

Epidemiology of Typhoid Fever in Some Primary Health Centers and Associated Communities within Obio Akpor Local Government Area, Rivers State

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ABSTRACT

Typhoid fever is one of the public health significant diseases in low-income countries in which the safety of drinking water supply, hygienic condition, and quality of life are poor and below standard. The study aimed at the Epidemiology of typhoid fever in some primary health centers and associated communities within Obio Akpor Local Government Area, Rivers State. Health records obtained from Model Primary Health Centres, Ozuoba, Elioizu and Elelenwo were used to determine the prevalence of typhoid fever in the study population. Typhoid fever data from January to December 2024 was extracted and used for the study. A total of 2718 individuals suffered from typhoid fever during the study period. Among these, 65.7% of the positive cases of *Salmonella typhi* were female, while 34.3% were male. Prevalence of typhoid fever was high in the 2nd and 3rd quarter (26.3%, 30.5%). Patients at the extremes of ages (0-20 and >40) accounted for the highest prevalence of *Salmonella typhi* cases (38.8% and 23.7%). The study has shown that typhoid fever remains endemic in Obio Akpor, primarily due to poor sanitation and contaminated water sources, highlighting the need for improved public health measures.

Keywords: Epidemiology, Typhoid Fever, Drinking Water Supply, Prevalence, health centers, Population, Low-Income.

Introduction

Typhoid fever is a systemic prolonged febrile illness caused by certain *Salmonella* serotypes including *Salmonella typhi*, *S. paratyphi* A, B, C (Crump *et al.*, 2004). The illness begins with mounting fever, headache, vague abdominal pain and constipation, which may be followed by appearance of rashes in some cases. During the third week, the patient reaches a state of prolonged apathy, toxemia, delirium, disorientation and coma followed by diarrhoea. Serious epidemic forms of diarrhea, e.g. typhoid (enteric fever), need a co-ordinated community approach. If left untreated, it can lead to complications affecting various organ systems (Fauci *et al.*, 2008). Typhoid fever is transmitted by water and food which are contaminated by human feces. Typhoid remains a global health problem with a higher burden in low and middle-income countries due to poverty, limited access to safe water and unhygienic practices (Mogasle *et al.*, 2014).

The disease is communicable for as long as the infected person excretes *S. typhi* or *S. paratyphi* in the feces or urine. Water is a source of diseases of typhoid which affect the alimentary canal. In home and school, it is essential that hands should be washed after defecating or urinating, for infection can be transferred in unclean hands used to prepare food or handle eating pots. Unwashed hands, exposed septic sores, contaminated water and flies can also spread infection to food during its preparation. In areas where drainage and sanitation are poor, water runs over the ground during rainstorms, picks up feces and contaminates water sources. This contributes significantly to the spread of diseases such as typhoid (Wang, *et al.*, 2012).

Typhoid fever is most prevalent among individuals involved in food handling and preparation, as well as those living in overcrowded slums and low-income areas where hygiene and waste management are poor.

Without effective preventive and control measures, the risk of typhoid fever outbreaks is likely to remain high (Faesey *et al.*, 2010). A continuous analysis of surveillance data is essential for detecting disease outbreaks, assessing trends, and evaluating the effectiveness of prevention and control programs. Moreover, surveillance data analysis provides valuable information for appropriate allocation of health resources (Jima *et al.*, 2012). However, despite the availability of collected data in the zonal health departments, it is often not analyzed in relation to the epidemiology of disease distribution. Such analysis is crucial for identifying at-risk populations, understanding trends over time, and mapping the geographical distribution of diseases, which in turn supports effective interventions (Zerfu *et al.*, 2018).

In Africa, typhoid fever remains a higher endemic tropical disease of public health significance due to its faster transmission rates (Kim *et al.*, 2019, Adesegu *et al.*, 2020). The reported figures on typhoid fever cases show that the trend of typhoid-related morbidity is in rapid increment over time in Africa. Outbreaks of typhoid fever were reported in 15 countries (Kim *et al.*, 2019). The estimated case fatality rate among non-surgical patients was 5.4% for the Africa region, which is six times higher than that of the Asia region (Marchello *et al.*, 2020).

