



## Protracted Cholera Outbreak in Asunafo North Municipal, Brong Ahafo Region, Ghana, 2014

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### Abstract

**Introduction:** Cholera is an acute diarrheal infection of the intestine caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae* O1. Ghana was hit by a severe cholera outbreak in 2014. Brong Ahafo was also severely affected by the nationwide outbreak. The Asunafo North Municipal was among the districts which were affected by the outbreak.

**Methods:** The study was descriptive secondary data analysis. Microsoft EXCEL 2007 was used for the analysis. Variables such as sex, age groups, date of onset and sub district distribution were analyzed by the use of tables and graphs. Data was extracted from case based forms, Preliminary report and line list.

**Results:** A total of 110 cases with 19 confirmed were recorded during the period of August to December, 2014. The case fatality rate was 2.7% and the proportion among males and females was 0.9:1.16 (5/59). The age group with the highest incidence were 0-4 years (12 cases) and the lowest age group was 15-19 years (5 cases).

**Conclusion/Recommendations:** Protracted propagated outbreak was observed, Cases were more among males and the most vulnerable group were people aged 15-29 years.

Asunafo North District should conduct periodic trainings for health staff to equip them on how to analyze data and manage cases to avoid nosocomial infection.

**Keywords:** *Vibrio Cholerae*; Sporadic; Protracted; Propagated

### Introduction

Cholera is an acute diarrheal infection of the intestine caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae* O1 [1,2]. The disease is characterized by severe watery diarrhea with vomiting and severe dehydration [3]. It has been estimated that about 75% of people infected with *Vibrio cholerae* do not develop any symptoms, although the bacteria are present in their faeces for 7–14 days after infection and are shed back into the environment, potentially infecting other people [4]. The mode of transmission of Cholera is through ingestion of food or water contaminated with fecal material. Transmission is therefore closely associated to poor environmental management due to water and sanitation issues.

Even though Cholera remains a major public health problem and affect primarily developing world populations with no proper access to adequate water and sanitation resources, the good news is that about 80% of cholera cases can be treated using only Oral Rehydration Salts (ORS) [5].

According to Ali, *et al*, an estimated 2.86 million cholera cases (uncertainty range: 1.3m-4.0m) occur annually in endemic coun-

tries. Among these cases, there are an estimated 95,000 deaths (uncertainty range: 21,000-143,000) [6].

Cholera in Africa accounted for about 90% of all cases reported to the World Health Organization in 1990 [7]. Global Health Observatory report shows that in 2016, 132 121 cholera cases and 2420 deaths were reported to WHO worldwide, 54% of cases were reported from Africa, 13% from Asia and 32% from Hispaniola [5].

Ghana was hit by a severe cholera outbreak in 2014, the entire country recorded an estimated number of about 20,199 cases [4].

Brong Ahafo Region was not spared and was also severely affected by the nationwide outbreak. A total of 1035 cases were reported, 550 (53.4%) were males and the rest females [1]. The Asunafo North Municipal was among the districts which were affected by the outbreak.

The Asunafo North Municipal staff did some preliminary analysis which included line listing of cases and weekly epidemiological trends in order to monitor thresholds. This analysis was not detailed enough to give full picture of what transpired with the outbreak in the municipality. Some of the issues that needed to be elucidated

were; pattern of the outbreak, magnitude of the outbreak, source of the outbreak and issues involve in the management of the outbreak and hence the need for the study.

**Methods**

**Study setting**

Asunafo North Municipal is located at the Southern part of BrongAhafo Region and has its capital at Goaso. It is bounded on the East and North- East by Asutifi District, North and North West by Dormaa District., West and South -West by the Asunafo South District.

**Population**

The municipality has a projected population of 136,558 based on the 2010 population census with an annual growth rate of 2.3%.

For easy administration, the municipality has been divided into six sub-municipals namely, Akrodie, Asumura, Goaso, Kasapin, Mim and Ayomso.

There are 251 communities with Goaso as the Municipal Capital.

The most widely practiced religions include Christianity, Islam and African Traditional Religion.

**Occupation/Vegetation**

The inhabitants of the Asunafo North are predominantly farmers, with cocoa being the main cash crop grown. Food crops produced include cassava, plantain and coco-yams.

The municipality is also noted for the production of timber due to the availability of the vast natural forest.

