ijcrr
Vol 04 issue 09
Category: Research
Received on:10/02/12
Revised on:27/02/12
Accepted on:17/03/12

GASTROENTERITIS OUTBREAK INVESTIGATION IN KURUGOD VILLAGE, KARNATAKA

T Gangadhara Goud, Bellara Raghavendra, Ramesh .K, Sameena A R B, Aravind Karinagannanavar

Department of Community Medicine, VIMS, Bellary

E-mail of Corresponding Author: bellararaghu@gmail.com

ABSTRACT

Background: Outbreaks of gastroenteritis are common in India. Most of the gastric infections increase due to humid weather condition, which in turn facilitates bacterial proliferation. Gastroenteritis continues to be transmitted in environments characterized by inadequate water supply and poor sanitation. **Aim**: 1) To find the source of infection 2) To propose control measures. **Materials and methods**: On 10th February 2010, Kurugod village reported a cluster of gastroenteritis cases. A case of gastroenteritis was defined as occurrence of more than 3 loose/watery stools and vomiting. Then our team searched for cases of gastroenteritis in that village by house to house survey and inspected the sanitation and water supply system. We collected water specimens from the affected areas for laboratory investigation. **Results**: The outbreak started on 10th February 2010, peaked on 17th and lasted till 20th February 2010. Total 245 cases were found in that village, out of that 230 cases of were reported in Kurugod A (attack rate: 2.21/1000, no deaths). The attack rate was highest among children aged 0-5 years (5.06/1000) and females were more affected (2.59/100). Water analysis was done from 11 different places of Kurugod area, the reports confirmed that water was unfit for drinking and chlorine was totally absent in 6 water samples of Kurugod A. **Conclusion and Recommendation:** This outbreak was due to contaminated water supply. To prevent recurrences in the future, we recommended that tanks should be cleaned and chlorinated periodically.

Keywords: Outbreak, gastroenteritis, water contamination, Control

INTRODUCTION

Gastroenteritis commonly known as stomach flu is an inflammation of the gastrointestinal tract, caused by common viruses, bacteria and parasites. Infection may lead to acute gastroenteritis, cholera and even viral hepatitis. The term gastroenteritis is most frequently used to describe acute diarrhea. It is not strictly accurate because it doesn't give an indication of the causative organism, partly because of lack of laboratory services, and partly because it is impossible and economically unjustifiable to confirm each case of diarrhoea by laboratory examination[1]. Gastric problems follow a seasonal trend, most of the gastric infections increase due to humid weather condition, causing the bacteria to proliferate more rapidly spoiling the food article and water and thus, increasing the risk of infection. Gastroenteritis continues to be transmitted in environments characterized by inadequate water supply and

poor sanitation. To control outbreaks, WHO recommends emergency interventions, including excreta disposal, sanitary measures and water quality monitoring[2, 3]. However, Gastroenteritis persists in India, including in Karnataka, Tamilnadu, Andhra Pradesh. Kurugod is a village located in Bellary district, Karnataka state. On 10th of February Kurugod Community Health Centre reported a sudden increase in gastroenteritis cases. We investigated this cluster to identify the source of transmission and to propose control measures.

MATERIALS AND METHODS

On the 10th February we got a phone call from District Health Office that there is a gastroenteritis outbreak in Kurugod. It is a village with geographical coordinates of 15° 20' 0" North, 76° 51' 0" East and 28 kilometres from Bellary. A rapid response team from VIMS, Bellary went to Kurugod. First we went to health facility and did line listing of all the cases and prepared a spot map. The index case was of a 3 year old female child who had gastroenteritis reported on February 10th morning at around 6 am. Then we entered the field area; a case of gastroenteritis was defined as the occurrence of three or more episodes of loose stools and at least one episode of vomiting.

