

## Diarrheal disease outbreak in Muskkot, Gulmi, Nepal – 2019

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### ABSTRACT

**Introduction:** Diarrhea disease outbreak was observed in Dajakot, Musikot Municipality, Gulmi, Nepal on April 2019. This study analyzes the data that were collected during this outbreak.

**Method:** This is a descriptive, cross sectional study defining the diarrheal outbreak at Gulmi in time, place and person.

**Result:** There were 188 patients presenting with symptom of diarrhea from April 23 to 29, 2019. There were 108 (57.4%) female and 80 (42.5%) male. Maximum (69) number of patients were on day 3 of outbreak.

**Conclusion:** The outbreak observed at Musikot in 2019 was due to contaminated source of water.

**Keywords:** diarrhea, epidemic, outbreak

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## INTRODUCTION

Diarrhea disease outbreak was observed in Dajakot, Musikot Municipality, Gulmi, Nepal on April 2019.<sup>1</sup> Following an increased number of cases which started from 23<sup>rd</sup> April 2019, a rapid response team was deployed by Health office, Gulmi on 25<sup>th</sup> April 2019. This was followed by deployment of a medical team from Gulmi hospital on 26<sup>th</sup> April 2019. The medical team managed patients while some were referred to Gulmi hospital. The diarrhea was controlled on 29<sup>th</sup> April 2019. This objective of this study is to analyze the data that were collected during this outbreak. This will serve as baseline data for further study and planning.

## METHOD

This is a cross sectional descriptive study looking into the records and important documentation produced during the outbreak (April 23 to 29, 2019). Following documents were available for analysis: patient's registry which had patient name, age and sex; record of the patient who were referred to Gulmi hospital; reports of water samples collected from the source; report of rectal swab sent from four patients; minute of a meeting held Gulmi Hospital. Water sample and rectal swabs were sent to National Public Health Laboratory which is a national reference laboratory of Nepal.

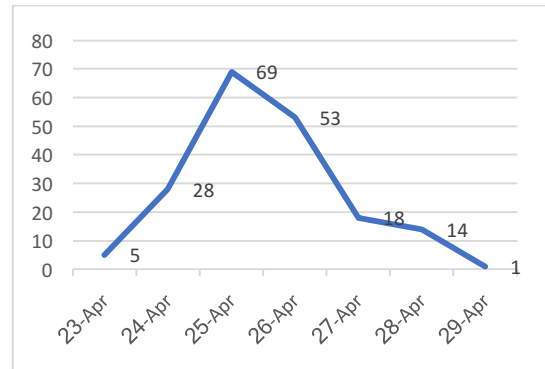
## RESULT

Total 188 patients presented with diarrhea, out of them 10 (5.31%) patients were referred to Gulmi Hospital. Nine of those patients were discharged after recovery while one patient was referred to higher center as the patient had acute kidney injury. There were 108 (57.4%) female and 80 (42.5%) male. Maximum (69) number of patients were on day 3 of outbreak (Figure 1).

**Table 1. Patient in different age group (N=188)**

Age	Number
Less than 5	8
5 to 15	40
15-50	100
50-65	21
More than 65	19

Water samples were sent from the community, reservoir tank, river ('noorknola') which was the main source and natural tap ('thulapandhera'). Water from all source showed more than 180 coliforms. Rectal swab of four patients were sent for culture, culture from one patient showed *Shigella flexneri*, others had no growth.



