabarkantha District. It was observed that out of 57 cases of diarrhoea, 6 were positive for *Vibrio Cholera* by hanging drop method. Out of these cases, 3 died due to cholera and the attack rate was 10.5% for cholera. The children and adults were infected. Studies show that the case-fatality rate in untreated cases is up to 30-50%. The treatment is rehydration and, if applied appropriately, should keep case-fatality rate below 1%.

Key words: Standard case definition, Surveillance, Case-fatality rate, Cholera

INTRODUCTION

Cholera is an acute diarrheal disease caused by toxigenic strains of *Vibrio cholera* serogroups O1 and O139. *Vibrio cholera* O1 belonging to the El Tor biotype is the most common serogroup in India, while the frequency of serogroup O139 has been declining considerably over the past few years. India, which comprises 28 states and 7 union territories, has a total population of 1.15 billion. Nearly two-thirds of Indian population lives in rural areas, where only 28% of households use piped drinking water and 26% of households have access to good sanitation. ^[1] According to *National health profile 2008*; 11,231,039 cases of acute diarrhoea were recorded in 2008. Out of

these, only 2,680 were cholera cases and only one death was reported. This represents a 24% increase in the number of cases reported with respect to the previous 5-year period (2000–2004). ^[2] In 2009, the number of cases of cholera reported to WHO increased by 16% when compared with 2008. ^[2] Human beings are the only host in cholera. It affects all ages and both genders. In endemic regions, children are more susceptible. Natural infection confers effective immunity. Chronic carriers are rare. Poor sanitary conditions facilitate the growth and transmission of *Vibrio Cholera* through faeco-oral route and rarely through direct transmission, because the incubation period is very short (2 hours to 5 days) so

the number of cases can rise quickly. Period of infectivity from onset of illness is about a week later. Infectivity rate depends on the infective dose. A patient with cholera excretes an average of 107 – 109 vibrios per ml of stool. The common signs and symptoms include abrupt onset of profuse, painless watery diarrhoea with or without vomiting. The stool may have ‘rice water appearance’. If untreated, the patient become dehydrated that may result into death. At least 90% cases are mild and remain undiagnosed. Case fatality rate may range from <1% to 50 %, depends on the effectiveness of the health services. [3] In view of current epidemic, the aims and objectives were to investigate cases and deaths and to provide accurate recommendations based on WHO guidelines. [4]

MATERIALS AND METHODS

Kheroj village is situated near famous religious place Ambaji in Sabarkantha district having more tribal population and hilly area. Ratanpur village is a very small village having around 100 houses. On 6th August, Medical officer

informed the district health authority about the outbreak. After that, Medical College was informed about an outbreak and a multidisciplinary team having an epidemiologist, physician, pediatrician, microbiologist and post graduate students, was formed. After reaching at Ratanpur village, a rapid surveillance (active, house-to-house/passive, PHC/lab) was carried out in predesigned and pre tested proforma from the informants, affected families and village leaders and line listing was done. Help was sought in terms of manpower, intravenous sets and fluids etc. from a neighboring PHC. Beds were arranged for the patients with the help of the villagers. Cases were managed intensively with continuous supervision. District health authorities declared it as an outbreak of acute diarrhoeal disease, and a team of 2 medical officers along with two ambulances were deputed to the PHC round the clock. Daily visit and reporting by health authorities also ensured effective monitoring and supervision of the situation. Stool samples and water samples were collected. Data was collected after verbal consent from informants, affected families and village leaders and analyzed.

RESULTS

Table 1: Verification of diagnosis in different villages in Sabarkantha District

Name of village	Total Population	Total houses	House visited (%)	Water supply		History of diarrhoea
				Well	Hand-pump	
Chagod	1356	221	184(83.25)	1	2	8
Nava mota	1341	255	140(54.9)	2	3	17
Ratanpur	951	100	81(81)	18	14	32(56.14%)
Dhanmahudi	490	110	60(54.54)	2	4	7
Bavalkathiya	428	190	104(54.74)	3	3	4
TotalPHC Kheroj	4566	776	569(73.32)	16	17	47
Village kheroj						10
Total	Population surveyed		3378			57(1.7%)

Out of 776 houses in the community, 569 (73.32%) had been included in surveillance. Total population visited was 3378. Out of which, total 57 (1.7%) had

history of diarrhoea, in which 32 (56.14%) were from Ratanpur village alone (Table 1).

Out of 32 cases in Ratanpur, 10 were men and 22 were women. Female (68.75%) were more than twice affected. The age wise

distribution of these cases is showing in Figure 1.

