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A THREE-YEAR HOSPITAL-BASED RETROSPECTIVE STUDY ON THE PREVALENCE OF TYPHOID FEVER AMONG PATIENTS ATTENDING SPECIALIST HOSPITAL, KABBA, KOGI STATE

[*1]Olubiyo, C.K., [1]Bonaventure, T., [1]Yusuf, L., [1]Eniola, K.I.T. and [2]Odoh V.U.

[1]Department of Biological Sciences, Kogi State University, Kabba
[2]Department of Biology, Kogi State College of Education Technical, Mopa

*Corresponding Author: kehinde128@yahoo.com /08069615157

Abstract
In tropical nations, particularly Nigeria, typhoid fever continues to be a public health concern. The purpose of this study was to ascertain the prevalence of typhoid fever during three years in a medical facility situated in Kogi State, Nigeria's North Central zone. Using laboratory records for all patient, a facility-based retrospective analysis was conducted at the Specialist Hospital Kabba in Kabba/Bunu Local Government Area between January 2021 and December 2023. Chi-square tests and descriptive statistics were employed to determine the distribution of the infection by age and season. In total, 5409 typhoid fever suspects were diagnosed using Widal test over 3 years, of which 98.8% (5343/5409) were seropositive. There were 98.9% of cases of typhoid fever during the period of the study. Typhoid fever prevalence was higher among patients aged <10 year (99.0%), followed by those aged 21-30 group (99.0%), while the prevalence was observed among patients aged 11-20 (98.5%). Annual trends in typhoid fever prevalence varied significantly with chi-square value of 20.794 from 2021 to 2023, from 99.7% in 2021 to 98.0% in 2022 to 99.0% in 2023. This study revealed the presence of high prevalence of typhoid fever in the Kabba area. In addition to clean water, sanitation, and hygiene initiatives, our results emphasize the necessity of increased surveillance as part of a more affordable and integrated approach to typhoid prevention and control.
Keywords: Typhoid fever, Prevalence, Trends, Hospital, Retrospective, Kabba

Introduction

Typhoid fever is an acute systemic infection caused by *Salmonella enterica serovar (Salmonella Typhi*, a human-restricted bacterium. Transmission occurs primarily via the fecal-oral route through ingestion of food or water contaminated with the pathogen. In settings where water treatment, waste disposal, and food handling practices are inadequate, the organism persists and spreads within communities (WHO, 2023).

Globally, an estimated 9-11 million cases occur annually, with over 110,000 deaths attributed to the disease. The burden is disproportionately concentrated in low- and middle-income countries in

sub-Saharan Africa and South Asia, where surveillance data remain limited but hospitalization rates are high (WHO, 2018). Clinical presentation ranges from prolonged fever and abdominal symptoms to severe complications such as intestinal perforation and sepsis, which contribute to prolonged hospital stays and treatment costs.

In Nigeria, rapid urbanization, population growth, and intermittent access to potable water create favorable conditions for sustained *S. Typhi* transmission. Outbreaks have been reported across multiple states and are frequently associated with rainy seasons, flooding, and reliance on untreated water sources. Despite vaccination campaigns and antimicrobial therapy, drug resistance among *S. Typhi* isolates has been documented in several Nigerian centers, complicating treatment outcomes and increasing healthcare expenditure (WHO, 2018).

At the hospital level, routine diagnosis relies on clinical suspicion supported by laboratory tests such as Widal test agglutination. However, hospital-based data on temporal trends, age distribution, and seasonality are sparse in many secondary facilities, particularly outside major urban centers (Sur *et al.,* 2018). This gap limits the ability of local health authorities to plan targeted interventions, allocate resources, and monitor the impact of control measures.

Specialist Hospital, Kabba, serves as a major referral center in Kogi State, attending to both urban and rural populations with diverse socioeconomic backgrounds. (Tientche *et al.,* 2025). Till date, there is limited published information on the hospital-based epidemiology of typhoid fever in this catchment area over an extended period. This study determines the prevalence of typhoid fever among patients attending Specialist Hospital, Kabba, over a 3-year period (2021-2023).