Sub-municipal	Projected Population for 2014		No. of Communities	No. of CBS Volunteers
	Population Growth Rate (2.3%)	EPI Annual Target (4%)		
Akrodie	24,171	967	29	58
Asumura	15,021	601	17	34
Ayomso	13,992	560	24	48
Goaso	22,535	1081	11	22
Kasapin	30,794	1132	34	68
Mim	30,042	1121	17	34
Municipality	136,558	5,462	132	264

**Table 1:** Asunafo North Municipal Projected Population by Sub-Municipals.

**Study design**

The study design employed was descriptive secondary data analysis. The study was basically focused on the analysis of the Asunafo north municipal 2014 Cholera outbreak data. The exact data used in this study was the line list. References were made from the case based forms and the laboratory results.

**Study population**

The study population was basically suspected cholera patients who reported at the various health facilities in the district for medical attention during the outbreak period as captured in the line-listing and case-based and laboratory forms.

**Data analysis**

Variables such as sex, age groups, date of onset, and sub district distribution were analyzed by the use of Microsoft excel and presented in tables and graphs.

**Ethical consideration**

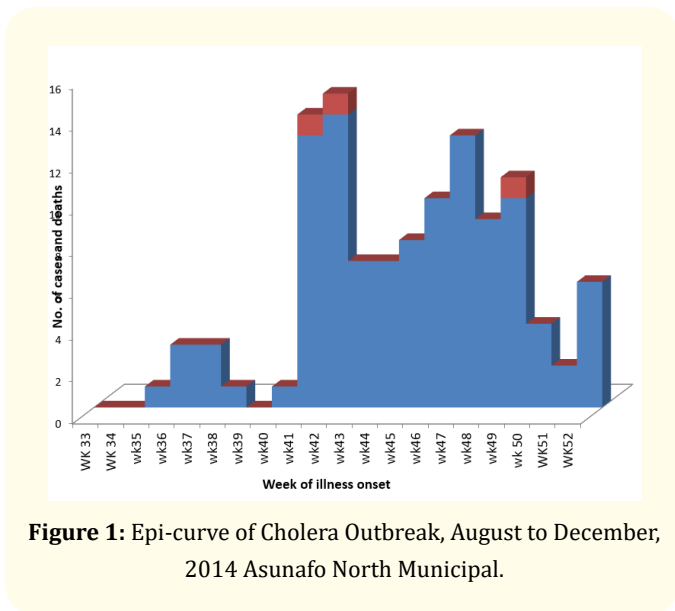
An approval was obtained from Regional Health Directorate and Asunafo North Municipal Health Directorate. The significance of

the study and data collection approach was also made known to them. Identifiers were removed from the data and data collected was secured by use of password.

**Results**

The index case was documented on 31<sup>st</sup> August 2014. The next case after the index case was documented on 2<sup>nd</sup> September 2014 and the cases started trooping in from here. The week of onset with the highest number of cases (41 cases) were recorded in week 42, in 2014. Cases plateau from week 36 to week 37 and declined and increased again astronomically from week 41 to 42 with two fatalities. At this juncture, the cases plateau again from weeks 43 to 44. There was increase again of cases from here with one more death and cases eventually subsided by week 52 ending. In fact, protracted propagated outbreak was observed (Figure 1).

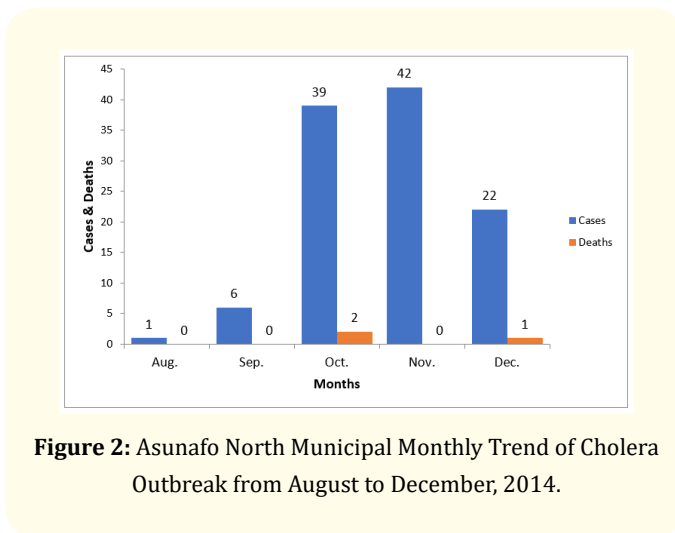
The month in which more cases were recorded was November and the lowest number of cases were been documented in the month of August, 2014. Most of the fatalities occurred in the month of October 2014 (Figure 2).