Table 2: Comparison of diarrhoea cases recorded in previous 3 years in July, August and September at primary health center

Year	July		August		September		Total	
	Fever	Diarrhoea	Fever	Diarrhoea	Fever	Diarrhoea	Fever	Diarrhoea
2009	161	235	151	272	175	173	487	680
2010	140	171	159	213	160	109	399	423
2011	69	77	90	93	40	88	199	258
2012	42	194	20 As on 6 th Aug	103	56	91	118	388

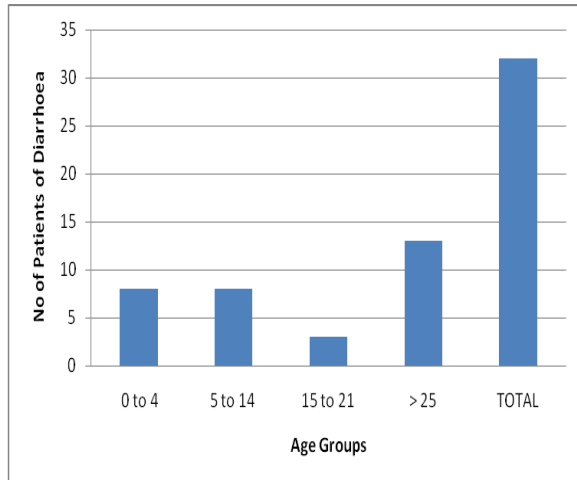


Figure 1: Age wise distribution of diarrhoea in Sukha Amba (Ratanpur village)

A comparison of diarrheal cases in July, August and September month in previous three years revealed in Table 2 that there was increase number of diarrheal cases in month of July and August–2012. The total cases of diarrhoea increased in 2012 as compared to 2011 but decreased as compared to 2009, suggesting an epidemic of diarrhoea. There were three deaths due to cholera (e.g. 5yr boy, 3 yr boy and 70 yr woman) on 2nd August with Case Fatality Rate of 5.26%.

The team undertook the control measures showing in Table 3. However it was not sufficient to control cholera as the well water was highly contaminated with fecal material.

Table 3: Control measures taken by Rapid Response Team at Kheroj

1. Surveillance of affected villages	6
2. Number of Medical Officers	6
3. Number of Para medicals	10
4. Total Cases	
Diarrhoea + Vomiting	41
Only Diarrhoea	52
Only Vomiting	3
Cholera Positive	6
5. Number of Deaths due to Diarrhoea	3
6. Houses Surveyed	81
7. Examination of Water Sample	3
8. Examination of Stool Sample	3
9. Chlorination In Emergencies	8
10. Chlorination of Well	8
11. Chlorination of Tanks	8
12. Orthotolidine Test	0.5 ppm
13. TCL Powder Used	200 kg
14. ORS Packets	2000

DISCUSSION

The case fatality rate showed a somewhat decreasing trend (range: 0.57–0.07). The number of cholera cases and deaths in present study were found to be more (5.26%) as compared to reported at WHO. [5]

The control measures for diseases spread by the faeco-oral route includes, an adequate supply of potable water, improved sanitation and the promotion of good hygienic practices, especially in developing countries like India, remain the mainstay for preventing both endemic and epidemic cholera. The combined efforts in health, family planning and nutrition are effective measures. Major outbreaks of cholera usually result from interplay of factors, such as favorable climate conditions and poor sanitation. Local capacity for improved diagnosis, data collection, compilation and

analysis needs to be strengthened so that vulnerable populations living in high-risk areas may be identified and offered comprehensive control activities.

It has been observed in Bangladesh and Peru that cholera vaccine is safe and confers 85–90% protection for 4–6 months among all age groups. This new vaccine opens up wider possibilities for public-health use in cholera-endemic countries, particularly in Asia, because it is a bivalent O1 and O139 vaccine, has no recombinant B subunit and, thus, does not require the administration of a buffer. [6]

Under the International Health Regulations (2005), official notification of all cases of cholera is no longer mandatory; however public health events involving cholera must always be assessed against the criteria provided in the Regulations to determine the need for official notification. [7]

RECOMMENDATIONS BY W.H.O. [4]

According to the WHO Standard Case Definition, "a case of cholera should be suspected" when,

- In an area where the disease is not known to be present, a patient aged 5 years or more develops severe dehydration or dies from acute watery diarrhoea.
- In an area where there is a cholera epidemic, a patient aged 5 years or more develops acute watery diarrhea, with or without vomiting.
- A case of cholera is confirmed when *Vibrio cholera* O1 or O139 is isolated from any patient with diarrhoea.
- Laboratory confirmation of the first 10-20 cases is essential to ascertain that this is a cholera outbreak. It is important to gather information on:

– Serogroup of *Vibrio* (O1 or O139)

