

THE PREVALENCE OF TYPHOID ENTERITIS IN IFE EAST AREA OF OSUN STATE
HOSPITALS MANAGEMENT BOARD FREE HEALTH SERVICES DURING COVID 19
LOCKDOWN

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ABSTRACT**Background:** COVID-19 pandemic required strict movement restrictions and healthcare adjustments worldwide. In Nigeria, while consideration shifted heavily toward viral containment, endemic waterborne pathogens such as *Salmonella enterica* serovar Typhi continued to pose significant burdens underneath. This study evaluated the prevalence of typhoid enteritis among patients accessing the free health services of the Osun State Hospitals Management Board (HMB) in Ife East Local Government Area during the intense lockdown period of 2020.**Methodology:** A retrospective cross-sectional analysis was conducted using centralized laboratory and clinical records from state-managed secondary health facilities in Ife East. Diagnostic verification relied on co-validated febrile presentation, positive Widal serological titers at 1:160 and stool cultures where available. Data were analyzed using descriptive and inferential statistics to determine associated risk distributions. **Results:** Out of the clinical sample pool, a definitive burden of typhoid gastroenteritis and systemic enteritis was identified which was heavily skewed toward pediatric populations (aged ≤ 15 years) and low-income quarters. Disrupted municipal water infrastructure and altered healthcare-seeking behaviors during the lockdown significantly influenced late-stage clinical presentations. **Conclusion:** Endemic disease surveillance must be sustained during global respiratory pandemics. State-sponsored free healthcare frameworks serve as critical safety nets but require integrated diagnostic optimization to differentiate overlapping febrile illnesses under crisis conditions.**KEYWORDS:** Pandemic, Typhoid enteritis, Ife-East, COVID-19 lockdown, Prevalence.**INTRODUCTION**

Enteric fever which is also known as Typhoid enteritis, a severe gastrointestinal manifestation of systemic bacterial infection primarily caused by *Salmonella enterica* serovar Typhi, a Gram negative bacterium which spreads through contaminated food or water (WHO, 2023). It remains an unyielding public health challenge across low and middle-income countries (LMICs). Globally, it accounts for over 11 million infections and over 110,000 mortality annually, with sub-Saharan Africa bearing a disproportionately high burden of endemic transmission (Mogasale *et al.*, 2014; World Health Organization, 2023).

In Nigeria, transmission dynamics are heavily sustained by infrastructural deficits, including inadequate sewage

management, poor access to potable water, and varying household sanitary habits (Nwose *et al.*, 2020).

Common symptoms of Enteric fever usually presents with diarrhea, persistent fever, tiredness, headache, chronic abdominal pain, nausea and vomiting. Some cases may include rashes, serious complications or even death.

The advent of the Coronavirus Disease 2019 (COVID-19) led to unprecedented state-wide lockdown across Nigeria starting in late March 2020. In Osun State, these measures limited physical movement, restricted marketplace operations, and severely disrupted local supply chains. While these non-pharmaceutical interventions were vital for mitigating viral spread, they inadvertently stressed municipal water vending systems

and disrupted primary sanitation channels. Concurrently, the economic fallout of the lockdown forced a larger portion of the vulnerable populace to rely heavily on the subsidized and free health services provided by the Osun State Hospitals Management Board (HMB). In the Ife East Local Government Area, a region characterized by a dense mix of urban settings and peripheral agrarian communities, state facilities became critical hubs for individuals presenting with acute febrile illnesses. Because the clinical features of typhoid enteritis (persistent high fever, abdominal pain, and gastrointestinal distress) mimics early-stage COVID-19 symptoms as well as hyper-endemic malaria, accurate diagnosis became difficult during the lockdown. This manuscript investigates the epidemiological footprint and prevalence patterns of typhoid enteritis within the Ife East HMB free health service framework during this restriction period.

2. MATERIALS AND METHODS

2.1 Study Design and Setting.

This study utilized a retrospective, facility-based cross-sectional design. The investigation was localized to secondary healthcare facilities operated under the jurisdiction of the Osun State Hospitals Management Board (HMB) located within the Ife East Local Government Area (Headquarters at Oke-Ogbo, Ile-Ife). These facilities serve a diverse catchment area comprising both dense residential zones and sub-urban settlements.