Materials and Methods

Description of Study Area

Specialist Hospital, Kabba is a secondary healthcare facility located in Kabba town, Kogi West Senatorial District, Kogi State, Nigeria. Kabba is the headquarters of Kabba/Bunu Local Government Area and lies on latitude 7 49'N and longitude 6 05'E in the northwestern part of Kogi State. Specialist Hospital, Kabba was established to provide secondary-level healthcare services to residents of Kabba/Bunu LGA and neighboring LGAs including Ijumu, Mopa-Muro, Yagba East, and Yagba West. It also receives referrals from parts of Ekiti, Kwara, and Ondo States due to its central location (Tientche *et al*., 2025)

Kabba town is situated approximately 45 km west of Lokoja, the state capital, and serves as a major commercial and administrative hub for the Okun-speaking people of Kogi State. The area has a tropical climate with two distinct seasons: a rainy season from April to October and a dry season from November to March. The average annual rainfall is 1200-1500mm, with peak rainfall between June and September. The population of Kabba/Bunu LGA is estimated at over 150,000 people based on projections from the 2006 national census, with a mix of urban and rural dwellers. The major occupations include farming, trading, civil service, and artisanship (NPC, 2006).

Study Setting and Design

A facility-based Retrospective study from was carried out at the Specialist Hospital Kabba in the Kabba/Bunu Local Government Area of Kogi State. Laboratory records of patients tested for typhoid fever between January 2021 and December 2023 were reviewed. This facility serves as a major healthcare facility for residents of Kabba and neighbouring communities and is located approximately 130 km from Lokoja, the capital of Kogi State. The hospital serves the Kabba community and the surrounding area with medical care. The area is 130 km from Lokoja, the capital of Kogi State. The hospital serves the Kabba community and the surrounding area with medical care.

Data Collection

Retrospective data collected January 2021 and December 2023 on the trend of typhoid fever prevalence were extracted from the Medical Laboratory records of Specialist Hospital Kabba. Data extracted include age, date of blood examination, months, and years of testing. Age was categorized into brackets (≤ 10, 11–20, 21–30, > 30 years) according to Etouke *et al*. 2024. Patients with positive Widal tests results were coded as "1", whereas, those with negative results were coded as "0".

Data analysis

The data was analysed using chi-square tests and descriptive statistics. Statistical Package for the Social Sciences (IBM SPSS) version 20.0 was used to analyze the secondary data after it had been imported into an Excel sheet. Graphs and tables were utilized to display the findings of the chi-square test and percentage prevalence analysis of the data to ascertain the association between the year and age groups.

Results

Figure 1 shows the monthly trend of Typhoid fever in the year 2021, there was a fluctuation in cases across the months. The prevalence of Typhoid was 99.0%. There was a slight decrease in June and September. Overall, positive cases remained consistently high throughout all month.

