

Research Article

Outbreak of Cholera in Ve-a-Gunga, Bongo District of the Upper East Region, Ghana: Impact of Traditional Medicine and the National Health Insurance Scheme

Joseph K. L. Opore^{1*}, John Koku Awoonor-Williams¹, John Kofi Odoom², Baba Awuni², Akugre Juliana³, Michael Otareyoo³, Collins Addo⁴, Dorcas Kyeiwa Asante⁵, Olivia Serwaa Opore⁶

¹Regional Health Directorate, Upper East Region, Ghana Health Service, Private Mail Bag, Bolga-Upper East Region, Ghana.

²Noguchi Memorial Institute of Medical Research Ghana, University of Ghana, Legon, Ghana.

³District Health Directorate, Bongo, Upper East Region, Ghana.

⁴Municipal Health Directorate, Bolgatanga, Upper East Region, Ghana.

⁵Municipal Health Directorate, P.O.Box 107, Akwapim North Mampong, Ghana.

⁶Science Education Unit (Ghana Education Service), P.O. Box M45, Cantonment, Accra, Ghana.

*Corresponding Author:

Joseph K. L. Opore

Email: oporej@yahoo.com

Abstract: The financial cost of seeking formal health care is often the major barrier to accessing health care in poor countries. Consequently, the governments of several developing countries have introduced free health care in an effort to improve their nation's health. There is evidence that suggests that many Ghanaians patronise both indigenous and orthodox health facilities simultaneously. On the 30th of June, 2015, The Bongo District Hospital prompted the Bongo District Health Directorate (DHD) that they had recorded a positive case of cholera from Kantebge's house at Ve-a-Gunga, in the Bongo District of the Upper East region of Ghana. We investigated to verify the diagnosis, identify risk factors and recommend control measures. We conducted a descriptive investigation and active case-search. We defined a cholera case-patient as a person with vibrio cholera isolated from stool sample or epidemiologically-linked to a person with vibrio cholera from the 1st of June to 20th of July at Valley View Sub-district of Bongo district. Stool from case-patients were taken for laboratory diagnosis. We performed univariate analysis by person, place and time using Epi-info version 3.3. The result of the 933 community members, 13 were affected. The overall attack rate was 1.4% (13/933) with a case fatality 15.4% (2/13). The mean age of case-patients was 28.5 years (± 18 SD) with females 69.2% (9/13) mostly affected. Sex specific attack rates were 0.9% (4/447) and 1.6% (9/486) for males and females respectively. The index case was 45yr-old man who reported at the Bongo District Hospital on the 30th of June. He took care of the primary case and also participated in the preparation and burial of the corpse. All the cases were recorded from Ve-a-Gunga, in the Bongo District. *Vibrio cholerae* serotype ogawa was isolated from stool samples. It was a point source outbreak that affected mainly women from the community. It is however hypothesized that the source of infection could be from the beans cake, the water from the Ve-a Dam or the primary case being a vibrio cholera carrier. Two (2) persons died as a result of taking some local concoction due to lack of money and the national health insurance scheme. An outbreak of ogawa serotype cholera with some fatalities was established in Ve-a-Gunga community in the Bongo district of the Upper East region. It was a point source outbreak that affected mainly women from the community. It is however hypothesized that the source of infection could be from the beans cake, the water from the Ve-a Dam or from a vibrio cholera carrier. The need for health care financial protection and avoidance of concoctions in the management of cholera case patients are basic requirements in avoidance of unnecessary death. Prompt outbreak response, case management and education about causes and prevention of diarrhea played a significant role in controlling the outbreak.