Kurugod village is divided into two geographical areas, Kurugod A and Kurugod B. Kurugod A has 10363 populations, Kurugod B has 10045 populations. With the help of predesigned, semi-structured questionnaire we did a house to house survey and collected information regarding date of onset, age, sex and place of residence, occupation and also information on drinking water, drainage system and any recent common events attended by the household members. Cholera outbreak was ruled out by doing Hanging drop preparation. We calculated attack rates with respect to age, sex and ward (the local geographic sub-division) using projected, standardized 2010 population estimates. The clustering of cases was found in Kurugod A where people consumed water supplied from a water tank situated uphill near the dwelling place. This led us to suspect the source of outbreak. We inspected the water tank, water pipelines, other sources of water supply, the drainage system and the sewage lines and collected water specimens from different wards and sent them for water quality testing.

RESULTS AND DISCUSSION

In our study we found that more than one third of the cases (36.5%) were in the age group of less than 10 years and females (57.9%) were more affected compared to males (42.1%). This may be due the fact that both women and children will be present in the household most of the times and thereby more chances of exposure to the source of infection (tap water) and more over children are more susceptible for the infection due less immunity compared to adults (Table I). In India diarrhoeal disease is major public health problem among children under the age of 5 years. During 2005, about 1.07 million cases of acute diarrhoea were reported in India with 2040 deaths[4]. But the actual incidence must be many folds. Since the advent of National Diarrhoeal Disease Control Programme, it has made a significant contribution in averting deaths among children under the age of 5 years, which was evident in our study where there was no mortality[5].

Table I:

Demographic profile of Cases in Kurugod A		
Age (In years)	**Frequency(n=230)**	**Percentage**
0-5	58	25.2
6-10	26	11.3
11-20	43	18.7
21-30	35	15.2
31-40	28	12.1
41-50	18	7.8
Above 50	22	9.6
Sex		
Male	97	42.1
Female	133	57.9
Occupation		
Profession	3	1.3
Farmer	33	14.3
Skilled	8	3.4
Semiskilled	1	0.4
Unskilled	47	20.4
Unemployed	138	60

Most of the cases had a habit of open air defecation (89.5%), no household purification of water (95.2%) and in 90.4% of the cases the source of drinking water was from tap water (Table II). This finding highlights the importance of improved water supply, excreta disposal, domestic and food hygiene. Without an adequate supply of clean water it is extremely difficult to promote personal and domestic hygiene. Simple hygienic measures like hand washing with soap before preparing food, before eating, before feeding a child, after defecation, after cleaning a child who has defecated and after disposing of a child's stool should be promoted[6]. Most of the pathogenic organisms are transmitted primarily or exclusively by the faecal-oral route. Faecal-oral transmission may be waterborne, food borne or direct transmission which implies an array of other faecal-oral routes such as via fingers or fomites or dirt which may be ingested by young children[7].

Table II:

Distribution of cases based on household practices		
Source of drinking water	**Frequency (n= 230)**	**Percentage**
Tap water	208	90.4
Open well	3	1.3
Bore well	5	2.1
River	2	0.8
Others	12	5.2
Method of household purification of water		
No	219	95.2
Filters	6	2.6
Boiling	5	2.1
Personal hygiene		
No Toilet facility	206	89.5
No hand wash before eating food	28	12.1
No hand wash after toilet	25	10.8

Among 230 cases of Kurugod A, the predominant symptoms were loose stools 219 (95.2%), vomiting 182 (79.1%), abdominal cramps 97(42.1%) and 66 (28.6%) had fever (Table III).

Table III:

Clinical profile of cases in Kurugod A*		
Symptoms	**Frequency (n=230)**	**Percentage**
H/o loose stools	219	95.2
H/o Vomiting	182	79.1
H/o pain abdomen	97	42.1
H/o fever	66	28.6