– Antimicrobial sensitivity patterns

Useful Comments for Precautions and Preparedness

- These "pre-position" supplies should include both IV fluids and ORS – most patients can be cured with ORS alone.
- A needs assessment, including the inventory of supplies available and needed, should be completed before the cholera season.
- Health professionals need specific training to treat cholera.
- A plan should be established to achieve the goal of training 90% of the health care workers.
- A good inventory of all water sources, obtained through sanitary surveys, is useful for identifying potential risks of contamination.
- Regular analysis of baseline data (person, place, time) is therefore valuable for adequate preparedness and for efficient monitoring of the cholera situation.
- Acidifying foods with lemons, tomatoes, yoghurt, and fermented milk help to inhibit the growth of *Vibrio cholera*.
- It is important to ensure disinfection of corpses with a 0.5% chlorine solution. For transporting corpses of cholera patients, corpse-carriers should wear gloves; corpses should be carefully wrapped.
- Alert health personnel and hospitals to report increase or clustering cases of diarrhea.
- Arrange random checks for water quality for coliform organisms (faecal contamination in high risk pockets of Kheroj).

Precautions at treatment centers

1. Tetracycline/Doxycycline should be given to cholera cases for 3 days and also to contact cases in family.

2. Universal infection control measures such as face masks, gloves or special staff should be used.

3. Carriers should be followed for 2-4 weeks.

Precautions at home and in the community

1. Bedding, clothing, mattresses should be disinfected by thorough drying in sun light.

2. Disposal of cholera stool is by putting them in a pit latrine or burying them.

Domestic chlorination of drinking water

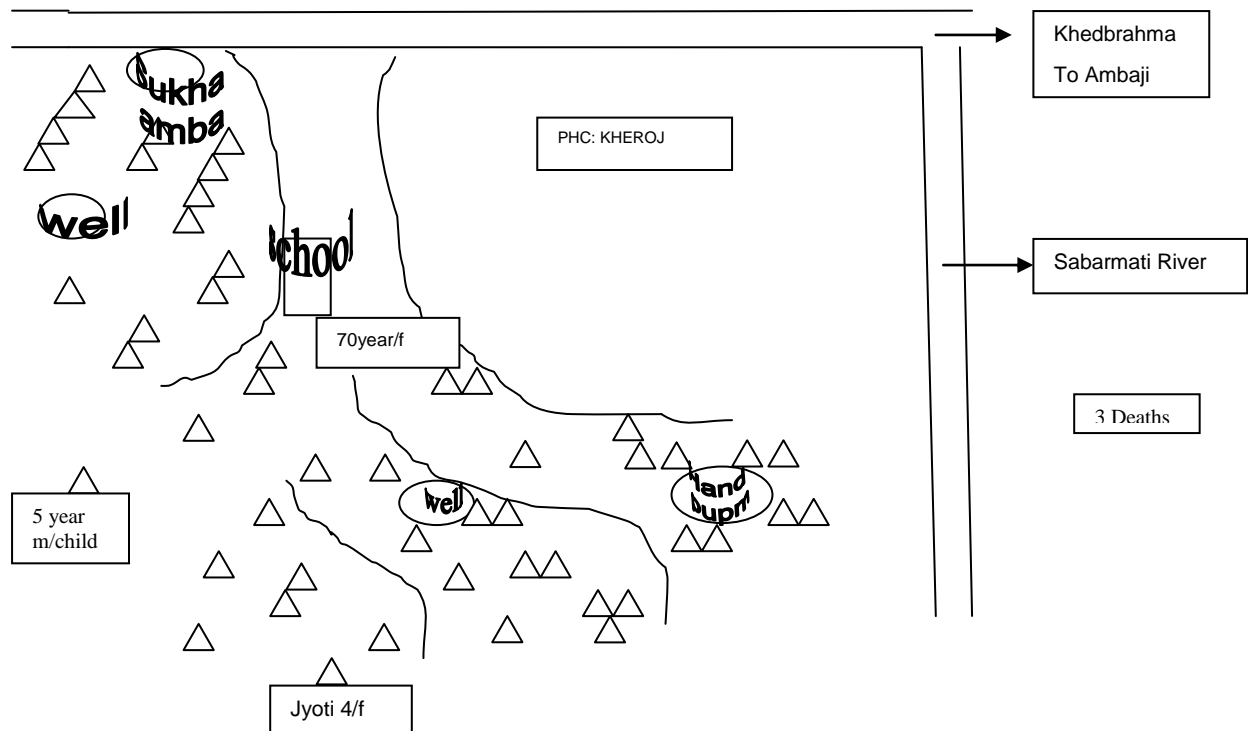
1. Crush commercially available chlorine-releasing tablets.

2. Put in the water container with 20 liters of water.

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Spot map of Sukha Amba (Ratanpur) Ta:Khedbrahma, Dist:Sabarkantha



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