Keywords: cholera, outbreak, concoction, health insurance, Bongo District, Upper East region of Ghana

INTRODUCTION

Cholera is an acute infectious illness with profuse watery diarrhea caused by toxigenic *Vibrio cholerae* sero group O1 or O139. The disease can kill within hours if left untreated. There is an estimated 3–5 million cholera cases and 100 000–120 000 deaths due to cholera every year. Ghana has recorded a massive outbreak of cholera since June 2014. Between January

and 28th June 2015, a total of 666 cholera cases including 9 deaths (Case Fatality Rate 1.4) have been reported from 32 districts of the country. Greater-Accra Region contributed 46.4% of the total cases. In the Upper East region, 287 cases with nine (9) deaths due to cholera were recorded in 2014 within 11 out of the 13 districts in the region. No case of cholera had been

confirmed in the Bongo District of the Upper East Region for the past five (5) years until June 2015.

Generally, up to 80% of cases can be successfully treated with oral rehydration salts. Effective control measures rely on prevention, preparedness and response. Provision of safe water and sanitation is critical in reducing the impact of cholera and other waterborne diseases.

Quality of care is a fundamental human right but this assertion is a reality for a section of the Ghanaian society. Inadequate number of the already ill-equipped health facilities coupled with the inadequate trained personnel at the facilities makes traditional medicine and medical practitioners an important part of the health care system in Ghana. The tendency for Ghanaians to patronize both indigenous and modern systems simultaneously also makes the subject an issue of great public health concern [1].

Health insurance schemes have emerged as alternative financing systems globally. The introduction of the scheme in Ghana followed the passage of the National Health Insurance Law, Act 650 in 2003, and its Legislative Instrument, LI 1809 in 2005. The objective of the scheme is to eliminate the financial barrier to accessing care while improving the way domestic resources for health are mobilised and allocated [2].

The financial cost of seeking health care has been shown in observational studies to be a major barrier to access to formal health care, especially among the poorest. Increased utilization of health services through policy is believed to be a major pathway to better health. Remarkably, there is little empiric evidence that changing policy can increase access and in turn results in better health, making the subject an issue of great public health concern [3].

On the 30th of June, 2015, The Bongo District Hospital prompted the Bongo District Health Directorate (DHD) that they had recorded a positive case of cholera in a 45 years old man from Kantebge'shouse at Veagunga with diarrhoea and vomiting at the hospital. The man had sunken eyes, was lethargic and was a referral case from Vea Health Centre.

As a statutory mandated duty and as part of disease outbreak and response, The Bongo District Disease Outbreak and Response Team commenced, on the same day, an investigation into the outbreak. The composition of the team was the District Director of Health Services, a Disease Control Officers, a Physician Assistant and an Environmental Health Officer. On the 4th of July the Regional Disease Outbreak and Response Team was informed of the outbreak and on the 5th of July joined the local team to

support, investigate and control the outbreak with these objectives: to (a) determine the magnitude of the outbreak (b) identify etiologic agent and source of infection, and (c) initiate control and preventive measures.

MATERIALS AND METHODS

We defined a suspected cholera case-patient as a person having acute watery diarrhoea, with or without vomiting. We also defined a cholera case-patient as a person with vibrio cholera isolated from stool sample or epidemiologically-linked to a person with vibrio cholera from the 1st of June to 20th of July at Valley View Sub-district of Bongo district. The demographic and clinical details of the suspected case-patients were collected from the hospital-records, the community and denominator data from the records of the Sub-district. Active case search and interview of the staff and community members were conducted to trace other cases and contacts to identify common source of infection to generate hypothesis.

Data abstracted included age, sex, date of onset, date of presentation at health facility, signs and symptoms and outcomes. We drew a spot-map, constructed an epidemic curve and calculated the attack rates by age-group.

Laboratory Investigations

A total of 5 stool samples from affected community members were tested with the Rapid Diagnostic Test Kits (RDTs) for cholera. Those samples that tested positive were cultured for vibrio. Colonies of growth were evaluated using standard biochemical reactions, and vibrio cholera-positive isolate were serogrouped and serotyped using agglutination tests with commercial anti-sera.

Environmental Survey

We inspected the Veagunga community for different sources of water used for drinking, cooking, domestic purposes, refuse dumping sites and toilet facilities to identify the possible sources of the outbreak. We also inspected conditions for food preparation and handling in the community.

