

Epidemiology and Risk Factors for Endemic Typhoid Fever in Keffi Metropolis of Nasarawa State

Research article

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Abstract

Endemic typhoid fever is a serious worldwide bacteria disease transmitted by the ingestion of contaminated food and water and the inhabitants of Keffi metropolis are seriously facing high case fatality rate due to inaccessibility to potable water supply and poor sanitation and hygiene practices. This study sought to assess the epidemiology and risk factors for endemic typhoid fever in Keffi metropolis, Nasarawa state, with the specific objectives to determine the demographic characteristics of the study area, determine the prevalence of endemic typhoid fever, to find out the risk factors for endemic typhoid fever, and to determine the appropriate measures to control and prevent the spread of endemic typhoid fever. A cross-sectional study design was adopted in the study area. Structured questionnaires were used as an instrument to obtain data. A total of 200 questionnaires were distributed, and all questionnaires were retrieved accordingly. Data collected were obtained, processed and analyzed using Microsoft Excel. The result revealed that majority of the respondents (54.5%) were between the age of 11-25 years, 55.5% were females in the gender distribution, 43.5% get their drinking water from tap, 38% said they boiled their water before consumption as the technique used in water purification / treatment in their households, 49.5% of the respondents said they are less than 7 in their households that experienced endemic typhoid fever, 93% said endemic typhoid fever is an illness caused by bacteria due to poor personal hygiene and sanitation practices in the community, 78.5% said signs and symptoms of endemic typhoid fever includes fever, vomiting, malaise, diarrhea and headache, 89% said that endemic typhoid fever is caused as a result of ingesting / eating contaminated food and water, 79% said that poor hygiene and sanitation can contribute immensely to the spread of endemic typhoid fever in the community, 97% proves that endemic typhoid fever disease can be cured if properly managed, 75% respondents said that early detection of the disease and follow-up with appropriate antibiotics treatment can cure endemic typhoid fever, 98.5% agreed that endemic typhoid fever can be prevented with the knowledge of victims (patients) on prevention of endemic typhoid fever, 82.5% said that good personal hygiene and use of clean water is the baseline for preventing endemic typhoid fever in the community. There is a need for government intervention to supply typhoid fever vaccines for the control, prevention and eradication of endemic typhoid fever in the community.

Keywords: Epidemiology; Risk factors; Endemic Typhoid Fever; Keffi Metropolis; Nasarawa State

Abbreviations: CDC: Centers for Disease Control and Prevention; FMC: Federal Medical Centre; LGA: Local Government Area; TCVs : Typhoid Conjugate Vaccines; WHO: World Health Organization

Introduction

Typhoid fever is a serious worldwide bacteria disease transmitted

by the ingestion of contaminated food and water, with the feces of an infected person, which contains the bacteria salmonella typhi [1]. There are different types of organisms that causes typhoid fever, this are: Salmonella typhi A, Salmonella typhi B, Salmonella typhi C, and Salmonella paratyphi D. Typhoid fever is a systemic infection caused by Salmonella typhi. The disease remains an important public health problem in developing countries particularly in sub-saharan African countries especially those with poor sanitary system, lack of access to



portable water or wholesome water. According to World Health Organization, WHO [2], there are an estimated 11-12 million cases of typhoid fever annually, resulting in approximately 128,000 -161,000 death worldwide. In Nigeria, typhoid fever is endemic, with an estimated incidence rate 100-200 cases per 100,000 population [3].

Epidemiological studies have shown that typhoid fever is a major cause of morbidity and mortality in the region. According to a study by Akinyemi et al [4], the prevalence of typhoid fever in Keffi metropolis was found to be 16.3%, indicating a serious burden of the disease on the population. The study also highlighted that poor sanitation and lack of access to clean water were important risk factors contributing to the high prevalence of typhoid fever in the area.

Another study by Oghenekaro et al [5] reported that the incidence rate of typhoid fever in Nasarawa State was 250 cases per 100,000 population, with Keffi metropolis being one of the most affected areas. The study identified contaminated water sources and improper waste disposal as major risk factors for the transmission of the disease in the region. In a retrospective analysis of typhoid fever cases in Keffi metropolis conducted by Abdullahi et al [6], it was observed that children under the age of 5 years were particularly vulnerable to the disease, with a high proportion of cases reported in this age group. The study also highlighted the presence of multidrug-resistant strains of *Salmonella typhi* and *S. paratyphi* as a growing concern, making treatment of the disease more challenging.

Furthermore, a study by Okoronkwo et al (2019) found that poor hygiene practices, lack of awareness about the importance of hand washing, and overcrowding in residential areas contributed to the ongoing transmission of typhoid fever. The study emphasized the urgent need for public health interventions to improve sanitation and hygiene practices in order to control the spread of the disease. It is against this background that present study sought to assess the epidemiology and risk factors for endemic typhoid fever in the Keffi metropolis of Nasarawa state.

