Review Article

OUTBREAK OF CHOLERA IN GHANA; A SYSTEMATIC REVIEW FROM 2010 TO 2020

ABSTRACT

Background: Cholera affects several hundred thousand individuals worldwide each year. According to estimates, more than 20 million individuals in Ghana are at danger of contracting the illness. However, research from Asia and other continents continues to be a major source of information for understanding cholera epidemiology in Africa, particularly in its coastal nations.

Method: The purpose of the study was to evaluate Ghana's cholera epidemics each year. A thorough analysis of articles that have been published on cholera outbreaks worldwide and in Ghana. A thorough search was done in the databases of Science Direct, PubMed, and Google Scholar to retrieve and to review research works published on cholera.

Results: Findings suggest cholera has been a significant public health issue for Ghana every year since the first case was reported in 1970. Greater Accra is the area with the most cholera cases each year, with Accra being the district with the most cases. Greater Accra alone reported 58.5% of all cholera cases in Ghana from 1998 to 2017. However, the least affected regions in Ghana are the Upper West, Northern, Upper East, and Volta region. The cause of these cholera outbreaks is subpar sanitation and contaminated water. Annual cholera outbreaks occur in Ghana, where more attention is needed. Multiple deaths have been caused by these epidemics.

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Conclusion: Improved sanitation and provision of adequate clean drinking water can help curb the incidence of cholera and its devastating effects on individuals and the country as a whole.

Keyword; *Sanitation, Ghana Health Service, Endemic, Vibrio cholera*

INTRODUCTION

The cholera disease is one of the main issues with public health on a global scale. In endemic nations, 2.8 million cases of cholera are reported annually, and 1.4 billion individuals are thought to be at risk [1]. Because it disproportionately affects the world's poorest and most vulnerable people, cholera has been dubbed a disease of injustice. [1,2]

However, there is cause for concern given the severe effects of Ghana's cyclical cholera outbreaks. In contrast to other diarrheal illnesses, cholera can be fatal to healthy young adults, and it is more likely to do so in immunocompromised people and undernourished children [2].According to the World Health Organization (WHO) Standard definition of a case of cholera, it may only be referred to as a case of cholera when: a person aged five years and over residing in an area not endangered to cholera develops an infection and presents with the symptoms of cholera (in this case, acute watery diarrhea with or without vomiting, leading to severe dehydration and or death). Only when the bacteria (Vibrio cholera O1 or O139) are isolated from the patient's diarrheal sample during laboratory culture is a case considered to be verified [3]. It is commonly linked to a lack of clean water and poor sanitation [4]. Its limited incubation period lasts about two to five days. It is an illness with acute diarrhea that, if neglected, can be fatal in a matter of hours [2]. It is simple to treat cholera. It has been demonstrated that prompt administration of oral rehydration salt (ORS) is effective in treating cholera-related dehydration

[2]. Additionally, individuals who are very dehydrated have a higher chance of going into shock and will need intravenous (IV) fluids right away. Additionally, medications could be necessary to help control the diarrhea and get rid of the bug [5]. However, cholera is thought to have an annual incidence of 1.3–4.0 million cases and 21,000–143,000 fatalities worldwide [6,7]. In endemic nations, around 1.3 billion people continue to be at risk for contracting cholera [6]. According to recent estimates from the World Health Organization (WHO), there are 1.3–4.3 million cholera cases recorded worldwide each year, and 21,000–143,000 people die as a result [8]. Since the 1980s, Ghana has continued to track sporadic cholera outbreaks, which have increased in frequency in recent years [2]. The deadly outbreak that started in June 2014 spread into 2015 [9,10]. A case fatality rate of 0.8% was documented as of January 4th, 2015, with a total of 28 922 cases and 243 deaths [1, 2]. Out of 216 districts in Ghana's 10 regions, the outbreak affected 130 of them [2].

Cholera is a public health issue in Ghana and requires significant attention, as evidenced by the figures on cases mentioned above. As a result, it's crucial to perform a study on cholera by analyzing the relevant material and providing suggestions for how to lessen the disease's impact.