Data Analysis

Data were entered into Epi Info software version 3.3 for data cleaning and analysis. We performed descriptive analysis of the outbreak data by person, place and time. Univariate analyses were expressed as frequency distributions, percentages, mean \pm SD, range, and rates (attack rates, case-fatality rates, etc.) as appropriate.

FINDINGS

Briefing by the Bongo District Directorate

According to the District Director of Health Services, supported by the District Disease Control officer, the primary case was a man of about 20 years of

age from Vea - Gunga. He bought and ate beans cake (koose) at a nearby market at Gowrie and later in the day had a bath in the Vea Dam on the 22nd of June. In the evening on the same day he experienced vomiting, abdominal pain and became suddenly weak. The family members sought for a herbalist who prepared a local concoction for him but that worsened the condition. He was rushed to the Vea Health Centre and later referred to the Bongo Hospital. He died on arrival on June 23rd. According to the family members, this man had returned from Kumasi (a major city in the middle belt of Ghana where an outbreak of cholera had been ongoing) about two months ago.

The second case was an old lady apparently from the same house who had complained of diarrhea and vomiting at the same period. She was given the same concoction and died on the 28th of June. She was one of the family members who cared for the primary case-patient.

The third case was a man (index case) of about 45 years who took care of the primary case and also participated in the preparation and burial of the corpse of the old lady. He fell ill shortly and was rushed to the Vea Health Centre. At the Vea Health Centre a stool sample was taken and the client was immediately referred to Bongo District Hospital for further management. The sample was later diagnosed positive for vibrio cholera by Rapid Diagnostic Test (RDT) and culture methods.

Briefing by the Medical Superintendent, Bongo District Hospital

According to the Medical Superintendent, the hospital received a referral case from Vea Health Centre with diarrhea and vomiting with severe dehydration.

The stool sample later tested positive for vibrio cholerae, initially from the rapid diagnostic test and later confirmed by bacterial culture. He was successfully managed with some gastrointestinal replacement fluids and antibiotics. They had attended to four (4) cases on 30th of June with similar presentations but since then, there had not been any reported case.

Briefing by the family head of Kantebge’s house at VeaGunga

According to the family head, the house had been quiet on any infectious disease until suddenly on the 22nd of June, the young man (primary case) visited their house and after a short while complained of abdominal pain, vomiting and diarrhoea. He is a frequent visitor to the house and sometimes passes the night with them. He went back to his house and returned shortly in a worse condition. He (family head) could not send him early to the hospital because the said young man had no health insurance scheme and this resulted in the family using the local concoction on him (primary case). The family head then invited the primary case-patients family for financial assistance. On the way to Vea Health Center, he passed on. Traditionally, according to the family head, neighbours come over to assist in burial and also support with fetching of water and preparation of food for mourners. They eventually drink water from the same storage pot.

Among the 933 community members, 13 were affected. The overall attack rate was 1.4% (13/933) with a case fatality 15.4% (2/13). The mean age of case-patients was 28.5 years (±18 SD) with females 69.2% (9/13) mostly affected. Sex specific attack rates were 0.9% (4/447) and 1.6 % (9/486) for males and females respectively (Fig-1).