**Figure 1: Number of patient with diarrhea per day (n=188)**

## DISCUSSION

The water sample from the different source in the community and reservoir tank showed coliform count more than 180. The source of water to Musikot Municipality is a river called 'noorknola', sample from this river also showed similar number of coliform suggesting that the water quality was not acceptable to drink. The guideline values for microbial quality suggest that, all water directly intended for drinking, treated water entering the distribution system and treated water in the distribution system must not have coliform bacteria in any 100 ml sample.<sup>2</sup> Poor sanitation and sewage control might be the possible cause of this outbreak, though it is not clear on the specific event that triggered this outbreak. Poor water quality, sanitation and hygiene account for some 1.7 million deaths a year world-wide (3.1% of all deaths and 3.7% of all DALY's), mainly through infectious diarrhea.<sup>3</sup>

A study in China suggested a contaminated well water as a common source of pathogen and is common in schools. The same study compared attack rates of outbreaks in rural areas (median, 12.63 cases/100 persons) and in primary schools (median, 14.54 cases/100 persons) were higher than those in urban areas (median, 5.62 cases/100 persons) and in secondary schools (median, 8.74 cases/100 persons) ( $P = 0.004$  and  $P = 0.013$ , respectively). *Shigella*, pathogenic *Escherichia coli*, and norovirus were the most common pathogens. Boys tended toward higher attack rates than girls (sex-specific attack rate ratio, 1.13; 95% CI, 1.00–1.29,  $P = 0.05$ ).<sup>4</sup> However in our study, females were affected more (57.4%) than male, common in 15-50 years which is not school going groups. In our study, one rectal swab showed *Shigella flexneri*.

Shigellosis is a clinical syndrome caused by invasion of epithelium lining the terminal ileum, colon and rectum. It can manifest from acute watery diarrhea to fulminant dysentery.<sup>5</sup> In 2015 outbreak of diarrheal illness caused by *Shigella flexneri* was observed in American Samoa affecting 280 children.<sup>6</sup> Similar outbreak was reported in China where 28 children were affected.<sup>7</sup> However, in our case it is not clear whether the outbreak is because of shigella or some other organism.

Mobilization of rapid response team (RRT) team was done quickly. This was one of the important step in managing outbreak. In Nepal RRT are guided by the 'RRT interim guideline' which mandates RRT to verify the event, formulate case definition, identifying mode of transmission, preparing line list to identify the disease syndrome, prevent spread of infection and treatment of the case.<sup>8</sup> Mobilization of RRT has been seen effective nationally and internationally in various outbreaks.<sup>9,10</sup>

## CONCLUSION

The outbreak observed at Musikot in 2019 was due to contaminated source of water. Necessary preparedness and mitigation will help prevent outbreaks in future.

## REFERENCES

1. Subedi, S.L., *Diarrhea outbreak in Gulmi village brought under control*, in *my republica*. 2019, Republica network: Kathmandu. available at: <https://myrepublica.nagariknetwork.com/news/diarrhea-outbreak-in-gulmi-village-brought-under-control/>
2. Organization, W.H., *Guideline for drinking water quality*. 2017, World Health Organization. p. 149. available at: <https://apps.who.int/iris/bitstream/handle/10665/254637/9789241549950-eng.pdf;jsessionid=63338AF6ECDD596D55540C1600AFD24F?sequence=1>
3. Ashbolt, N.J., *Microbial contamination of drinking water and disease outcomes in developing regions*. *Toxicology*, 2004. **198**(1-3): p. 229-238.
4. Ding, Z., et al., *Infectious diarrheal disease caused by contaminated well water in Chinese schools: A systematic review and meta-analysis*. *Journal of epidemiology*, 2017. **27**(6): p. 274-281.
5. Kotloff, K.L., et al., *Shigellosis*. *The Lancet*, 2018. **391**(10122): p. 801-812.
6. Painter, J.E., et al., *Outbreak of Diarrheal Illness Caused by Shigella flexneri—American Samoa, May–June 2014*. 2015.
7. Shen, H., et al., *An outbreak of shigellosis in a Children Welfare Institute caused by a multiple-antibiotic-resistant strain of Shigella flexneri 2a*. *Journal of infection and public health*, 2017. **10**(6): p. 814-818.
8. Nepal, G.o., *RRT interim guideline*, E.D.C.D. division, Editor. 2018.
9. Taylor, S., *Student Outbreak Response Team*. 2018.
10. Landgren, J. *Insights from an ethnographic study of a foreign response team during the EBOLA Outbreak in Liberia*. in *ISCRAM*. 2015.