

**ORIGINAL ARTICLE****INVESTIGATION OF A CHOLERA OUTBREAK IN KANPUR VILLAGE OF PANCHMAHAL, GUJARAT****Shroff Bhavesh D<sup>1</sup>, Mazumdar Vihang S<sup>2</sup>**

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**ABSTRACT**

**Introduction:** Diarrhoeal disease outbreaks are causes of major public health emergencies in India. We investigated such outbreak in Kanpur village of Panchmahal district, Gujarat to identify the etiological agent, source of transmission and propose control measures. We also conducted case-control study to identify risk factors.

**Results:** The outbreak was caused by *V. cholera* O1. Cases were not localized to any specific area but scattered in village depending on location of children who had eaten ice-cream from local vendor. Contaminated water was not identified as possible source of the cholera outbreak.

**Keywords:** Cholera, outbreaks, local vendor

**BACKGROUND**

Cholera is a waterborne disease characterized by severe diarrhea. The etiological agent is *V. cholerae* O1 (more recently also *V. cholerae* O139), which colonizes the small intestine and produces an enterotoxin responsible for a watery diarrhea. Without prompt treatment, a person with cholera may die of dehydration in a matter of hours after infection. Cholera outbreaks are generally associated to contaminated food and water supplies.

Until the 19<sup>th</sup> century, cholera was confined to the Indian sub-continent<sup>1</sup>. There, cholera outbreaks are seasonal with one or two peaks per year<sup>2</sup>. From this region, cholera has spread throughout the world seven times since 1817<sup>3</sup>. The last pandemic began in 1961 in Indonesia, spread through the Asian continent during the 60's, reached Africa in 1970<sup>4</sup> and Latin America in 1991.

**THE OUTBREAK**

In May 2010, an outbreak of diarrhoea was reported from Kanpur village of Panchmahal district (Gujarat). A Rapid Response Team (RRT) was constituted from Medical College, Baroda to investigate the reported outbreak.

Kanpur had a population of 1950 with approximately 170 Households (HH). Most of the houses were scattered and people used hand pump water for drinking purpose. There were total 29 hand-pumps, there being at least one hand-pump among 5-7 households.

As per the reports of Block Health Officer (BHO) and Epidemic Medical Officer (EMO) of the area, 6 cases of nausea and 2 cases of diarrhea and vomiting were reported and hospitalized at CHC Goghamba and simultaneously, surveillance to find other cases was started. During surveillance, a case of single episode diarrhea was reported in a 12 year old female. She had received ORS and Tab Metronidazole (400mg) from the health worker. On the same day, she developed severe diarrhea and vomiting which was continuous in nature,

lasting for 2 hrs. She succumbed within 2 hours while on the way to the doctor.

After discussion with the BHO and the EMO at the CHC, the team headed for Kanpur village. On reaching the village, the team met medical officer of the area who was engaged in surveillance activities. After checking records of surveillance teams, it was found that 3 cases of diarrhea and vomiting had been detected. A map of location all the hand pumps were made. Children who had complaints of diarrhea and vomiting were examined by the pediatrician and their stool samples were collected by microbiologist of the RRT. Three children were referred to the CHC by the pediatrician for treatment.

The team then headed to the house of girl who had died due to diarrhea. Here, after verifying the history, the surrounding area was examined; water that they used for drinking and cooking was checked. The stored grains and food items were also checked. One significant finding in the history was that the deceased had consumed ice cream purchased from a vendor coming to the village. The local people and the health personnel of the area suspected the quality of this ice-cream.

Out of the 742 children of the village, 38 children had consumed ice-products from the vendor. A day after, 15 had developed symptoms, among them one died and 3 had severe symptoms.

A case control study was carried out to find out the responsible risk factor/s for this outbreak. The control group consisted of children who belonged to the same village and were studying in the same class as the patients. Subsequent to enrollment of a case (total 15), eligible controls of the same gender were approached until four control children were individually matched to each case because of the small number of the cases. It was not possible to get suitable controls for one case, so a total of 14 cases and 56 controls were enrolled and the informed verbal consent was obtained.

The study confirmed that ice cream consumption from local vendor was associated with the symptoms of the outbreak since odds of having consumed the ice-cream among symptomatics was 4.23 times that of those non-symptomatics.

It was not possible to obtain the sample of ice-creams, so couldn't specify the responsible type/ flavor of ice cream.

**Table 1:** Distribution of cases and controls based on consumed ice-products

	Cases	Controls	Total
Consumed ice cream	11	26	37
Not consumed ice cream	03	30	33
<b>Total</b>	<b>14</b>	<b>56</b>	<b>70</b>

$\chi^2=4.64$ ,  $p<0.05$

Relative risk = 3.3, odds ratio= 4.23, 95% CI=0.94-21.64

The EMO had also documented similar type of out breaks from other areas of Panchmahal district wherein, 8 cases of similar illness were confirmed to be due to Cholera.

Reports of microbiological examination revealed that of the samples taken by a Rapid Response Team, 2 out of 3 were positive for V cholerae.

#### PREVENTIVE AND CONTROL MEASURES TAKEN:

- Family members of the deceased and other persons of the village were made aware of the reasons of Cholera in the given situation, how it spreads, and importance of general cleanliness and chlorination of water.
- Distribution of chlorine tablets and educating people how to use them was done as well as prophylaxis with Doxycycline was given to family contacts and in neighboring houses when warranted. They were also asked to adopt preventive measures for averting possible contamination of drinking water.

#### CONCLUSION:

- It was concluded from the investigations that this outbreak of Cholera was caused by V. cholera 01 and the source of the infection was the consumption of the locally prepared ice cream. Cases were not localized to any specific area but scattered in village depending on the consumption of the contaminated product.

#### RECOMMENDATIONS:

- It was recommended to halt and prevent the further spread of this outbreak a ban on

local vendor who was selling contaminated ice-products specifically ice-cream. It was also recommended to monitor other producers of similar products as possible potential sources of infection.

- Monitoring of the quality of drinking water also was recommended to be done by sanitation staff.
- Strengthening the surveillance in all villages under the PHC was advised. Local health workers were instructed to be vigilant for unusual occurrences related to health and report them immediately to their superiors.
- Proper disposal and treatment of infected fecal waste and all contaminated materials (e.g. clothing, bedding, etc.) of cholera patients as well as personal hygiene was advised.
- Medical officers were asked examine all suspected cases of diarrhea/ vomiting, and promptly manage the cases. If required, immediate referral to higher centers must be done. Continued surveillance to detect and treat hidden cases in the community was recommended.

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