Epidemiology of Endemic Typhoid Fever

Typhoid fever is caused by the bacterium *Salmonella typhi* and *S. paratyphi*, primarily transmitted through contaminated food and water. Typhoid fever spread worldwide in the areas where there is inadequate sanitation and hygiene practices such as Keffi metropolis and Nigeria as a whole and other under-developing countries. In Keffi metropolis, the incidence of typhoid fever has been steadily increasing over the years, leading to a serious burden on the healthcare system. According to a study by Ogbu et al. [7], the prevalence of typhoid fever in Keffi metropolis was found to be 23.5%, indicating a high endemicity of the disease in the community where there is poor sanitation and hygiene practices.

Causes and Risk Factors of Endemic Typhoid Fever

According to Mogasale et al [8] and Akinyemi et al [9], they stated the following as some of the key causes and risk factors for endemic typhoid fever in the communities:

- A. **Poor Sanitation and Hygiene Practices:** Inadequate sanitation facilities and poor hygiene practices, such as lack of access to clean water for drinking and washing, contribute to the spread of typhoid fever in the community.
- B. **Contaminated Food and Water Sources:** Consumption of contaminated food and water, particularly from street vendors or unregulated sources, increases the risk of contracting typhoid fever in the community.
- C. **Overcrowding and Poor Living Conditions:** Overcrowded living conditions, especially in urban slums and informal settlements, create an environment conducive to the spread of typhoid fever

through person-to-person transmission.

D. **Lack of Access to Healthcare Services:** Limited access to healthcare facilities and diagnostic services in the community can lead to delays in diagnosis and treatment of typhoid fever, resulting in increased morbidity and mortality rates.

E. **Lack of Vaccination Coverage:** Low vaccination coverage against typhoid fever in the community leaves individuals susceptible to infection and contributes to the persistence of the disease in the community, etc.

Management of Endemic Typhoid Fever

According to WHO and CDC [10], the management of endemic typhoid fever can be approached through various strategies, including:

- a) **Improving Sanitation and Hygiene Practices:** Enhancing access to clean water, promoting hand washing, and implementing proper waste management systems can help reduce the transmission of typhoid fever. A study by Akullian et al. [11] demonstrated that improved sanitation and hygiene practices significantly reduced the risk of typhoid fever transmission in urban slums in Kenya.
- b) **Vaccination Campaigns:** Vaccination against typhoid fever can be an effective strategy to control the disease. The WHO recommends the use of typhoid conjugate vaccines (TCVs) as they provide longer-lasting protection and can be administered to children as young as six months old. A study by Shakya et al. [12] showed that TCVs were highly effective in reducing the burden of typhoid fever in Nepal.
- c) **Health Education and Awareness Programs:** Educating the community about the symptoms, transmission routes, and preventive measures of typhoid fever can help in early detection and prompt treatment. A study by Tadesse et al. [13] emphasized the importance of health education campaigns in reducing the incidence of typhoid fever in Ethiopia.
- d) **Strengthening Healthcare Infrastructure:** Ensuring access to quality healthcare facilities, diagnostic tools, and appropriate treatment options is crucial for managing typhoid fever. A study by Mogasale et al. [14] highlighted the importance of healthcare infrastructure in reducing the burden of typhoid fever in low- and middle-income countries.
- e) **Active Surveillance and Case Management:** Implementing robust surveillance systems to detect and monitor typhoid fever cases, along with timely diagnosis and appropriate treatment, can help in managing the disease. A study by Mogasale et al. [15] emphasized the need for active surveillance and case management to control typhoid fever in endemic areas.

Treatment of Endemic Typhoid Fever

Treatment for typhoid fever typically involves the use of antibiotics to eliminate the causative agent, *Salmonella typhi*. The choice of antibiotics is important to ensure the effectiveness of treatment and to reduce the risk of antibiotic resistance. Commonly recommended antibiotics for treating typhoid fever include fluoroquinolones (such as ciprofloxacin or levofloxacin) or third-generation cephalosporins (such as ceftriaxone).

According to the WHO guidelines, the treatment plan for typhoid fever in adults includes:

- i. **Oral fluoroquinolone therapy for 7-14 days:** Ciprofloxacin 500 mg orally two times a day or Levofloxacin 500 mg orally once daily.
- ii. **In cases where the patient is unable to take oral medications,** intravenous third-generation cephalosporins can be used: Ceftriaxone 2 g intravenously once daily.



For pediatric patients, the treatment plan may vary based on age and weight. The CDC also recommends similar antibiotic treatment regimens for typhoid fever, emphasizing the importance of completing the full course of antibiotics to ensure the infection is fully eradicated. In cases of severe typhoid fever or suspected antibiotic resistance, the WHO suggests hospitalization and intravenous antibiotic therapy. Monitoring of the patient's condition, including regular temperature checks and blood tests, is essential to assess treatment response and adjust therapy if needed.

Fluid replacement: Oral rehydration solutions or intravenous fluids may be given to prevent dehydration caused by fever, vomiting, and diarrhea. **Nutritional support:** A balanced diet rich in nutrients is important to support the body's immune system and aid in recovery.