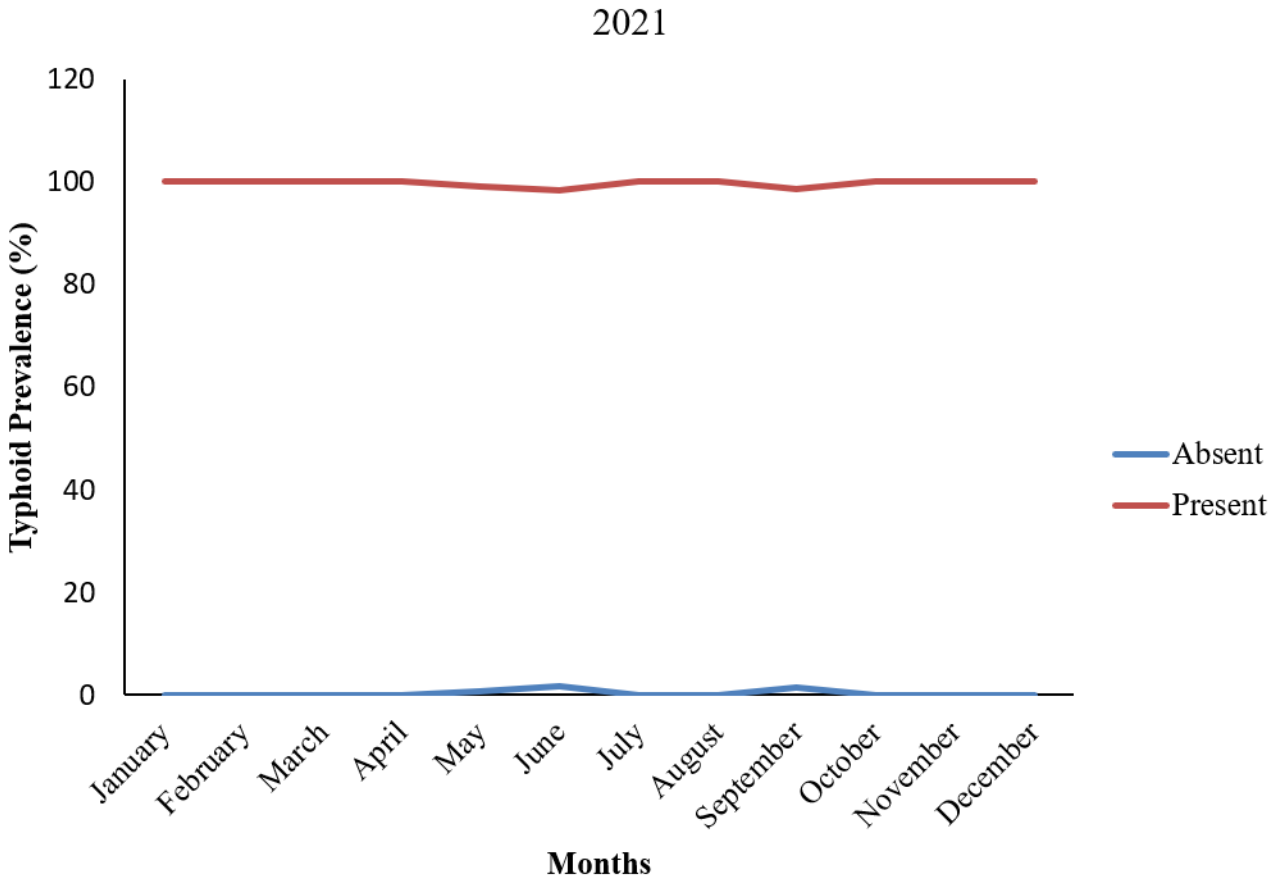

Figure 1: Monthly Trends of Typhoid Fever in 2021

Figure 2 shows the monthly trend of Typhoid fever in the year 2022. Typhoid fever positivity was sustained from 97-100% from January to June with a decrease to 85% in July followed by a return in August to December. There was an increase in negative cases in the month of July.