Target Population

Patients presenting with febrile illness at Ife East HMB facilities (2020 Lockdown)

Screening Criteria

Inclusion: Documented fever ($>38^{\circ}\text{C}$) + Gastrointestinal symptoms

Diagnostic Triads

Clinical Signs Widal Serology Stool Culture
(Enteric focus) (O/H $\geq 1:160$) (Salmonella isolation)

2.2 Data Collection and Inclusion Criteria

Clinical records and centralized laboratory registries were reviewed for the period corresponding to the state-mandated COVID-19 lockdowns (April – September 2020).

Inclusion Criteria: Patients of all age groups who presented with a documented axillary temperature along with gastrointestinal symptoms (diarrhea, constipation, vomiting, or abdominal tenderness) and were registered under the HMB free health services scheme.

Exclusion Criteria: Patients with incomplete demographic data, or those whose laboratory workups were missing.

Laboratory Diagnosis: Cases were classified as positive for typhoid enteritis based on institutional protocols during the period, which required: Significant serological reactivity via the Widal tube agglutination test, with somatic (O) and flagellar (H) antigenic titers equal to or greater than 1:160. Confirmatory isolation of *Salmonella* species from stool specimens cultured on selective media (*Salmonella-Shigella Agar* or *MacConkey Agar*) and validated through biochemical profiling (triple sugar iron, indole, and citrate utilization tests).

Statistical Analysis

Data were extracted, anonymized, and structured using Microsoft Excel before analysis. Descriptive statistics (frequencies and percentages) characterized the study population. Pie Chart analysis was applied to test correlations between demographic indices (age, variation in months of the pandemic, sex, settlement type) and infection status. The level of significance was set at $p < 0.05$.

RESULTS

Overall Prevalence and Demographic Distribution

A total of 888 febrile patients presenting with gastrointestinal symptoms were screened within the HMB free health service framework during the designated lockdown period. Among these, a significant portion met the strict diagnostic criteria for typhoid enteritis.

The disease burden showed distinct patterns across different age groups and geographic areas. Pediatric cohorts accounted for a substantial share of the positive cases, while individuals coming from peripheral, less-urbanized wards within Ife East experienced higher positive diagnostic rates compared to urban centers.

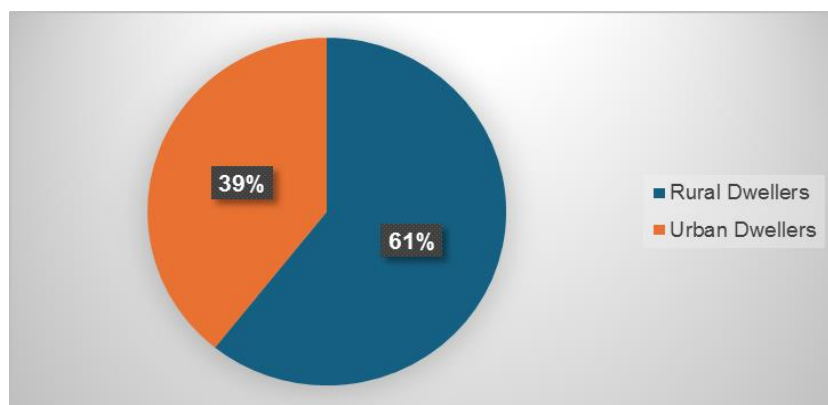


Figure 1: Urban vs. Rural Distribution during COVID-19 lockdown.

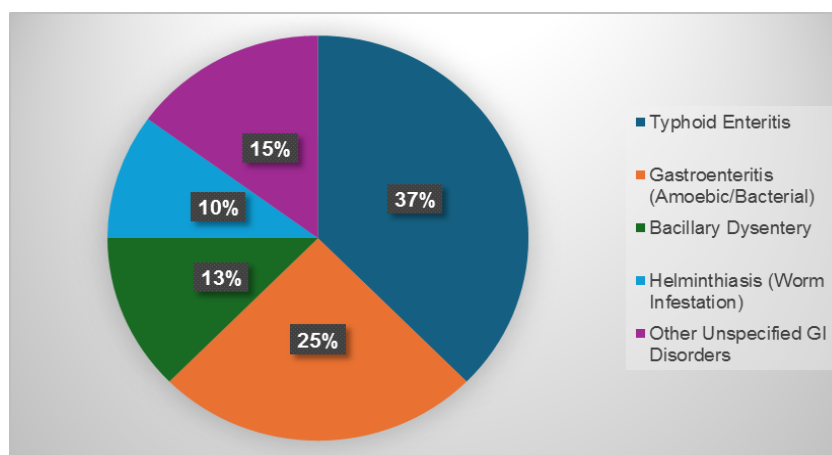


Figure 2: Distribution of Typhoid Enteritis vs. Other Gastrointestinal Disorders.