Control and Prevention of Endemic Typhoid Fever

According WHO and the CDC [16], stated that to control and prevent endemic typhoid fever, the standard guidelines provided by the can be followed.

a) **Improved Sanitation and Hygiene:** Enhancing access to clean water, promoting proper sanitation practices, and encouraging good personal hygiene can help prevent the transmission of typhoid fever. This includes the provision of safe drinking water, proper waste disposal systems, and promoting hand washing with soap. According to the WHO, "Improved sanitation and hygiene are the most effective measures to prevent typhoid fever transmission".

b) **Vaccination Campaigns:** Implementing vaccination programs can significantly reduce the incidence of typhoid fever. The WHO recommends the use of TCVs for routine immunization in areas with a high burden of the disease. TCVs have been shown to be safe and effective in preventing typhoid fever. The CDC states, "Vaccination is the most effective way to prevent typhoid fever".

c) **Surveillance and Early Detection:** Establishing a robust surveillance system to monitor the occurrence of typhoid fever cases is crucial for early detection and prompt response. This includes laboratory testing of suspected cases, reporting of cases to the appropriate authorities, and monitoring trends in disease incidence. The CDC emphasizes the importance of surveillance, stating, "Surveillance is critical for detecting outbreaks and monitoring trends in typhoid fever".

d) **Health Education and Awareness:** Conducting health education campaigns to raise awareness about the signs and symptoms of typhoid fever, its mode of transmission, and preventive measures can empower individuals and communities to take appropriate actions. This can be done through community engagement, schools, and healthcare facilities.

The WHO highlights the significance of health education, stating, "Health education is essential to raise awareness about typhoid fever and promote preventive measures". By implementing these measures in accordance with the guidelines provided by the WHO and CDC, the control of endemic typhoid fever in the community can be improved.

Statement of the Problem

Typhoid fever is a serious public health affecting people living in the Keffi Metropolis of Nasarawa State, with a high prevalence rate. This trend had been disturbing people of Keffi over some decades due to poor environmental sanitation practices, indiscriminate disposal of waste (solid and liquid), poor hygiene practices of food handlers, inadequate potable water supply by the state government, etc. these had been the major contributory risk factors for endemic typhoid in Keffi metropolis. Limited health education on the likelihood of this endemic typhoid fever had been leading to untimely mortality (death) of both young and old people in the Keffi and Nasarawa State. There-

fore, this present study would be of help to address this ugly trend in Keffi and Nigeria as a whole.

Significance of the Study

This research will be of significance to students, lecturers, government, researchers, and inhabitants in the study area. Students who wish to carryout research of similar topic will find this work of great significance, as it will provides them with valuable knowledge and understanding of the epidemiology and risk factors associated with endemic typhoid fever in Keffi metropolis of Nasarawa State. This information can be useful to students studying public health, epidemiology, or related fields to enhance their levels of understanding in disease transmission, prevention, and control strategies.

The findings from this study will be of significance to the researchers as it will contribute to the existing knowledge on endemic typhoid fever in the study area. The findings of this research would also be used by the researchers who may wish work on similar topics to identify the gaps in the current knowledge, develop new research questions, and design interventions to reduce the burden of endemic typhoid fever in the communities. The findings will also be of great importance to lecturers as it can serve as a valuable resource for teaching and learning. Lecturers can use the findings to illustrate real-life examples of epidemiological studies, risk factors analysis, and public health interventions relating to typhoid fever cases. This can also enhance the quality of education and provide practical insights to students in the field of public health and preventive medicine.

Government will finds this research work useful, as it can helps the government in making public health policies and interventions which could aimed at reducing the burden of typhoid fever in the study area. The findings from this research could also help the government in identifying high-risk populations, implementing targeted prevention and control strategies, and allocating resources effectively to control the spread of endemic typhoid fever disease.

Findings from this research work will also be of great significance to the inhabitants of the area, as it will provide them with important information about the epidemiology and risk factors associated with endemic typhoid fever. This knowledge can empower individuals to take preventive measures, such as practicing good hygiene, accessing clean water sources, and seeking timely medical care. It can also raises awareness about the disease and its impact on the community, leading to increase support for public health initiatives.

Justification of the Study

The epidemiology and risk factors for endemic typhoid fever in Keffi metropolis of Nasarawa State is multifaceted and important, since it is a densely populated area with a high-risk of disease transmission. The city's population density, inadequate sanitation infrastructure, and limited access to potable or wholesome water sources contributed to the increase risk of typhoid fever transmission. This present study in Keffi, could help identify the local factors that contributed to the spread of disease and develop targeted interventions to reduce it burden in the area and Nigeria as a whole.

Aim of the Study

This research work aimed to assess the epidemiology and risk factors for endemic typhoid fever in the Keffi metropolis of Nasarawa state.

Objective of the Study

The specific objectives of this study include:

- To determine the demographic characteristics in Keffi metropolis of Nasarawa state.
- To determine the prevalence of typhoid fever in the study area.



- To find out the risk factors for endemic typhoid fever in the study.
- To determine the appropriate measures to control and prevent the spread of endemic typhoid fever in the study.

Research Questions

- What is the demographic characteristics in Keffi metropolis of Nasarawa state?
- What is the prevalence of typhoid fever in the study area?
- What is the risk factors for endemic typhoid fever in the study area?
- What is the appropriate measures to control and prevent the spread of endemic typhoid fever in the study area?

Research Methodology

Study Design

A cross-sectional study design is adopted to obtain data in the area of study.