In high-density neighborhoods close to urban areas associated with heavy rains, is where more than 50% of Ghana's population lives, according to a report by Global Communities [2,11]. Cholera outbreaks are more likely to occur in these communities and are also the most difficult to contain. This is because those who inadvertently contract the disease spread it quickly to those with whom they come into touch, making it challenging to contain the disease [2]. Since its first outbreak in 1970, cholera has been a significant public health issue that Ghana has to deal with every year. Greater Accra is the area with the most cholera cases each year, with Accra being the district with the most cases [12]. Greater Accra alone reported 58.5% of all cholera cases in

Ghana from 1998 to 2017 [12]. However, the least affected regions in Ghana are the Upper West, Northern, Upper East, and Volta region. These cholera outbreaks are brought on by inadequate sanitation and unhygienic water sources in overcrowded urban slums especially in flood prone seasons [12]. As part of Ghana's Integrated Disease Surveillance and Response (IDSR) system, it is one of the twenty-three (23) priority diseases and disorders that are being monitored [13]. 54% of the 132 121 cholera cases and 2420 fatalities that were reported to WHO globally in 2016 were in Africa [12]. Ghana Health Service reports that a total of 9542 cholera cases with 100 fatalities were documented in 2010, 10 628 cases with 105 deaths in 2011, 28 975 cases with 243 deaths in 2014, 618 cases with five deaths in 2015, and 150 cholera cases in 2016 [12]. Epidemiological monitoring noted 82,754 cases of cholera between 1998 and 2017 [12].

According to Ghana's IDSR system, cholera and five other communicable diseases are classified as epidemic prone (epidemic potential) diseases [14]. Although contaminated water and food are the main ways that cholera spreads, a variety of regional and demographic factors can also contribute to an individual becoming infected [13]. Therefore, it is not surprising that the Water and Sanitation Program reported that the country loses an estimated amount of more than 250 million US dollars (USD) due to premature deaths, productivity losses, and healthcare provision as a result of poor sanitation and diarrheal diseases like cholera, particularly since the majority of the working population in the country falls within the age range of 20-49 years [2]. This demonstrates the financial burden that cholera has on Ghana [2]. However, research from Asia and other continents continues to be a major source of information for understanding cholera epidemiology in Africa, particularly in its coastal nations [15]. Therefore, it is essential that additional research on cholera across the African continent, particularly in Ghana, be done. This

study aims to conduct a systematic review on cholera epidemics in Ghana, discuss associated mortalities, and propose recommendations to solve them.

MATERIALS AND METHODS

The phrases "cholera OR Vibrio" AND ("Africa" OR the current or former names of all sub-Saharan African nations) were systematically searched in PubMed between 2010 and 2020. The journals with titles or abstracts that discussed cholera outbreaks, epidemiology in Africa, or environmental Vibrio detection were those with the most successfully recovered citations. Google, Google Scholar, reference lists from important textbooks, and articles that were searched were used as well as other papers from non-indexed journals and reports from various agencies. Using the search archives feature on the website (www.promedmail.org) and the terms "cholera" and the nation names, ProMED-mail alerts were also looked into. Only full texts that included information on cholera morbidity or outbreak processes were considered eligible. Extracted information on cholera outbreaks included: the precise location and local environmental characteristics; the year and season of outbreak start, peak, and end; the population affected; the dynamics of the epidemic; the suspected source and/or underlying risk factors; the isolation of V. cholerae and other Vibrio species in their local environments; and the genotyping of epidemic strains. A thorough analysis of papers that had been written about

cholera epidemics in Ghana was also carried out. To locate studies published on Cholera cases, a thorough search was carried out in the PubMed, ScienceDirect, and Google Scholar databases. The words "cholera outbreak," "annual," and "Ghana" were used. Only materials from MOH and other international organizations that were published in English were included, including articles, reports, and data. Unpublished reports and unofficial statistics were not included. The reviews of papers and reports span the years 1998 to 2017. This study only looked at full-length articles and reports. We also looked at papers based on the inquiry, "Is cholera still a major public health problem in Ghana?" We sought to get a response through this review and provided suggestions.

Furthermore, all secondary sources were used to collect the data for this study. Secondary data was taken out of records that were collected by looking through client folders and line lists that were already in place at different levels across different facilities.

The method only refers to searching if articles from then stated sources, there is no description of how information was then extracted, synthesized and analyzed from the articles found. What statistical analysis was deployed?

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RESULTS

How many articles were found (n), how many fit the inclusion criteria of the researcher (n, %).

Articles used were from which year to which year

A total of 20,185 cases of cholera were reported to the Ghanaian Disease Surveillance Center from the Ashanti-, Central-, Eastern-, Greater Accra-, Western- and Volta regions in 2014. The date of disease onset was reported for 20,120 cases; the remaining 65 cases were removed from the dataset for all other analyses [16]. The earliest reported onset date was the 20th of May 2014 and the latest was the 11th of December 2014, with a peak number of 2,853 cases in the 35th calendar week (25–31 August) [16,17]. Age was reported for 19,863 cases and distributed with a median age of 26 years and an interquartile range (IQR) of 20–35 years [16]. The median age of cases did not change during the course of the outbreak. The majority of cases was male (58.4%; n = 11,796), and median age was not markedly different between males (26 years; IQR 20–35) and females (25 years; IQR 19–35). The case fatality rate (CFR) was 0.8% (165 deaths) with a higher median age among deceased of 34 years (IQR 24–47) [2,16].