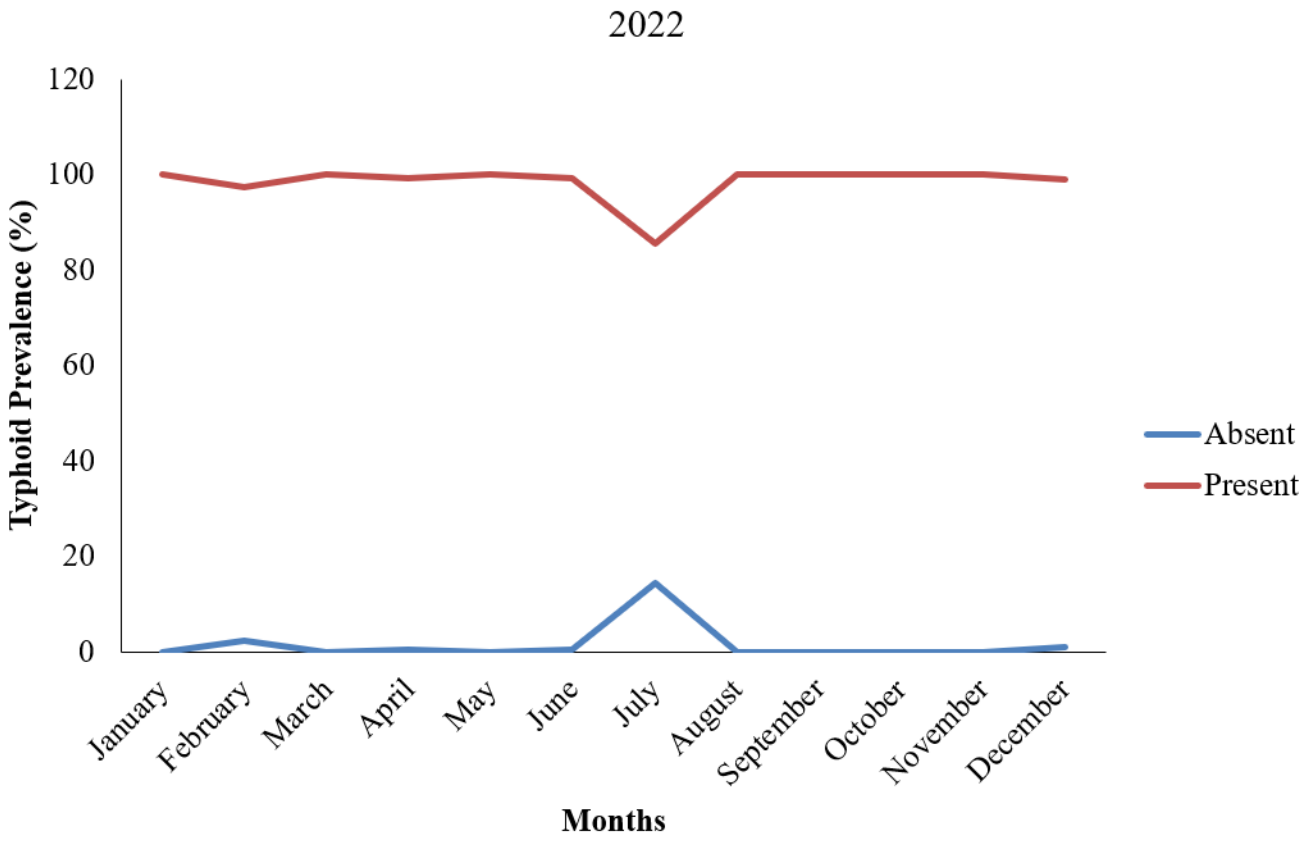

Figure 2: Monthly Trends of Typhoid Fever in 2022

Figure 3 illustrate the monthly distribution of Typhoid for 2023. Positivity was maintained at 99-100%, from January to April, with a minor decline to 92% in May and 96% in June before stabilizing July to December. There was a peak in negative cases