Study Settings

This study was conducted in five randomly selected wards in Keffi Local Government Area (LGA) of Nasarawa State – Angwa Iya II, Angwa Rimi, Liman Abaji, Sabon Gari and Yara wards. Keffi LGA is the smallest of the 13 Local Government Areas of Nasarawa State, North-Central Nigeria with a total land mass of 138km². Its head-quarters is Keffi town. Keffi is an ancient town located at latitude 8.85 and 7.87 longitude. It is 57km from Abuja, the capital city and about 128km from Lafia, the Nasarawa State capital. Keffi is completely bounded by Karu LGA except to the west where it shares a border with Kokona LGA. The population estimates for Keffi Local Government was 92,664 (2006 census figures), with the population projected to have grown to 124,900. The under 5 population (U5) of Keffi is estimated to be 20% of its total population, from unpublished data of the Keffi LGA National Population Commission. Keffi has 10 wards – Angwa Iya I & II, Angwa Rimi, Sabon Gari, Jigwada, Goriya, Gangare, Yara, Tudun Kofa, and Liman Abaji.

The indigenous population in Keffi LGA include Gbagyi, Gwandara, Ham, Hausa, Yeskwa but other ethnicities have settled in the area – Afo, Eggon, Fulani, Igbo, Mada, Yoruba and many others. Due to the heterogenous nature of the inhabitants of Keffi, Hausa and English are the languages spoken as lingua franca in the area. Majority of the inhabitants are farmers, artisans and civil servants with the rest involved in cattle rearing, and menial jobs. The 2 main religions practiced are Christianity and Islam, although a minority of the populace still prac-

tice the traditional religion. Pertaining to health care, Keffi Local Government has 21 public Primary health centres, 1 secondary health care centre and the Federal Medical Centre (FMC), Keffi a tertiary health care facility.

Sample Size and Sampling Techniques

200 participants were targeted for the sample size to determine the victims of endemic typhoid fever in the study area. The simple random sampling technique were used to collect data.

Method of Data Collection

The structured questionnaires were used to collect data, whereas a total number of 200 questionnaires were distributed to the total number of 200 respondents. All questionnaires were retrieved accordingly.

Method of Data Analysis

The data collected were processed and analyzed using Microsoft excel. The information were presented inform of pie charts, bar charts and figures.

Instrumental Design

Structured questionnaire was used as an instrument in the study. The questionnaire was in two parts; first part covers the demographic characteristics and the second part covers the information on the endemic typhoid fever.

Method of Validating Instrument

The instrument had been validated by the supervisor and any other two experts of the same discipline who made this research work valid.

Limitations of the Study.

The study was limited to Keffi metropolis as the area of research, and financial constraints, and means of transportation were other challenges that the researchers encountered at the course of carrying out the research.

Results

Presentation of Frequency Distribution

Figure 1, the result revealed that 79 (39.5%) respondents fall between the age less than 10 years, 109 (54.5%) were between the age of 11-25 years, 6 (3%) were between the age of 26-35 years, 3 (1.5%) were between the age of 36-45 years and 3 (1.5%) were between the age of 46 and above. Hence, majority of the respondents 79 (39.5%) were between the age less than 10 years in the age distribution.

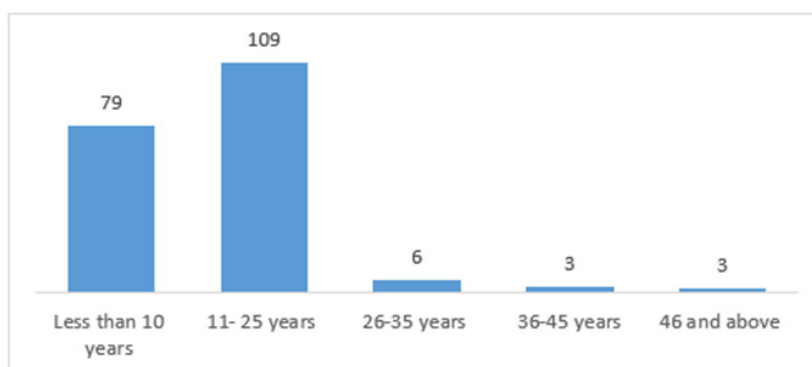


Figure 1: Age Distribution of Respondents.



Figure 2, the result showed that 1600 (55.5%) respondents were females, and 2000 (44.5%) were males. Hence, the majority of the respondents 111 (55.5%) were females in the gender distribution.

Figure 3, reviews that 87(43.5%) respondents get their drinking water from tap, 23 (11.5%) respondents get their drinking water from well, 34 (17%) get their drinking water from both river and stream, while 47 (23.5%) fetched their water from borehole and 9 (4.5%) respondents get theirs from other sources. Hence, majority of the respondents 87 (43.5%) get their drinking water from tap.

Figure 4, reveals that 15 (7.5%) respondents used cotton as a means of treating their waters before consumption, 46 (23%) respondents use purchased water filter, 40 (20%) don't treat their water before consumption, 79 (38%) respondents treat their water by boiling, while 23 (11.5%) respondents used other means to treat their water before consumption. Hence, most of the respondents 76 (38%) said they boiled their water before consumption in the water purification / treatment in a household.