Therefore, the study aimed at the Epidemiology of typhoid fever in some Primary Health Centers and associated communities within Obio-Akpor Local Government Area, Rivers State. The findings from this study will help partly in the planning of Typhoid fever control and prevention for the Local Government Health Sector, both governmental and NGOs (non-governmental organization), and also encourage other researchers to investigate the incidence of typhoid infection regarding to the study area.

Materials and Methods

Description of Study Location

The present study was conducted in Obio-Akpor Local Government Area (LGA) of Rivers State, Nigeria, which is among the 23 administrative LGAs in the state. The study locations were Rumuokparali (4.8637° N, 6.9190° E), Elioizu (4.8599° N, 7.0217° E), and Elemenwo (4.8398° N, 7.0727° E) communities in

Obio/Akpor Local Government Area, Rivers State, Nigeria. Geographically, it is located at approximately 4.8776° North and 7.0283° East, The LGA spans an area of approximately 260 km². According to the 2006 census, the LGA had a population of 462,789. Its postal code is 500102, and it is constituted mainly by the people of the Ikwerre ethnic nationality.

Study Period

Typhoid fever data from January to December 2024 were extracted and used for the study.

Study Design and Sampling Technique

A prospective study design was employed to assess the prevalence of typhoid fever in Obio Akpor Local Government Area. Systematic sampling technique was used for data collection.

Data Collection and Management

Data used for the study was based on the records of the following Primary health centers: Model Primary Health Center Ozuoba, Model Primary Health Center Elioizu and Model Primary Health Center Elemenwo. Data on typhoid fever cases were extracted by the Laboratory technologists in the health centers. Its element included date of report, age, sex and laboratory findings. Typhoid fever cases from January to December 2024 were extracted.

Ethical Considerations

Ethical approval for this study was obtained from the Rivers State Health Care Management Board before data collection.

Results

The data of the positive cases of typhoid fever from the health centers is presented in Figure 1 and in Tables 1 and 2.

Across the sampling stations in Figure 1, 1054 (38.8 %) of the typhoid fever positive cases were between the age of 0-20, followed by patients of age > 40 with 643 (23.7 %) cases followed by patient of the age, 31-40 with 531 (19.5 %) cases and the least was obtained patients age 21-30 recording 489 (18%).

According to the gender demographics, 1787 (65.7%) of the positive cases of typhoid fever were females, while 931 (34.3%) cases were male as presented in Table 1.

For the quarterly trend, typhoid fever positive cases varied within the different sample locations as shown in Table 2.

Typhoid fever positive cases were highest in the third quarter with a prevalence of 76.5% in Rumuokparali; for Elioizu the first quarter had the highest prevalence of *Salmonella typhi* cases (18.1%) and Elemenwo had the highest prevalence in the second quarter (14.7%). Typhoid fever positive cases were higher in the third and second quarter with a prevalence of 30.5% and 26.3%, respectively.