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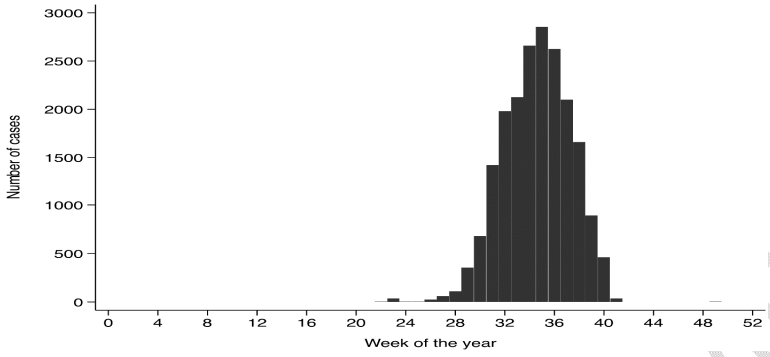

Fig 1. Epidemiology of the 2014 outbreak in Ghana; year with the largest outbreak of cholera [16].

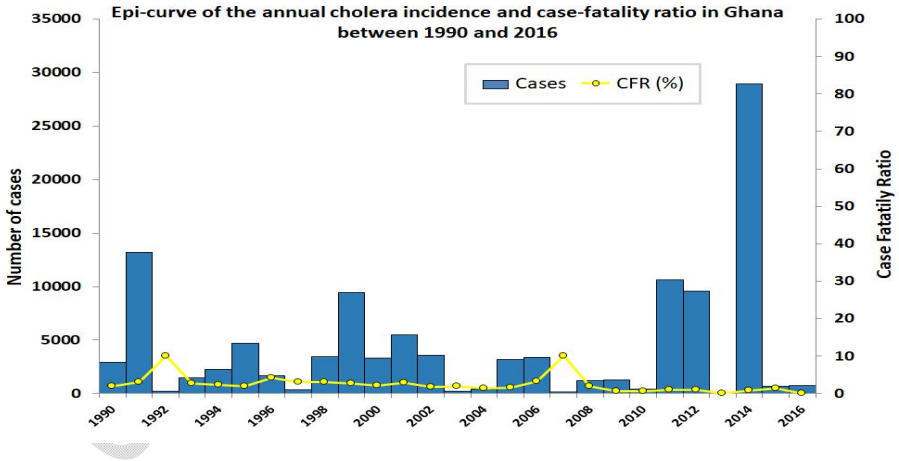

Fig 2. Epi –curve of the annual cholera incidence and case - fatality ratio in Ghana between 1990 and 2016 [18].

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Table 1. Distribution of cholera epidemic mortality, morbidity & fatality rate from 2010 to 2020 [19]

YEAR	NUMBER OF CASES	NUMBER OF DEATHS	FATALITY RATE (CFR %)
2010	9,542	100	1.04
2011	10,628	105	0.98
2012	9,548	100	1.0
2013	-	-	-
2014	28,975	243	0.83
2015	618	5	-
2016	720	-	-
2017	-	-	-
2018	-	-	-

2019	-	-	-
2020	-	-	-

State that there were no cholera cases reported for the period 2017 – 2020

It is also important to mention that CFR was below 2% across all years

Describe then results above in the same way you described for 2014

DISCUSSION

Vibrio cholerae, a bacterium, can be found in water and food, which can lead to the extremely contagious and fatal diarrheal illness cholera (V. cholerae). Vibrios can endure for a very long time in feces-filled coastal waters [20]. The years 2010 to 2020 were covered by this study's examination of cholera outbreaks in Ghana throughout the previous ten years.

According to estimates from the World Health Organization (WHO), cholera caused 21,000 to 143,000 fatalities worldwide in 2018 and between 1.3 and 4.0 million infections [20,21]. However, in 2010, there were 9,542 cases of cholera overall, and 100 deaths, according to the Ghana Health Service [12]. 10,628 cases and 105 fatalities were recorded in 2011. With 9,548 cases and 100 fatalities in 2012, the disease spread to 53 districts across nine regions [12,18]. Almost no information was made public regarding the assessment of the 2013 outbreak response efforts, despite the periodic cholera outbreaks [22]. Nevertheless, Ghana saw a spike in cholera