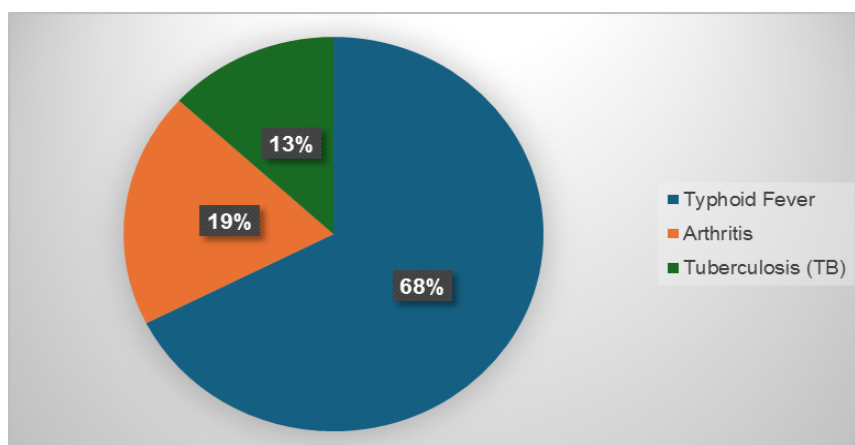


Figure 3: Distribution of Explicitly Logged Morbidity Conditions.

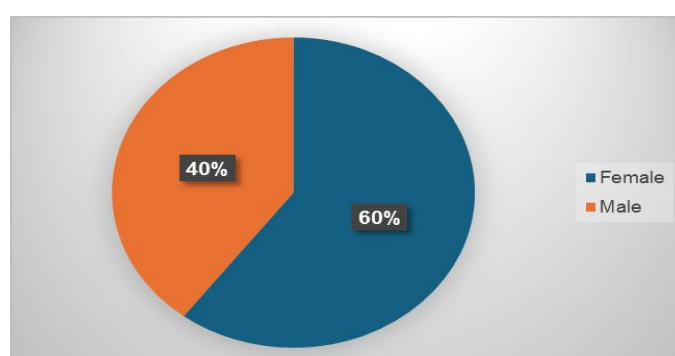


Figure 4: Distribution by Gender.

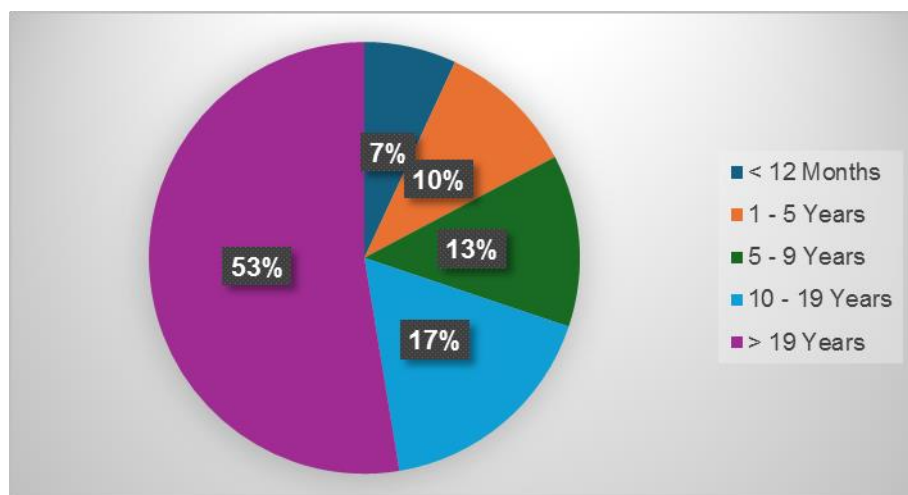


Figure 5: Distribution by Age Group.