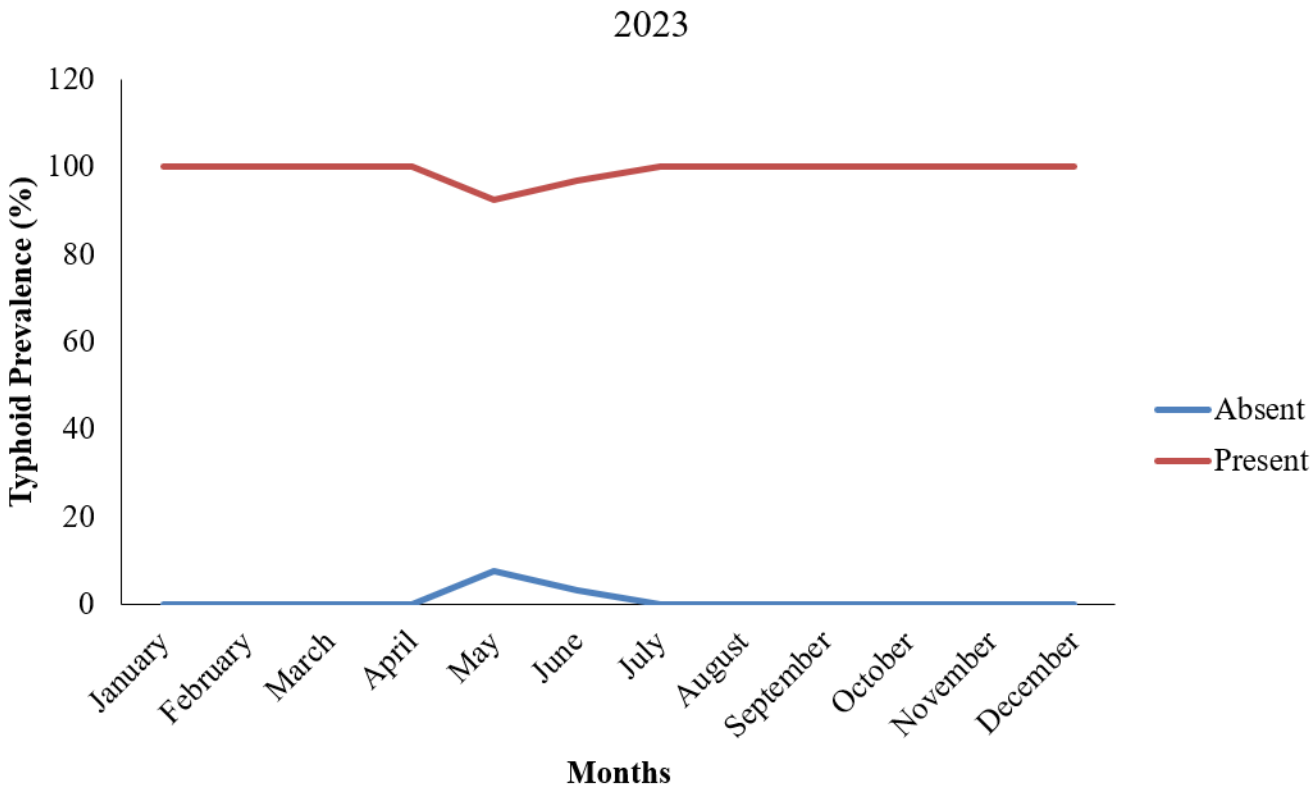

Figure 3: Monthly Trends of Typhoid Fever in 2023

A total of 5407 cases suspected cases, out of these 5434 (98.8%) tested positive while only 64(1.2%) was negative. In 2021 5(0.3%) were and 1498 (99.7%) were positive; 2022 39(2.0%) were and 1913 (98.0%) were positive; 2023 20(1.0%) were and 1932 (99.0%) were positive. The Chi-square value was 20.794 with a p-value of <0.001. This indicates statistically significant association between year and typhoid fever prevalence (Table 1)

Table 1: Prevalence of Typhoid Fever

Variables	Negative	Positive	Chi-square	p-value
2021	5 (0.3%)	1498 (99.7%)	20.794	<0.001
2022	39 (2.0%)	1913 (98.0%)		
2023	20 (1.0%)	1932 (99.0%)		
Total	64 (1.2%)	5343 (98.8%)		

The distribution of typhoid fever based on age groups. The age group <10 years: 14(1.0%) negative, 1445 (99.0%) positive; age group 11-20 years: 6(1.5%) negative, 401 (98.5%) positive; age group 21-30 years: 8(1.0%) negative, 785 (99.0%) positive; age group >30: 36(1.3%) negative, 2712 (98.7%) positive. The age-group 21-30 years had the highest number of cases followed by <10 years. The chi-square value was 1.503 with a p-value of 0.682. There is no statistically significant association between age groups and Typhoid fever (Table 2).

Table 2: Age Distribution of Typhoid Fever

Age	Negative	Positive	Chi-square	p-value
<10	14 (1.0%)	1445 (99.0%)	1.503	0.682
11-20	6 (1.5%)	401(98.5%)		
21-30	8 (1.0%)	785 (99.0%)		
>30	36 (1.3%)	2712 (98.7%)		
Total	64 (1.2%)	5343 (98.8%)		

Discussion

With an overall frequency of tested case of 98.8%, the study shows the prevalence of typhoid fever among patients who shows and was tested for typhoid fever at Specialist Hospital, Kabba. Patients under the age of ten and those in the 21–30 age range had the highest prevalence, which varied between age groups. The age distribution of typhoid fever cases in our study showed that the highest prevalence rate was among patients under 10 years (99.0%), followed by those in the 21-30 age group (99.0%). These findings are consistent with those of other studies that have reported a high burden of typhoid fever among children and young adults (Crump *et al.,* 2004; Ochiai *et al*., 2008). The high prevalence rate among children may be attributed to their increased susceptibility to infection due to their developing immune systems and poor hygiene practices. Typhoid fever prevalence increased steadily between 2021 and 2023, according to annual averages. As part of an all-encompassing strategy for typhoid prevention and control, these results emphasize the necessity of increased surveillance and the introduction of typhoid conjugate vaccines (TCVs).