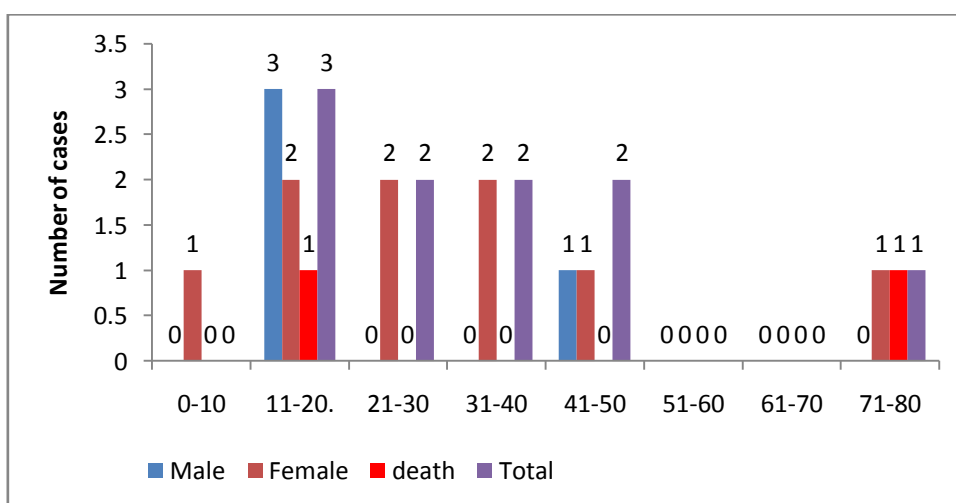


Fig-1: Age and Sex Distribution of Cholera Cases in Vea-Gunga,Bongo-UER, July, 2015

The index case, a 45 year-old male farmer reported with diarrhoea and vomiting with some dehydration at Vea Health Centre. After giving him a

gastrointestinal replacement fluid a stool specimen was taken and he was referred with the sample to Bongo District Hospital.

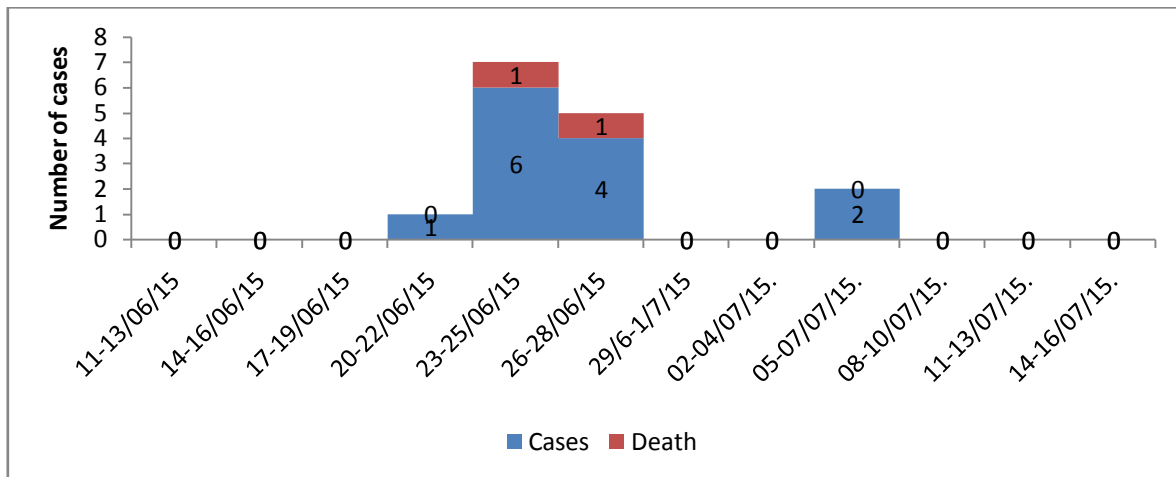


Fig-2: Distribution of cholera cases and Deaths by date of Onset, Ve-a-Gunga, Bongo-UER, July, 2015

The outbreak was a point source (Figure2). The onset of diarrhoea and vomiting in the community started from the 22nd of June and peaked between 23rd and 25th of June. No cases were reported between 29th

of June and 4th of July. From the 5th to the 7th of July 2 cases were reported and since then no cases have been reported in the community.