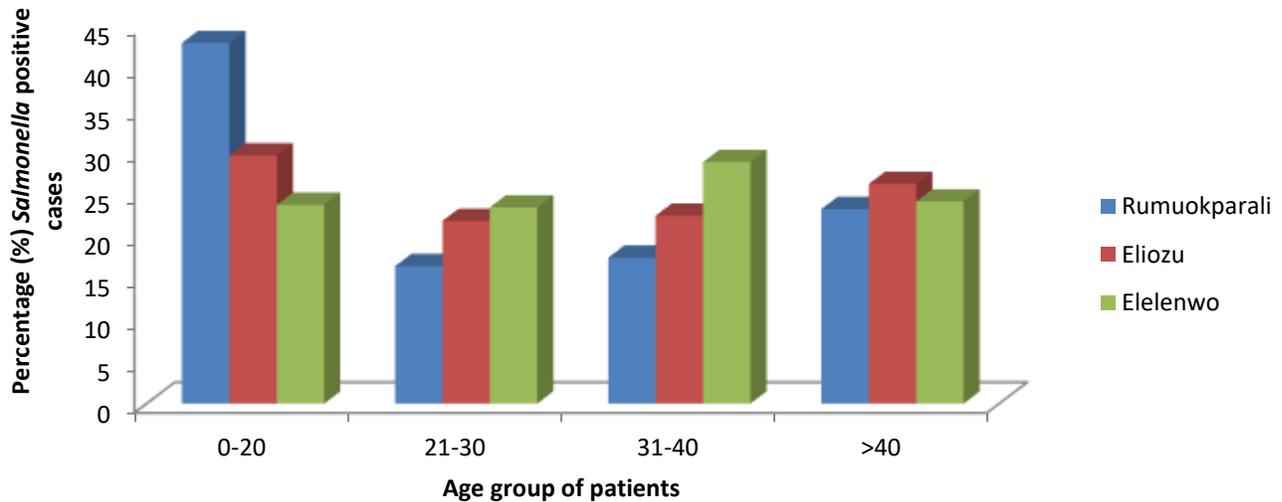


Fig. 1: Age profile of *Salmonella typhi* positive cases in Obio/Akpor Local Government Area based on health records

Table 1: Gender specific case series of *Salmonella typhi* in Obio/Akpor Local Government Area based on health records

Gender	Location in Obio/Akpor Local Government Area			Overall No. (%)
	Rumuokparali No. (%)	Elioizu No. (%)	Elemenwo No. (%)	
Male	663(32.9)	161 (46.3)	107 (30.2)	931 (34.3)
Female	1353(67.1)	187 (53.7)	247 (69.8)	1787 (65.7)
Total (%)	2016 (100)	348 (100)	354 (100)	2718

Table 2: Quarterly trend of *Salmonella typhi* positive cases in Obio/Akpor Local Government Area based on health records

Quarter (Month)	Location in Obio/Akpor Local Government Area			Overall No. (%)
	Rumuokparali No. (%)	Elioizu No. (%)	Elemenwo No. (%)	
1 st (Jan-Mar)	418 (71.6)	106 (18.1)	60 (10.3)	584 (21.5)
2 nd (Apr-Jun)	515 (72)	95 (13.3)	105 (14.7)	715 (26.3)
3 rd (Jul-Sep)	635 (76.5)	75 (9)	120 (14.5)	830 (30.5)
4 th (Oct-Dec)	448 (76.1)	72 (12.2)	69 (11.7)	589 (21.7)
Total (%)	2016 (74.2)	348 (12.8)	354 (13)	2718 (100)

Discussion

The study assessed the epidemiology of typhoid fever in some primary health centers and associated communities within Obio Akpor local government area, rivers state. Individuals at the extremes of ages had the highest prevalence of typhoid fever. This is in agreement with a high incidence of typhoid fever recorded in children ≤ 15 in the study of Omotola *et al.* (2020), Abioye *et al.* (2017) and Osu *et al.* (2024). These results suggest that hygiene awareness, especially among those handling children, is necessary. Contaminated foods and waters and unhygienic food preparation in homes seemed to have most likely exposed these age groups to the infection. Osu *et al.* (2024) suggests that people within this age groups may have a weakened immune system due to other illness and may be at higher risk of contracting the disease.

According to the gender demographics, 65.7% of the positive cases of *Salmonella typhi* were female, while 34.3% were male. This is in line with the study of Osu *et al.* (2024) in which the highest prevalence (55%) of positive cases of *Salmonella typhi* was recorded compared to the males (44.5 %). These results suggest that females are often responsible for food preparation and handling, which may increase their exposure to contaminated food and water sources. Furthermore, hormonal differences between males and females can also play a crucial role in susceptibility to typhoid fever. Estrogen, a hormone found in higher levels in females can affect the immune response to certain infections.

The findings regarding the peak months in this study are consistent with prior studies in which typhoid fever cases were generally high during the third quarter of the year, followed by the number of cases recorded in the second quarter of the year and lowest during the first quarter and Last quarter. High rates coincided with the rainy season with low ones during the dry season. The peaks of April, May, June, July and August for different years were also observed in a study conducted by Fusheini *et al.* (2020). Notwithstanding, typhoid fever cases are recorded all year round and each month recorded cases.

Conclusion

The study demonstrates that typhoid fever remains endemic in Obio Akpor Local Government Area, with higher prevalence among females and at the extremes of age. The seasonal increase, particularly during the 2nd and 3rd quarters, underscores the influence of environmental factors such as poor sanitation and contaminated water sources. These findings highlight the urgent need for strengthened public health interventions, improved water quality, and enhanced community hygiene practices to reduce the burden of typhoid fever in the area.

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