Figure 5, the result proves that 99 (49.5%) respondents said they are

less than 7 persons, while 57 (28.5%) respondents said they are between the range of 7-10 persons, and 20 (10%) respondents said they are between the range of 11-13, and 24 (12%) respondents said they are more than 13 persons. Therefore, 99 (49.5%) of the respondents said they are less than 7 persons in a household that experienced endemic typhoid fever.

Figure 6 shows that 173 (86.5%) respondents said they are aware of endemic typhoid fever, and 27 (13.5%) respondents said they are not knowledgeable about endemic typhoid fever. Hence, 173 (86.5%) of the respondents said they are aware of endemic typhoid fever in the community.

Figure 7 revealed that 186 (93%) respondents said an illness caused by bacteria due to poor personal hygiene and sanitation", 4 (2%) respondents said an illness which affect only children", 2 (1%) respondents said "endemic typhoid fever doesn't exist", while 8 (4%) respondents said that "it is when somebody has fever". Hence, majority of the respondents 186 (93%) said endemic typhoid fever is an illness caused by bacteria due to poor personal hygiene and sanitation in the community.

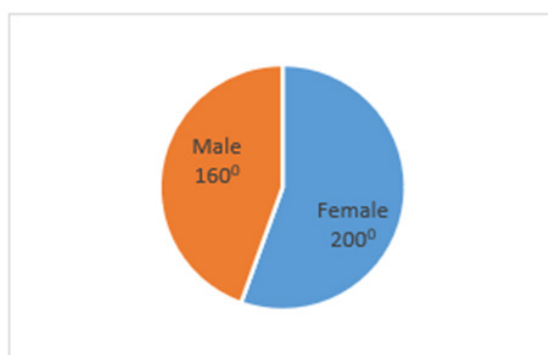


Figure 2: Distribution of Respondents by Gender.

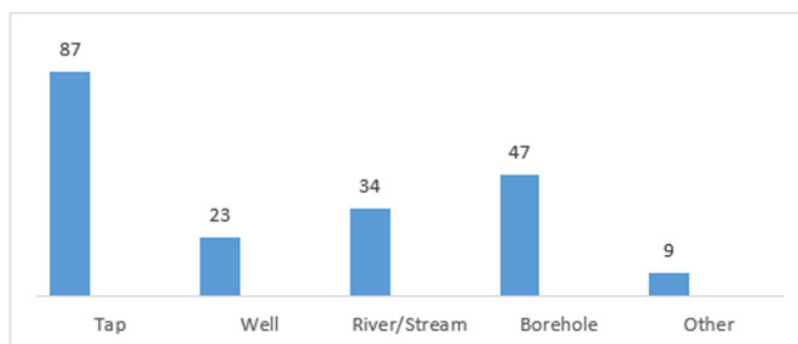


Figure 3: Respondents' Main Sources of Drinking Water.

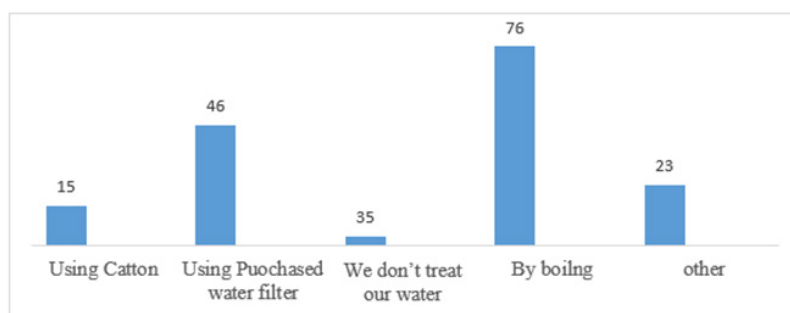


Figure 4: Respondents' Water Purification / Treatment in a Household.

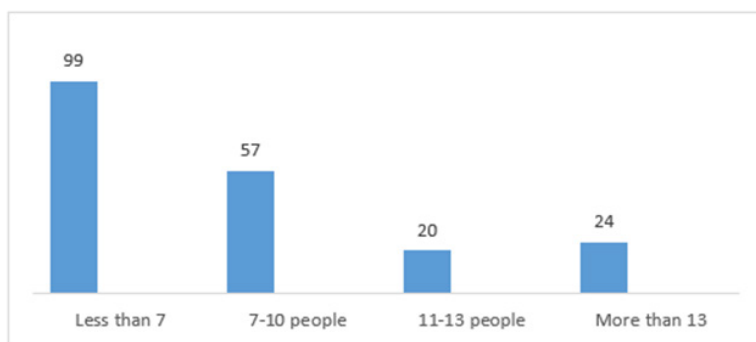


Figure 5: Number of Persons Present in a Household that Experienced Endemic Typhoid Fever.

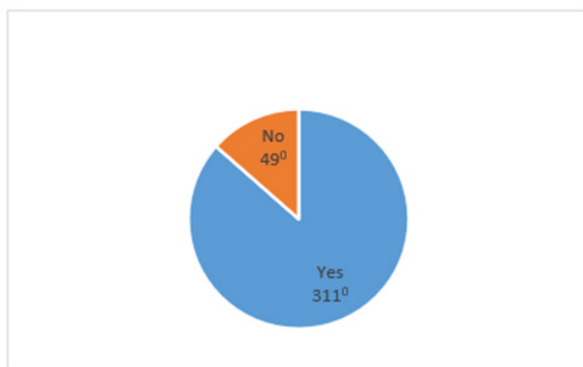


Figure 6: Awareness of Victims (Patients) on the Endemic Typhoid Fever in the community.