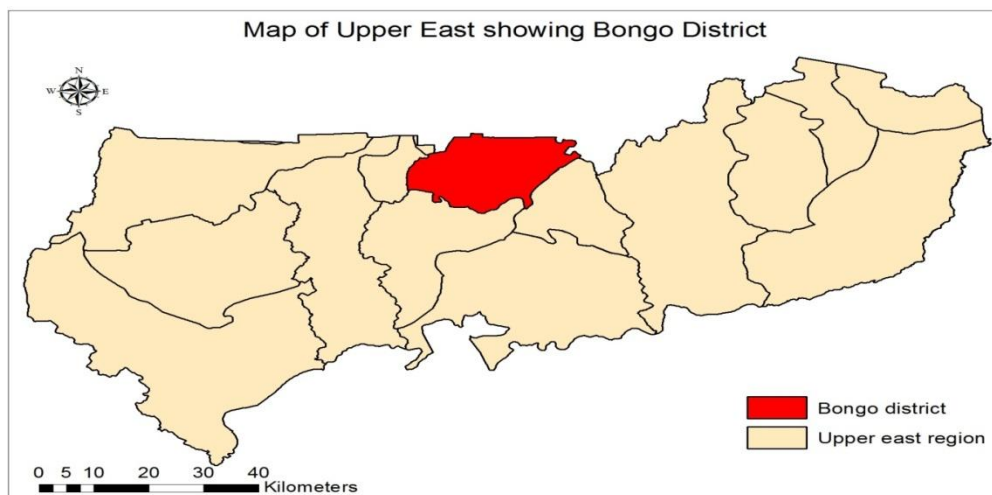


Fig-3: Map of Upper East showing Bongo District in Ghana

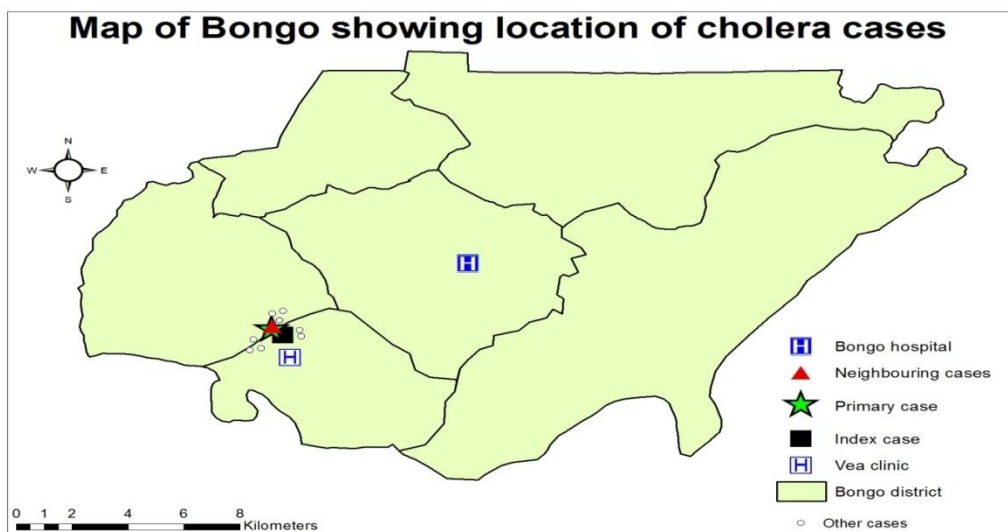


Fig-4: Map of Bongo District in Ghana showing location of cholera cases

All 13 cases-patients were found in three houses close to each other in Ve-a-Gunga community. These houses were located about a kilometer from Ve-a Health Centre and about 10 kilometers from Bongo District hospital. No further cases were recorded from other health facilities in Valley Zone Sub-district where Ve-a-Gunga is located.

Laboratory Investigations

Out of the 5 stool samples which were taken from the case patients and sent to the Bongo District Hospital, one (from index case) was confirmed positive for vibrio cholera serotype ogawa.

Environmental Investigations

One bore hole and an uncovered well were found in the community. The uncovered well was microscopically dirty. No refuse disposal site was located in the community. The inhabitants practiced open defaecation and no public latrine was cited in the community. There is a dam located about 1.5 kilometers from the community where some community members take their bath and wash their clothes.