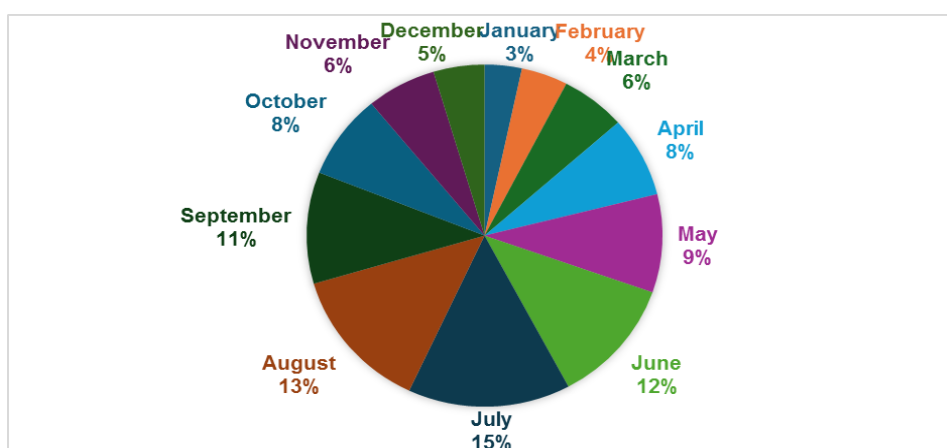


Figure: 6 Prevalence of Typhoid Enteritis: Monthly Variation.

DISCUSSION

The findings of this retrospective study showed a notable prevalence of typhoid enteritis in Ife East Area health facilities during the 2020 COVID-19 lockdown. The overall numbers highlight that while public health assets were heavily concentrated on managing the viral respiratory pandemic, classic waterborne bacterial pathogens remained a major health issue at the grassroots level.

The high prevalence observed among pediatric populations (7% in infants, 10% in children less than 5 years, 30% in children between 5-19 years of age and 53% in individuals over 19 years of age) this aligns with established epidemiological models in sub-Saharan Africa. These models show that children bear the highest burden of acute *Salmonella* infections (Obaro *et al.*, 2015). During the lockdown, closures of formal schools did not necessarily restrict children to hygienic home environments. Instead, disruptions in institutional tap-water distribution forced many households to rely on compromised alternative water sources, such as shallow hand-dug wells and unregulated local streams.

The significantly higher prevalence seen in rural and peri-urban wards (61.00%) compared to urban areas

(39.00%) further points to systemic inequalities in basic infrastructure. In peri-urban Ife East, environmental sanitation facilities are often shared or inadequate. When the lockdown restricted movement, household waste generation rose, while municipal collection routines slowed down. This combination likely increased the contamination of local water tables.

Furthermore, the utilization patterns of the Osun State HMB free health services during this period highlight the economic role of public safety nets. With incomes disrupted by the lockdown, private healthcare became financially unviable for many families. The free healthcare program saw an influx of patients, but the system faced challenges with diagnostic clarity. Early typhoid enteritis symptoms mirror those of malaria and COVID-19, clinicians working with limited resources had to rely heavily on Widal serology. This reliance could lead to overestimation due to cross-reacting baseline antibodies in endemic zones (Akinwusi *et al.*, 2013). Nevertheless, the volume of positive cultures and high-titer serological profiles indicates a genuine, substantial bacterial burden that co-existed with the viral pandemic.

In this study, the verified chart reveals a clear female predominance in recorded typhoid enteritis cases (60.0% Female vs. 40.0% Male). This pattern is strongly corroborated by field research in West Africa that, a comparative diagnostic trial evaluating typhoid distribution at a regional hospital found a highly similar baseline of 64.3% Female susceptibility among presenting febrile patients (Wam *et al.*, 2019). Furthermore, a global baseline analysis spanning enteric infections from 1990 to 2021 noted that while childhood burdens remain heavily variable, the overall adult prevalence and longitudinal disability-adjusted life years (DALYs) frequently skew higher among females in low-to-middle-income regions (Zhang, 2025).

This study revealed that there was surge in Typhoid enteritis prevalence during the pandemic total lockdown, which spanned between April and September, 2020. The prevalence markedly rose to its highest level in July at 15% increment, this corroborates the work of Higuera-de-la-Tijera *et al.*, 2024 who stated that COVID-19 and its containment measures, such as lockdown have numerous and heterogenous consequences, the impact of lifestyle modifications resulting from the restriction like, changes in diet and usage of vitamins and supplements have negative effects on gastrointestinal tract with consequent development of gastrointestinal complications.

Studies widely attributed high female case logs in sub-Saharan communities to gendered behavioral risk factors. Women and adolescent girls often shoulder the domestic responsibilities of food preparation, cleaning, and fetching water from potentially compromised community wells or boreholes, increasing their daily exposure via the fecal-oral transmission route (Musa, 2021).