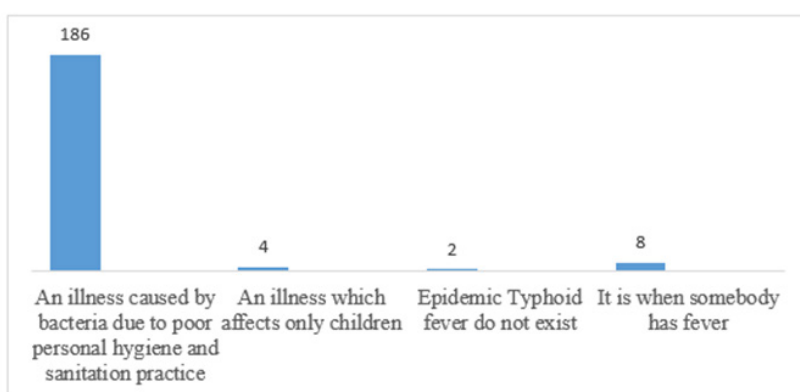


Figure 7: Knowledge of the Victims (Patients) about the Endemic Typhoid Fever.

In Figure 8, 12 (6%) respondents said “endemic typhoid fever does not have signs and symptoms”, 30 (15%) respondents said that “the signs and symptoms of endemic typhoid fever are anger, poverty, short height, and hunger”, 157 (78.5%) respondents said that the signs and symptoms of endemic typhoid fever includes “fever, vomiting, malaise, diarrhea, and headache”, and 1 (0.5%) respondents said that “overweight, hallucination, loss of hair are the signs and symptoms of endemic typhoid fever”. Therefore, majority of the respondents 157 (78.5%) said the signs and symptoms of endemic typhoid fever includes “fever, vomiting, malaise, diarrhea, and headache “.

The Figure 9, result revealed that 20 (10%) respondents said that one can gets infected with endemic typhoid fever by “talking to people”, 178 (89%) respondents said that “people can contract the disease by ingesting/eating contaminated food and water”, 2 (1%) respondents said that one can gets infected with endemic typhoid fever by walking on the way, and others were none with one can gets infected with en-

demetic typhoid fever by staying in the hospital. Hence, majority of the respondents 178 (89%) said that endemic typhoid fever is caused as a result of ingesting / eating contaminated food and water.

Figure 10, the result shows that 9 (4.5%) respondents said that going to school can serve as a risk factor for endemic typhoid fever, 29 (14.5%) respondents said that smoking or alcohol consumption can trigger endemic typhoid fever, 158 (79%) respondents said that poor hygiene and sanitation can serve as a risk factor for endemic typhoid fever, and 4 (2%) respondents said that don’t have idea on the risk factors of endemic typhoid fever. Hence, majority of the respondents 158 (79%) said that poor hygiene and sanitation can contribute immensely to the spread of endemic typhoid fever in the community.

In the Figure 11, 194 (97%) respondents said that endemic typhoid fever is a disease that can be cured, and 6 (3%) said that endemic typhoid fever cannot be cured”. Hence, majority of the respondents 194 (97%) proves that “endemic typhoid fever disease can be cured”.



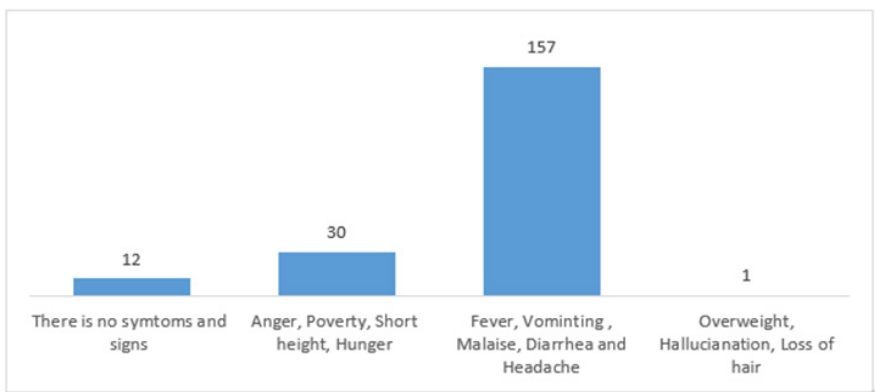


Figure 8: Clinical Signs and Symptoms of Endemic Typhoid Fever Experienced by Victims (Patients).

