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Original Research Article

Outbreak investigation of acute diarrheal disease in Palitana urban, Gujarat

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ABSTRACT

Background: Clustering of diarrhoea and vomiting cases were reported in Palitana urban on 22 December 2014. Rapid response team was sent from government medical college, Bhavnagar to control the epidemic.
Methods: A cross sectional study was conducted in Palitana urban for acute diarrheal disease epidemic investigation. Secondary data obtained from health staff and analysed to have clear picture of epidemic. Necessary actions were taken to control it.
Results: Total 390 cases were reported. Out of them 21-30 adult age group was more affected as compared to other age groups. Attack rate of diarrheal disease was more in male population (85.61%) as compared to female population (40.99%).Over all attack rate was 64.19%.
Conclusions: It was an acute diarrheal disease outbreak due to mixing of drinking water with polluted water.

Keywords: Attack rate, Acute diarrheal disease, Outbreak

INTRODUCTION

Diarrhoea is defined as the passage of loose, liquid or watery stools more than three times a day.[1] Diarrhoea may be due to various reasons, in developing countries its mostly infectious origin. Because of the existing environmental, socio-economic and demographic conditions in developing countries like India, this micro-organism flourishes.[2] This has contributed more deaths not only in adults but more in children too, accounting for 9 per cent of all deaths among children under age 5 worldwide in 2015.[3] A significant proportion of diarrheal disease can be prevented through safe drinking-water and adequate sanitation and hygiene.

On the date 22 December 2014, there was reporting of 102 diarrheal and vomiting cases at health facility, Palitana. It was reported as clustering of cases so no primary or index case was found. Local health team had immediately started to treat the cases and activated diarrheal surveillance with the help of 15 surveillance team in the field. The main affected areas were pachas Varia, Hawamahal, Fakirwado, Shaktinagar, Lakshmandham and Vrundavan society from palitana taluka having population about 6200,. It was the 5th day of epidemic when rapid response team was called for investigation.

On 26th December, 2014 RRT of GMC, Bhavnagar has visited the affected area. The RRT consisted of one public health expert, one physician, one paediatrician, one microbiologist, four residents and one laboratory technician.

METHODS

It was a cross-sectional study done as part of rapid response team which was sent to Palitana area on the date 27th December 2014. Total fifteen surveillance team have done house to house surveillance on daily basis. The secondary data obtained from them were entered and analysed in Microsoft Excel.

OPD base case assessment and treatment were given by physician and paediatrician.

Sanitary survey

Rapid assessment of sanitary and environmental condition was done by public health expert.

Microbiological survey

Water samples

Total three samples were collected from different sources of affected area. All samples were taken to check water quality but sample were treated with chlorine (super chlorinated as measure to prevent further spread of disease) so they were in acceptability range.

Stool samples

Five stool samples were taken to know the micro-organism.

RESULTS

Figure 1: People drawing water directly from municipal main water supply pipe. Waste water drainage mixing with it.

Insanitary conditions, leaking of pipes of water and mixing of drinking water with polluted water in major pipes were main findings. Water supply in that area was provided every alternate day. People were using flexible pipes for drawing water illegally from the municipal lines. The municipal pipes as well as these flexible pipes were leaking at many places. The waste water from the households was getting mixed with this water through these leakages. All five stool samples were found positive for microorganism (*E. coli*).

Other findings were given below.

Table 1: Age wise distribution of acute diarrheal disease cases.

Age group (in years)	Male	Female	Total
< 1	0	0	0
1-4	3	4	7
5-10	21	5	26
11-20	24	15	39
21-30	98	59	157
31-40	102	24	126
41-50	14	10	24
51-60	5	2	7
≥ 60	9	3	12
Total	276	122	398

Total 390 cases were reported. Out of them 21-30 adult age group was more affected as compared to other age groups.

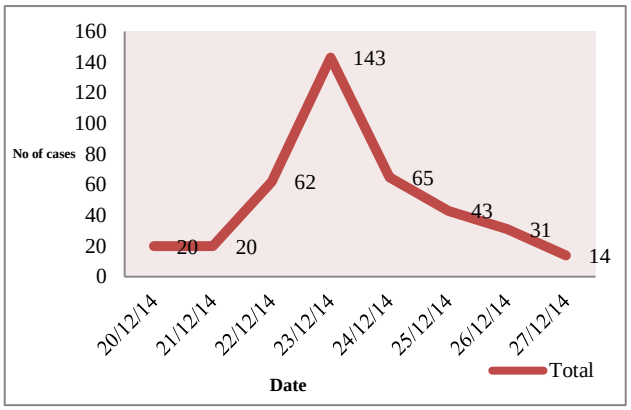

Figure 2: Epidemic curve showing acute diarheal disease cases by date of onset.

Table 2: Sex wise attack rate of acute diarrheal disease cases.

Sex wise distribution	No. of ADD cases	Sex wise population	Attack rate (%)
Total male cases	276	3224	85.61
Total female cases	122	2976	40.99
Total cases	398	6200	64.19

Whole population of affected area was surveyed (6220). Attack rate of diarrheal disease was more in male population (85.61%) as compared to female population (40.99%). Over all attack rate was 64.19%.

As Figure 2 showing the epidemic begun on date 20th December 2014, started increasing number of cases afterward. Maximum cases were reported on 23rd December 2014 and then epidemic started to decline.

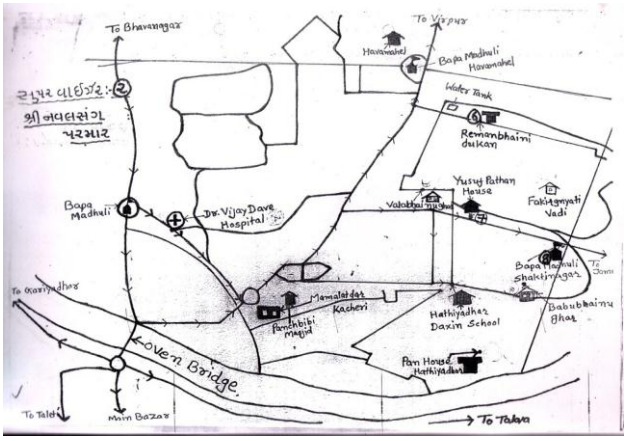

Figure 3: Spot map showing acute diarrheal cases distribution.

Based on active cases search and spot map, main affected areas were 50 Varia, Hawamahal, Fakirwado, Shaktinagar, Lakshmandham and Vrundavan society from palitana.there was a common water supply system which was found leaked and mixing with the drainage water.

DISCUSSION

According to various data, Gujarat has reported many acute diarrheal disease outbreaks in recent past years.[4-6] There were various causes f or these epidemics to occur like open air defecations, disposal of sullage in an open space and problems to get safe drinking water.[5,6] Overall the safe and potable water is contaminated through one or another reason was the main culprit in acute diarrheal disease outbreak. In our epidemic the major age affected was 21-30 years of age while other epidemics have different age groups were affected like infants, 6-17 years etc.[5,6] Overall male were more affected then female in our study (AR=85.61%), similar findings were there in a study from Gujarat.[5]

The epidemic built up in few hours and continued up to 4-5 days, after the control measures the cases started to fall, it was similar to other studies showing common source epidemic pattern.[5-7]

CONCLUSION

It was an acute diarrheal disease outbreak due to polluted drinking water.

Most probable reasons for polluted water was leaking municipal pipes of water supply, illegal water connections, mixing of waste water with drinking water lines and the municipal tank without proper lids and regular cleaning.

All the necessary actions were taken and further recommendations were suggested.

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