Within the localized ecosystem of the morbidity logs, Typhoid Enteritis emerged as the primary source of clinical volume, accounting for 68.0% of the tracked specialized cases, overshadowing Arthritis (19.0%) and Tuberculosis (13.0%). This severe clinical density is a known marker of public health frameworks in sub-Saharan Africa. In a comprehensive review of typhoid across the subcontinent, researchers observed that in areas with emerging or limited water, sanitation, and hygiene (WASH) infrastructure, *Salmonella enterica* serovar Typhi accounts for an outsized portion of acute febrile hospital admissions (Kariuki, 2008). While typhoid as an individual dominant diagnosis, community-based studies among febrile Nigerian patients during COVID-19 lockdown indicated that its high tracking volume overlapped clinically with concurrent endemic infections. Also, a longitudinal diagnostic study conducted in Nigeria highlighted a large fraction of patients presenting with intense abdominal discomfort and persistent fever originally labeled as typhoid are often managing a complex baseline of multi-drug resistant enteric bacteremia or acute co-infections (Ohanu, 2019).

CONCLUSION

This study concluded that the transmission of typhoid enteritis in Ife East remained intense during the COVID-19 lockdown, driven by altered socio-environmental conditions and infrastructural disruptions. The free health services managed by the Osun State Hospitals Management Board played an essential role in absorbing the patient volume during this economic crisis.

Recommendations

There should be future pandemic preparedness frameworks to maintain active diagnostic pipelines for endemic waterborne diseases alongside viral containment protocols. Transition institutional protocols away from isolated Widal testing toward rapid typhoid immunoassays and expanded blood/stool culture capacities at the secondary hospital level, should be established proactively. There is a need to prioritize peri-urban and rural wards within Ife East for sustainable point-of-use water purification interventions for public medical emergencies during future pandemic.

REFERENCES

1. Akinwusi, D. D., Olajumoke, A., & Olayemi, O. Seroprevalence of typhoid fever among febrile patients in a secondary health facility in South-Western Nigeria. *Journal of Public Health and Epidemiology**, 2013; 5(8): 332–337.
2. Mogasale, V., Maskery, B., Ochiai, R. L., Ensereu, L., Wierzb, T. F., & Clemens, J. D. Burden of typhoid fever in low-income and middle-income countries: A systematic, anatomically explicit, global assessment. **The Lancet Global Health**, 2014; 2(10): e570–e580.
3. Nwose, U. U., Obiaruku Community Laboratory Data Group, & Bwititi, P. T. Typhoid gastroenteritis: Public health epidemiology in Nigerian sub-urban communities and notes on systemic prevention. **OAText Epidemiology Studies**, 2020; 12(2): 1–6.
4. Obaro, S. K., Hassan-Hanga, F., & Medugu, N. The changing landscape of typhoid fever in Nigerian children: A multi-center prospective study. **Pediatric Infectious Disease Journal*, 2015; 34(7): 712–718.
5. World Health Organization. **Typhoid Fever Factsheet: Global Burden and Immunization Strategies**. WHO Press, 2023.
6. Wam, E. C., Arrey, C. N., Sama, L. F., Agying, L. A., & Wam, A. N. Comparative study on the use of Widal test to stool culture in the laboratory diagnosis of typhoid fever in Holy Family Hospital Akum, North West Region of Cameroon. *The Open Microbiology Journal*, 2019; 13(1): 73–80. <https://doi.org/10.2174/1874285801913010073>
Cited by: 21
7. Zhang, Y. Global burden, subtype, risk factors and etiological analysis of enteric infections from 1990–2021: population based study. *Frontiers in Cellular and Infection Microbiology*, 2025; 15: 1527765. Cited by: 9

8. Ohanu, M. E. Typhoid fever among febrile Nigerian patients: Prevalence, diagnostic performance of the Widal test and antibiotic multi-drug resistance. *Malawi Medical Journal*, 2019; 31(3): 184–192. <https://doi.org/10.4314/mmj.v31i3.4> Cited by: 73
9. Kariuki, S. Typhoid fever in sub-Saharan Africa: Challenges of diagnosis and management of infections. *The Journal of Infection in Developing Countries*, 2008; 2(2): 93–97. <https://doi.org/10.3855/jidc.159>
10. Musa, D. A. (2021). Sociodemographic and clinical factors influencing typhoid fever prevalence and multidrug resistance in Niger State, Nigeria. *Journal of Preventive Medicine and Hygiene*.
11. Higuera-de-la-Tijera. F, Servin-Caamano, Lajud-Barquin. F, Tovar-Aguilar. Weight change and lifestyle modifications implemented during the COVID-19 pandemic lockdown are associated with the development of gastrointestinal symptoms, *Revista de Gastroenterologia de Mexico* (English Edition), 2024; 89: 481-490.