This rate is significantly higher than those reported in similar studies conducted in other parts of Nigeria, such as a study in Sokoto that reported a prevalence rate of 75.6% (Jamilu *et al*., 2019). The high prevalence rate in our study may be attributed to the fact that Specialist Hospital, Kabba, is a major referral center for the surrounding communities, which may lead to an overrepresentation of typhoid fever cases (Tientche *et al*., 2025).

The monthly distribution of typhoid fever cases showed a steady trend over the 3-year period, with slight variations. The highest prevalence rate was recorded in 2021 (99.7%), followed by 2023 (99.0%), and the lowest in 2022 (98.0%). These findings are consistent with earlier studies that reported fluctuations in typhoid fever prevalence rates over time (Buckle *et al*., 2012; Mogasele *et al*., 2014). The fluctuation may be attributed seasonal and climatic factors the peak rainy season in Kabba occurs between June and September, with an average annual rainfall of 1200-1500mm. During this period, flooding and runoff often contaminate boreholes, wells, and streams which are major sources of drinking water for many households. This increases exposure to *S. Typhi* through contaminated water and food, leading to a rise in infected cases. Our findings are in agreement with the WHO which established that typhoid fever incidence often peaks during and after rainy

seasons in endemic areas due to contamination of water supplies (Akinyemi *et al.,* 2021). Conversely, the dry season months may show a decline as water sources are less prone to surface contamination. Also, Inconsistent access to safe drinking water and poor sanitation infrastructure in both urban and rural communities around Kabba/Bunu LGA contribute to periodic outbreaks. During periods of water scarcity in the dry season, people may resort to unsafe water sources, while poor waste disposal during rains facilitates fecal contamination. These variations in exposure risk drive the slight monthly differences seen. Genomic studies from Nigeria also highlight that multiple introductions of *S. Typhi* occur through regional movement and poor WASH, sustaining transmission.

Our study's high typhoid fever prevalence rate might be attributed to the use of widal test agglutination method by Specialist Hospital Kabba and emphasizes the necessity of increased surveillance and the introduction of typhoid conjugate vaccines (TCVs) as part of an all-encompassing strategy for typhoid prevention and control. In endemic regions, TCVs have been demonstrated to be successful in lowering the incidence of typhoid fever (Meiring *et al*., 2018). The results also highlight the significance of expanding access to WASH (safe water, sanitation, and hygiene) services, especially in the areas around Specialist Hospital, Kabba.

In comparison to other studies, our findings are consistent with those reported in similar settings. A study conducted in Ghana reported a prevalence rate of 92.6% among suspected typhoid fever cases (Marks *et al*., 2017). Another study in Ethiopia reported a prevalence rate of 85.1% (Animut *et al*., 2019). However, the prevalence rate in our study is higher than in some other studies, which could be explained by variations in the population, laboratory techniques, and study design.

Conclusion

The findings underscore that typhoid fever remains a major public health concern in Kabba and its environs. The persistence of high positivity rates among tested cases suggests that the use of Widal test agglutination method by Specialist Hospital Kabba and ongoing transmission, likely driven by contamination of water sources during the rainy season, poor sanitation infrastructure, and the circulation of MDR and ESBL-producing *S. Typhi* strains as reported in other parts of Nigeria and globally.

Ethics and Approval and Informed Consent: Data used were obtained secondarily for public databases, without participants´ identifier information. Therefore, informed consent was not applicable

Authors´ contribution: OCK and BT conceptualized the study, OCK, BT, YL, KITE and OVU designed the study. OCK, BT and YL Participated in fieldwork and data collection. OCK, KITE and OVU performed the data analysis; OCK, BT and YL interpreted the data. OCK prepared the first draft of the manuscript, reviewed by BT, YL and KITE. All authors contributed to the development of the final manuscript and approved its submission.

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