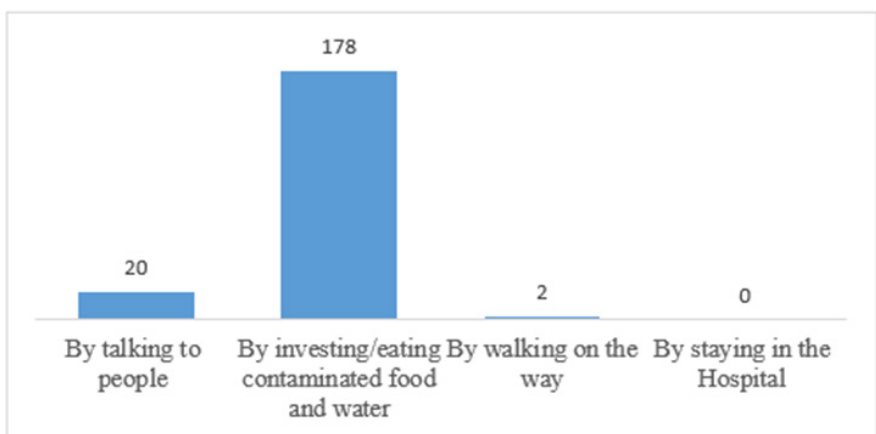


Figure 9: How the Victims (Patients) Contracted Endemic Typhoid Fever.

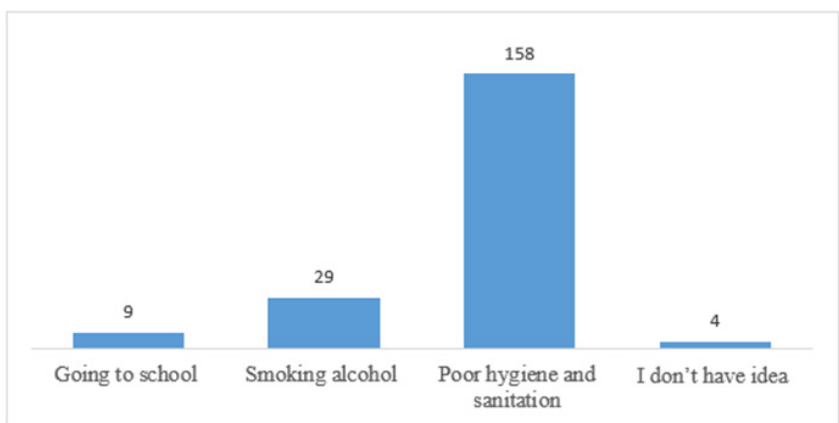


Figure 10: Factors Contributed to the Spread of Endemic Typhoid Fever in the Community.



Figure 11: Knowledge of Victims (Patients) about Treatment of Endemic Typhoid Fever.

Figure 12, revealed that 150 (75%) respondents said that early detection of the disease and follow up with appropriate antibiotics treatment can cure endemic typhoid fever, 29 (14.5%) respondents said that going to school can also serve as a cure for endemic typhoid fever, 12 (6%) respondents said that drinking contaminated water is the baseline for curing endemic typhoid fever, and 9 (4.5%) respondents said that not accessing immediate medical help can also cure endemic typhoid fever. Hence, majority of the respondents 150 (75%) said that early detection of the disease and follow up with appropriate antibiotics treatment can cure endemic typhoid fever.

In this Figure 13, 197 (98.5%) respondents agreed that endemic typhoid fever can be prevented, and 3 (1.5%) respondents disagreed that it cannot be prevented. Hence, majority of the respondents 197

(98.5%) agreed that endemic typhoid fever can be prevented in the knowledge of victims (patients) on prevention of endemic typhoid fever.

Figure 14, revealed that 10 (5%) respondents that by sleeping in the night, 4 (2%) respondents said to avoid breathing can also prevent endemic typhoid fever, 21 (10.5%) respondents said playing under the rain can also help in preventing endemic typhoid fever, and 165 (82.5%) respondents agreed that good personal hygiene and use of clean water is the baseline for preventing endemic typhoid fever. Hence, majority of the respondents 165 (82.5%) said that good personal hygiene and use of clean water is the baseline for preventing endemic typhoid fever in the community.

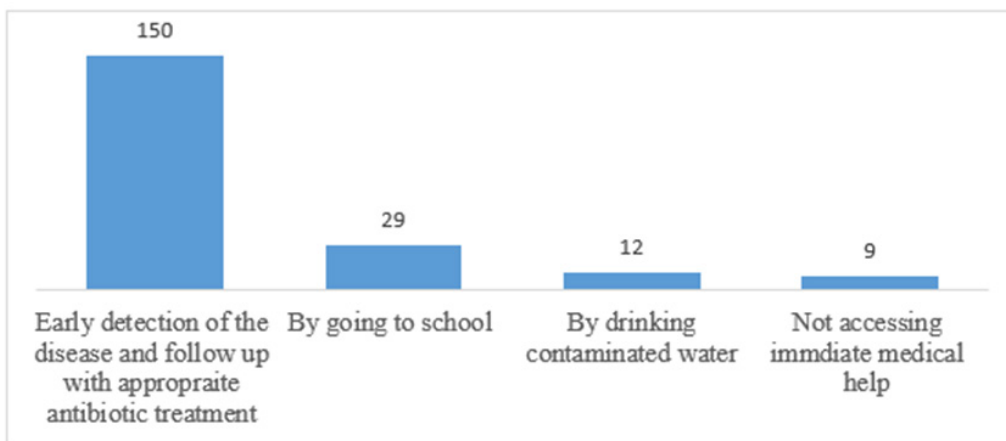


Figure 12: Management of Endemic Typhoid Fever among Victims (Patients).