*multiple answers

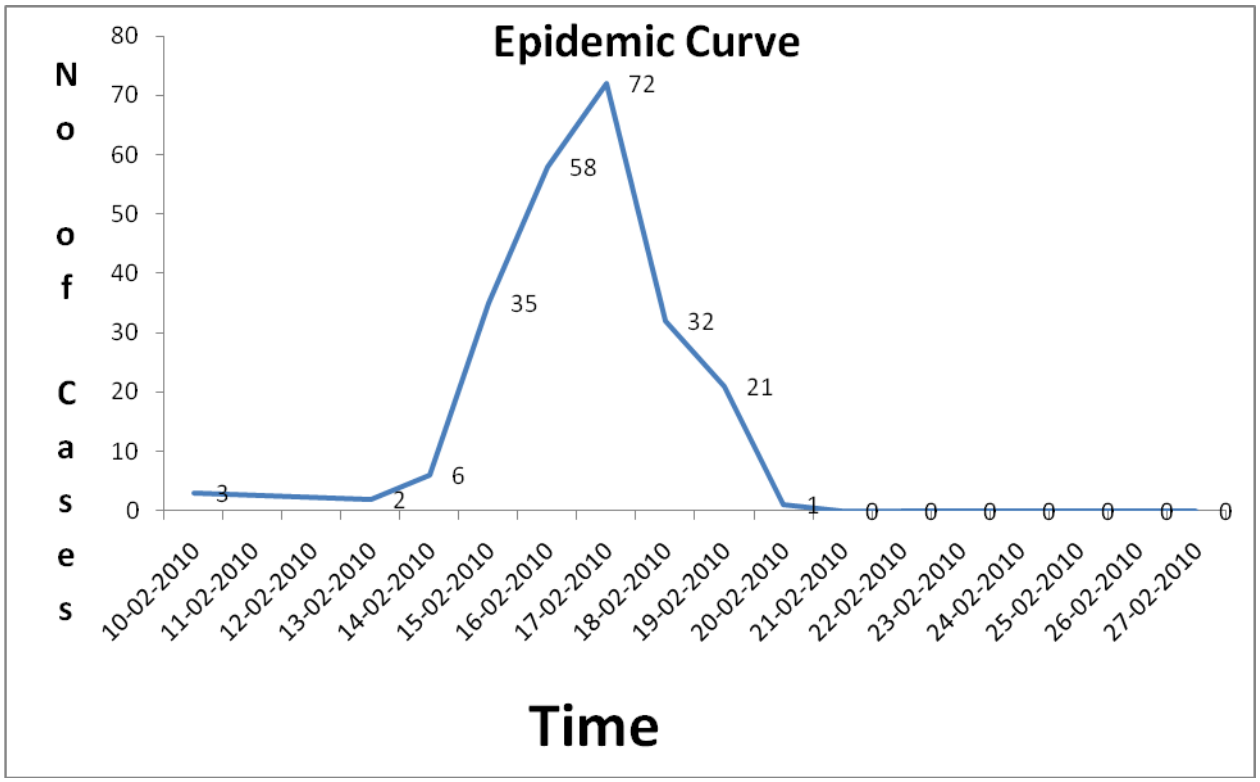
We identified 245 cases, out of which 230 cases of gastroenteritis were from Kurugod A area and 15 cases were from Kurugod B area. The attack rate in Kurugod A was 2.21% and attack rate in Kurugod B was 0.14% and there were no deaths. The attack rate was highest among the 0–5 age group (5.06/100), females (2.59/100) and in Indranagar (3.8/100), Pinjar colony (2.3/100), Halegode (2.5/100). All these areas got water supply from same tank. Kurugod B with a population of 10045 had only 15 cases (6.2%) (Table IV), where the water supply was from a different tank.

Table IV:

Disease attack rate in Kurugod A			
Locality	**Population at risk**	**Cases (n=230)**	**Attack rate (%)**
Indranagar	1050	40	3.80
Pinjar colony	965	23	2.38
Halegode	945	24	2.53
Ganekal road	921	15	1.62
Goudar oni	750	11	1.46
Kelagal pete	670	10	1.49
Kumbar oni	845	12	1.42
Naik oni	868	13	1.49
Near old police station	905	20	2.20
Others	2444	62	2.53
Sex			
Male	5228	97	1.85
Female	5135	133	2.59
Age(In years)			
0-5	1146	58	5.06
6-10	1171	26	2.22
11-20	2194	43	1.95
21-30	1841	35	1.90
31-40	1451	28	1.92
41-50	1040	18	1.73
Above 50	1520	22	1.44

The outbreak started on 10th February 2010, peaked on 17th and lasted till 20th February 2010 (Graph I). The epidemic curve showed sudden rise and fall with no secondary waves and all cases occurred within one incubation period of disease thereby indicating common source of infection which might have resulted due to contamination of water.