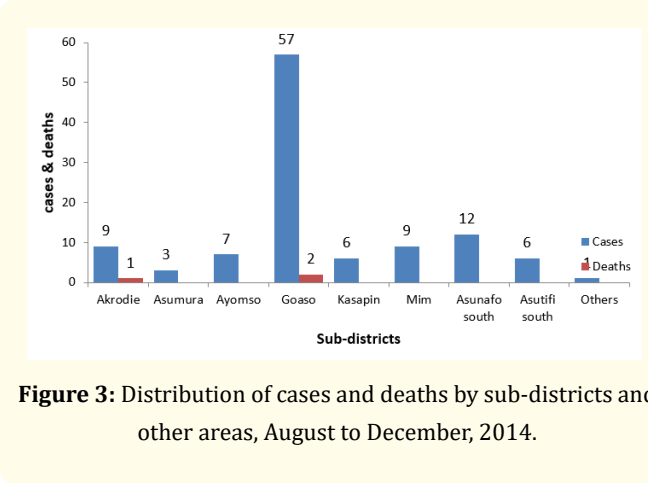
**Figure 1:** Epi-curve of Cholera Outbreak, August to December, 2014 Asunafo North Municipal.

Age groups	Frequency	Male (%)	Female (%)
0-4	12	6 (5.5)	6 (5.5)
5-9	7	1(0.9)	6 (5.5)
10-14	9	3(2.7)	6 (5.5)
15-19	5	2 (1.8)	3 (2.7)
20-24	11	6 (5.5)	5 (4.5)
25-29	10	2 (1.8)	8(7.3)
30-34	9	6(5.5)	3 (2.7)
35-39	7	4(3.6)	2 (1.8)
40-44	7	3 (2.7)	4 (3.6)
45-49	9	4(3.6)	5 (4.5)
50+	24	14(12.7)	10(9.1)
<b>Total</b>	<b>110</b>	<b>51 (46.4%)</b>	<b>59 (53.6%)</b>

**Table 2:** Distribution of cases by age and sex, August to December, 2014.



**Figure 2:** Asunafo North Municipal Monthly Trend of Cholera Outbreak from August to December, 2014.



**Figure 3:** Distribution of cases and deaths by sub-districts and other areas, August to December, 2014.

The total number of cases recorded during this outbreak from August to December 2014 were 110 cases with a case fatality rate of 2.7%. The male to female ratio was 0.9:1.16 (51/59). The age group with the highest incidence were 0-4 years (12 cases) and the lowest age group was 15-19 years (5 cases). Out of the twenty-three (23) suspected cases tested, nineteen (19) turned out to be positive whereas four (4) were negative (Table 2).

Goaso subdistrict was the sub-district which recorded the highest number of cases and deaths (57/2), whereas Asumura sub district recorded the least number of cases (3). There were also cases from Asunafo south district, Asutifi south district and Western Region (Figure 3).

## Discussion

### Case definition

#### Suspected Case

It is most important to ascertain that all patients considered to be cholera cases in fact have the same disease. According to the WHO case definition, a case of cholera should be when:

- In an area where the disease is not known to be present, a patient suspected 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 diarrhoea, with or without vomiting.

### Confirmed case

A case of cholera is isolated from any patient with diarrhoea. Confirmed when *Vibrio cholerae* O1 or O139 [8].

The Asunafo North Municipality recorded its first Cholera case in the municipality on the 31st August 2014 at Goaso Government Hospital. around 4:00pm. The index case was found to be a Ghana Broadcasting Corporation (GBC) worker at Cape Coast. He therefore resides in Cape coast and lives in GBC quarters which is just behind old Government Hospital in Cape Coast. The 45 year old man left Cape Coast for Berekum on Friday 29th August 2014 to visit his wife and children. He further continued his journey from Berekum to Asunafo North on 30th August 2014 to visit a sick brother at Bitre (a community in Asunafo North) where the sickness started. According to him, before embarking on his journey to Brong Ahafo, he had a nice time at GBC Club House at Cape Coast. He took some drinks and meals from the above mentioned restaurant

As part of investigation into epidemic prone diseases which cholera is not an exception, stool specimen was collected on 31<sup>st</sup> August 2014 and was submitted to the Regional Hospital Laboratory for further investigation. The feedback from laboratory was received on Tuesday 2<sup>nd</sup> September 2014 and it was positive. Investigation was conducted at Bitre and Berekum.