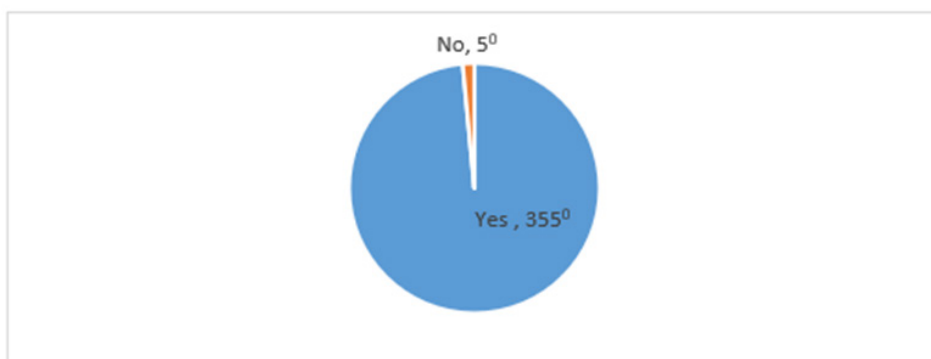


Figure 13: Knowledge of Victims (Patients) on Prevention of Endemic Typhoid Fever.

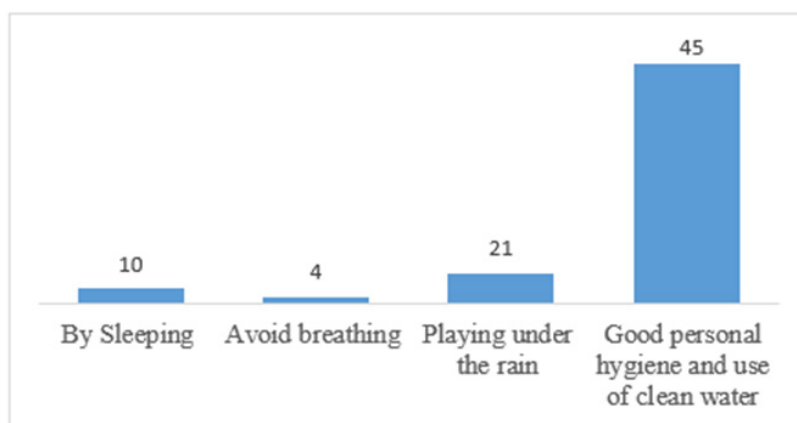


Figure 14: Prevention of Endemic Typhoid Fever among Victims (Patients).

Discussion

Endemic typhoid fever is a serious public health concern in many developing countries, including Nigeria affecting individuals of all ages. In this present study, endemic typhoid fever was highest in young adults (54.5%) aged 11-25 years than in older adults (1.5%) aged 46 and above. This is understandable, because young age adults may have a weakened immune system due to other illness, may be at higher risk of contracting the disease. This present findings contradicts a retrospective analysis of typhoid fever cases in Keffi metropolis conducted by Abdullahi, Mohammed and Bala (2020) which identifies children under the age of 5 years to be more vulnerable to endemic typhoid fever.

In terms of gender distribution, endemic typhoid fever was highest among females (55%), than in males (44.5%). This may interest us to know that in some cultures, 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.

In the same vein, in terms of knowledge and awareness of respondents about endemic typhoid fever, (93%) respondents were knowledgeable enough to know that endemic typhoid fever is caused by bacteria due to poor personal hygiene and sanitation practices. This phenomenon had been elaborated by Okoronkwo, Ojale and Akinoyemi (2019) extensively in his study on the knowledge, attitude, and practices regarding typhoid fever among residents of Keffi metropolis. Similarly Abdullahi, Umar and Ibrahim [17] note prevalence and [18,19] risk factors of typhoid fever in Keffi metropolis, Nasarawa State. This assertion reinforced the findings of this present study which observed poor personal hygiene and sanitation practices as the risk factors of endemic typhoid fever.

Conclusion

In conclusions:

- Most of respondents were females in the sex distribution.
- Majority of these respondents are young age people.
- The major risk factor contributing to the menace of endemic typhoid fever in the study area is poor personal hygiene and sanitation practices.
- Most of the respondents said the effects of endemic typhoid fever can be reduced through improvement in personal hygiene and sanitation practices.

Recommendation

Regarding the above findings, the following recommendations were made:

- There is a need for government intervention to supply typhoid fever vaccines for the control of endemic typhoid fever.
- There is a need for government to enact relevant laws that will govern safe dumping of refuse, and ensure the prosecution of defaulters.
- There is also a need for government intervention in supplying clean water or providing clean water source to the populace in order to reduce the menace of endemic typhoid fever in the study area and society as a whole.

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Ethical Clearance

The approval of this research work was obtained from the director of primary health department, Keffi LGA, Nasarawa state.

Declarations

Authors' Contribution: The study's conception was attributed to ATJ and DHI while AVO undertaken the fieldwork and data collection. OMU analyzed and interpreted the data. The initial manuscript draft was prepared by HFA, subsequently reviewed by OMU. Collaboratively, all authors played a role of refining the final manuscript, and their collective efforts culminated in its approval and submission.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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