Graph I: Graph showing onset of cases with respect to time



There was no history of common exposure like festival, ceremony or event to be suspected as common source. But however there was a common source of drinking water from the uphill water tank which accounted for the majority of cases. Water analysis was done from 11 different places of Kurugod and among the sampled water, 6 samples report confirmed that water was unfit for drinking and chlorine was totally absent in the water sample and all these 6 samples were from Kurugod A. To address this problem Government of India had started National Water supply and Sanitation Programme in 1954 and in 1972 a special programme known as Accelerated Rural Water supply Programme was launched to supplement the previous programme. Recently Government of India has launched *"Swajaldhara",* in 2002, where the Panchayats and communities have the power to plan, implement, operate, maintain and manage all water supply and sanitation schemes[8]. Here the role of Government has shifted from direct service delivery to that of planning, policy formulation, monitoring and evaluation and partial financial support. On completion of the project gram panchayat or village water and sanitation committee manages the project. But however effective steps must be taken for capacity building of village water and sanitation committee for better implementation of the project.

CONCLUSION AND RECOMMENDATION

The outbreak started on 10th February 2010, peaked on 17th and lasted till 20th February 2010. The attack rate of Kurugod A was 2.21/100 and it was highest among the 0–5 age group (5.06/100) and females (2.59/100). This outbreak was caused by contaminated water from the uphill tank; the same was confirmed by

water analysis report. As a result of our investigation, immediate measures were taken by the authorities like distribution of chlorine tablets to all the households and chlorination of water in uphill tank. Apart from this, the health workers were trained and oriented to help prevent diarrhoea by convincing and helping community members to adopt and maintain certain preventive practices such as clean drinking water, use of plenty of water for hygiene, use of sanitary latrines and personal hygiene and community was educated about the water borne diseases and household methods of water purification. In co-ordination with Village Sanitation Committee a plan for construction of sanitary latrines, regular maintenance of water tanks and replacing leaking water pipelines in a phased manner was chalked out to prevent recurrences in future.

ACKNOWLEDGEMENTS

Authors acknowledge the services of health personnel of Kurugod Community Health Centre and also Bellary district health authority for their support. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

REFERENCES

1. "Surveillance and Control of Acute Diarrheal Diseases", EURO reports serial no 44 Copenhagen, WHO 1981.
2. WHO. Global task force on cholera control. Cholera outbreak assessing the outbreak response and improving preparedness. WHO/CDS/CPE/ZFK/2004.4. Geneva, Switzerland: WHO. Retrieved October 10, 2011. Website: http://www.who.int/healthtopics/cholera.
3. WHO. Global task force on cholera control. First steps for managing an outbreak of acute diarrhoea. WHO/CDS/CSR/NCS/2003.7 Rev.1, Geneva, Switzerland: WHO. Retrieved October 10, 2011. Website: http://www.who.int/healthtopics/cholera.
4. Govt of India (2006), Health Information of India 2005, Ministry of Health and Family Welfare, New Delhi.
5. (Park K, Textbook of Preventive and Social Medicine20th Edition, Banarasidas Bhanot publishers, 2009:194)
6. Park K, Textbook of Preventive and Social Medicine20th Edition, Banarasidas Bhanot publishers, 2009:199
7. R G Feachem (1984) Bull WHO 62 (3) 467-476.
8. Swajaldhara, Department of Drinking Water Supply, Ministry of Rural Development, GOI, Retrieved November 28, 2011. Web site: http://ddws.nic.in / swajaldhara / html / faq.htm.