Letters were written to notify the Municipal Chief Executive and other stakeholders including all health facilities to be on the high alert. Health education on the local Fm Stations to sensitize the general public was intensified.

The total number of cases recorded in the district during this outbreak from August to December, 2014 were 110 cases with a case fatality rate of 2.7%, this implies that the outbreak was not properly managed [8]. The study revealed that the first death was not initially noticed, it was after the death that the wife also started exhibiting the signs and symptoms of cholera. Her stool sample was collected, tested and confirmed as *vibrio cholera*. It was therefore epidemiologically linked with the husband's death because the husband presented similar signs and symptoms before expiration.

Another set of cases and a death that shocked the investigation team was a nosocomial infection attacking cases number 090 to 094. Investigation proved that case number 091 contracted the infection from the Goaso Municipal Hospital. According to the woman, one week prior to showing signs and symptoms of Cholera, one of her children was hospitalized at Goaso hospital and because there was no bed for her child in the kids ward for the child to be heamo transfused, she and her child were admitted at ward A where the Cholera patients were receiving treatment. She then picked the infection from the hospital and infected her husband and four children back home leading to the death of one of the kids. Nosocomial infections usually fuel disease outbreaks especially Cholera outbreaks [9].

The male to female ratio was 0.9:1.16 (51/59). This is in consonance with the study conducted by N. Lwamga and Opare [1,10]. The age group with the highest incidence were 0-4 years (12 cases) and the lowest age group was 15-19 years (5 cases).

The week of onset with the highest number of cases (41 cases) were recorded in week 42, 2014. Cases plateau from week 36 to week 37 and declined and increased again astronomically from week 41 to 42 with two fatalities. At this juncture, the cases plateau again from weeks 43 to 44. There was increase again of cases from here with one more death and cases eventually subsided by week 52 ending. In fact, protracted propagated outbreak was observed.

The month in which more cases were recorded was November and the lowest number of cases were been documented in the month of August, 2014. Most of the fatalities occurred in the month of October 2014. The high number of cases recorded in the months of October to December was in league with the study by Michael [11].

Goaso sub district recorded the highest number of cases and deaths (57/2), whereas Asumura sub district recorded the least number of cases (3). There were also cases from Asunafo south district, Asutifi south district and Western Region. The record of more cases in Goaso Sub-district was due to the following reasons; Pito seller at Goaso abotanso contracted the infection and infected three of her grandchildren. Since she was still brewing the pito during the outbreak period. The District Epidemic Rapid Response Team met a stiff opposition when attempted to close down the pito bar. The pito bar was eventually closed down through the assistance of the security. At this juncture, cases started emerging from Zongo area and in a particular house where there was a hand dug well, the water source was contaminated and more than 24 cases were being recorded from one house. Chemoprophylaxis was initially administered to confirmed cases contacts and the District Epidemic Management Committee decided to halt prophylaxis to contacts with the view that contacts may develop resistance to the drug. This decision eventually did more harm than good as cases propagated and the outbreak got out of hand.

Goaso weekly Wednesday market is one of the most popular, well attended and well observed market days in the district and for that matter the Brong Ahafo Region. People from Kumasi, Accra and other areas in the country do patronize this market in their numbers every Wednesday for selling and buying. Large gathering with poor environmental sanitation usually facilitates spread of cholera cases [10]. The number of cases Goaso sub district and the district at large recorded during this outbreak could be ascribed to the above mentioned factors.

### Conclusion

There was a number of Cholera cases recorded during the period of the outbreak. Case fatality was on the higher side. Protracted

propagated outbreak was observed. Cases were preponderance among males

### Recommendations

Asunafo North District should conduct periodic trainings for health staff to equip them on how to analyze data and manage cases in such a way that hospital acquired infections could be avoided.

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