epidemic outbreaks between 2011 and 2014, with Greater Accra being the hardest afflicted area [2,12,18]. The largest epidemic was noted to occur in 2014 since 1991[18]. A cholera outbreak was detected in Ghana in June 2014. 6,018 cases were reported on August 18 in 34 districts across five regions, with 47 fatalities (a fatality rate of 0.9%). The Accra Metropolitan Area had the most cases (5,558) and deaths (45) of any area [2,18]. A total of 15000 cases of cholera had been reported by September, of which 126 were fatal. 23,622 instances had been reported overall by the end of October, of which 190 were fatal [2,18]. The number of cholera cases recorded during the 2014 outbreak was highest among people aged 20 to 49, accounting for 70% of cases. Nearly 30,000 new cases and more than 250 fatalities were recorded from cholera in Ghana in 2014, when 60 percent of the country's districts reported illnesses [23]. From a total of 216 districts across all 10 regions, the outbreak affected around 130 districts [2]. In Table 1.0, the Ghana Health Service in the year 2016 reported a cholera outbreak that had reached seven out of the country's 10 administrative regions [1,18]. Later that same year, 596 cases of the disease, in a short wave, were reported in Ghana's central region but no known deaths were reported [20,24]. However, the disease spread because control and preventive measures were put off. [2]. Despite the high number of cases, the fatality rate remained below the WHO target of 1% during the 2014 outbreak, which is in contrast to reported numbers from other major cholera outbreaks on the African continent, such as from Kenya (CFR = 2.3%) or Zimbabwe (CFR = 4.7%) [16]. From 2017 to 2019, Ghana consistently reported no cholera cases, hence there were no cholera cases reported [25]. Additionally, according to the Ghana Health Service (GHS), there were no cholera cases in Ghana in 2020[1,2,21]

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Factors that led to decrease in cholera cases for the year 2015 to 2020

Despite the ongoing cholera outbreaks, virtually little information about the evaluation of the outbreak response efforts made in 2013 was published [22]. However, this may be a result of cases being missed or not being reported that were handled at home but not reported to the hospital [1,12]. This however could be attributed to missed or unreported cases which were managed at home, and not reported to the hospital.

Cholera cases have decreased recently as a result of several government efforts. The adoption of National Sanitation Day is one of the policies. National Sanitation Day is a day set aside for the nation to perform environmental cleanup activities [26]. Another policy that was implemented was the one house one toilet policy; in that every household was to have a toilet facility available, if not will face the law [27]. Also, all of the country's provinces and districts received cholera epidemic alerts from the Ghana Health Service on a nationwide basis. Additionally, the country's 10 regions received standard operating procedures for cholera surveillance and case management [28]. Again the control was aided by prompt case management, contact tracing, health education, limiting access to cholera treatment centers, and implementing water sanitation and hygiene measures [23]. The National Cholera and Emergency Preparedness and Response Plan was also updated and put into operation, and supplies and other logistics were sent to the outbreak locations that were affected [2]. Through various media sources and some health organizations, such the Red Cross Society, public health messages about cholera, its prevention, and control methods were spread throughout the regions which also help control and to contain the infection [1,2]. Health facilities handled cholera cases in accordance with national protocols. District health management teams (DHMTs) in Ghana educated districts, particularly rural populations, on sanitation and hygiene in coordination with district assemblies [2]. The cholera preventive strategies, however, did not have much of an impact despite the fact that these

response measures were successful for a variety of reasons, including a change in government [29]. Moreover, according to the Ghana Health Service (GHS), there were no cholera cases in Ghana in 2020 [23]. Dr. Patrick, Director-General of the Ghana Health Service, who talked to Joy News, however, credited the safety measures put in place to deal with the Covid-19 outbreak for the success [30].

What was the effect of COVID-19 for 2019-2020 period?

CONCLUSION

In order to raise Ghana's public health to levels of acceptability on the international stage, the cyclical nature of the cholera outbreak is a canker that necessitates quick intervention. Response measures to prevent recurrence of cholera epidemics in Ghana require a multi-sectoral approach, which should also encompass the cooperation and participation of the public. Especially, because for a public health preventive intervention to be feasible and sustainable like that of cholera, it must involve the affected community from the scratch thus from planning to implementation. Cholera epidemics should be recognized and given top priority by the Ministry of Health in cooperation with the Ministry of Sanitation and Water Works, Ministry of Local Government and Rural Development, Ministry of Works and Housing, Ministry of Communications, Ministry

of Education, municipal and district assemblies, and the Food and Drug Authority thus further enforcing the multi-sectorial approach to preventing and where possible, eradicating cholera in Ghana. With such an approach, they will be able to address issues associated with the scarcity of drinkable water sources, the existence of urban slums, the enforcement of regulations governing environmental sanitation and food hygiene, as well as the correct disposal of garbage. The best chance of success is found in a WASH (Water Sanitation and Hygiene) intervention that has been specially designed with component activities to address the unique needs of the targeted populations in a way that will be both most effective and efficient. In order to lower the mortality and morbidity linked to cholera outbreaks, it is crucial to give the recommendations stated top priority when making policy choices about Ghana's sanitation situation.

Data Availability

The data used to support the findings of this study are included in the article and also available from the corresponding author upon request.

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