DISCUSSIONS

The study has revealed that the two (2) case-patients died as a result of taking a local concoction as an alternate method to cure the ill condition. Apparently the relatives of the deceased sought the assistance of a herbalist because they could not afford the cost of medical care. It has been documented by Schellenberg [4] and several others that, one of the biggest hindrances to accessing health care is Poverty. In a small village in the Menchum division of the Northwest region of Cameroon, during the outbreak of cholera in 2010, one Beatrice Ngea, 25, recounted her experience in the village about a young lady with severe diarrhea and dehydration. "After 24 hours of treating the lady with a concoction, she became extremely weak and pale, but everyone thought she would be fine with the concoctions. Surprisingly, she died in the hands of her eldest child, who was barely 9 years old" [5]. According to UNDP (2007) Human Development Report however, it is estimated that about 80% of the Ghanaian populace relies on herbal preparations for primary health care. Maurice Ocuaye, a consultant with the United Nations Children's Fund (UNICEF) once expressed worry that many Ghanaians did not know the symptoms of cholera but think it was just diarrhoea and felt they could just visit a traditional healer or take some concoction and get well [6]. The high patronage of traditional medicine is either because it is cheaper, more convenient or simply believed to be more effective [7]. There is therefore, the need of a persistent strategic health education targeting family heads, opinion leaders and all those who matter on the consequences of some local concoctions especially when the content has not been adequately researched. Taking a local preparation made of herbs is certainly a

cheaper option but it might result in an unnecessary death.

It was also noted with passion from the outbreak investigations that, the family head could not send the primary case to the hospital because the said young man had no health insurance scheme. This could be as a result that the patient has not joined the scheme or could not afford the premium. If the latter is true, then this observation buttresses the fact that healthcare payments can impede access to health services and also disrupt the welfare of households with no financial protection. A study in the Kassena-Nankana District of the Upper East region of Ghana, has clearly demonstrated that insured patients with the National health Insurance Scheme were more likely to seek formal health care when sick [8]. However, it has also been documented by some studies that the health insurance had only a partial or no impact on the catastrophic health expenditures depending on the structure and services offered by the scheme. Subsequently, this did not change much of the people's health seeking behavior [9-12]. Health insurance is expected to offer financial protection against health shocks. Ghana began the implementation of its National Health Insurance Scheme (NHIS) in 2004 aiming at removing the financial barrier to healthcare. About 34% of Ghana's population of 24.6 million is valid card holding members (i.e. active members) of the NHIS [13]. Even though the mutual scheme does not cover cosmetic surgeries and aesthetic treatment, out and in-patient general and specialist diagnostic tests and laboratory investigations as well as oral health, maternity and emergencies are taken care by the scheme. It is therefore imperative to strategically canvas for more enrolment into the national health insurance scheme to enable the members of the communities to access the basic primary health care services. This should not be limited to the scheme managers but all stakeholders in the health service delivery.

One issue of concern is however the fact that there seems to be a low awareness of basic primary health care and public health related issues within the populace. This is with regard to the treatment of certain diseases of public health importance in the country. Currently some of these diseases are treated for free in public health facilities. There should therefore have been no excuse for not sending the cases-patients to a health facility on account of not having a health insurance scheme. This then means that a lot is education and public awareness activities need to be embarked upon to forestall such occurrences.

CONCLUSIONS

An outbreak of ogawa serotype cholera with some fatalities was established in Ve-a-Gunga community in the Bongo district of the Upper East region. It was a point source outbreak that affected mainly women from the community. It is however

hypothesized that the source of infection could be from the beans cake, the water from the Vea Dam or the primary case being a vibrio cholera carrier. The need for health care financial protection and avoidance of concoctions in the management of cholera case patients are basic requirements in avoidance of unnecessary death. Prompt outbreak response, case management and education about causes and prevention of diarrhea played a significant role in controlling the outbreak.

Ethical considerations

This project was conducted as part of health system process improvement and service-based learning in the Upper East Region. Official permission was obtained from the Regional Director of Health Services for the use of the data. We ensured the confidentiality of the Cholera case-patients through the use of de-identified and coded data.

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Competing interests

Authors have declared that no competing interests exist.

Authors' contributions

This work was carried out in collaboration between all authors. Author JKLO, JKAW and JO did the study design and wrote the protocol. Authors, JKO, JO, JKLO and BA did the statistical analysis and literature searches while editorial work of study was by authors DKA and OSO. All authors read and approved the final manuscript.

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