
| RESEARCH ARTICLE

Prevalence of Typhoid Fever among Patients in Ga West Municipality, Ghana: A Blood Culture-Based Cross-Sectional Study

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| ABSTRACT

Typhoid fever remains a significant public health burden in sub-Saharan Africa, yet many Ghanaian municipalities lack laboratory-confirmed epidemiological data. This study determined the prevalence of blood culture-confirmed typhoid fever and identified associated demographic and clinical factors among febrile patients in Ga West Municipality, Ghana. We conducted a cross-sectional study from October 2025 to March 2026 among 284 febrile patients attending seven health facilities. We processed blood cultures using standard microbiological procedures to isolate *Salmonella Typhi*. Data on sociodemographic and clinical characteristics were collected using a structured questionnaire. We used descriptive statistics, chi-square tests, and binary logistic regression for analysis, with statistical significance set at $p < 0.05$. The prevalence of blood culture-confirmed typhoid fever was 2.8% (95% CI: 1.2%-5.4%), with 8 positive isolates among 284 participants. Fever (85.6%), headache (56.7%), loss of appetite (49.6%), and abdominal pain (48.6%) were the most common presenting symptoms. Prevalence varied widely by age group (0.0%–10.0%), being highest among participants aged ≥ 60 years (10.0%) and lowest among those aged 18–29 years (0.0%). Five positive cases were male, and three were female; sex was not significantly associated with blood culture positivity. Clinical characteristics were significantly associated with blood culture positivity ($\chi^2 = 13.527$, $df = 6$, $p = 0.036$) and independently predicted laboratory-confirmed typhoid fever (model $\chi^2 = 15.214$, $df = 3$, $p = 0.018$), whereas sociodemographic factors were not significantly associated. The low prevalence of culture-confirmed typhoid fever (2.8%) among febrile patients underscores the importance of laboratory confirmation to avoid overdiagnosis and inappropriate antibiotic use. Strengthening blood culture capacity and implementing evidence-based clinical algorithms are essential for improving typhoid diagnosis, antimicrobial stewardship, and public health interventions in Ga West Municipality and similar settings in Ghana.

| KEYWORDS

Typhoid fever, *Salmonella Typhi*, prevalence, blood culture, Ghana, Ga West Municipality

| ARTICLE INFORMATION

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1. Introduction

Typhoid fever remains a major cause of morbidity and mortality in low-income settings where access to clean water and sanitation infrastructure is scarce. (Marks et al., 2024; Teferi et al., 2022). The WHO estimates approximately 11–

21 million cases and over 600,000 deaths annually, with the highest burden concentrated in sub-Saharan Africa and South Asia. (Marks et al., 2024; Sekhar et al., 2020). In Ghana specifically, typhoid fever ranked among the top ten causes of outpatient illnesses from 2020 to 2022, with over 365,000 cases reported in 2017 alone (Besigye & Oyo, 2024; Boakyey Okyere et al., 2025).

The Severe Typhoid in Africa programme documented high disease incidence exceeding 100 per 100,000 person-years across multiple sub-Saharan sites, with 346 *S. Typhi* isolates recovered from 27,544 blood cultures (Marks et al., 2024). Earlier multicentre surveillance across 13 African countries yielded 135 *S. Typhi* isolates from 13,431 febrile patients, with adjusted incidence rates ranging from 0 to 383 per 100,000 person-years (Marks et al., 2017). Multidrug-resistant *S. Typhi* was isolated in Ghana, Kenya, and Tanzania, underscoring the dual threat of disease burden and antimicrobial resistance (Marks et al., 2017). A systematic review estimated a pooled typhoid prevalence of 4.1% in Ghana, averaging 7.7% among febrile patients (Dassah et al., 2025). Blood-culture-confirmed prevalence among febrile patients ranges widely across the region: 6.4% in Kebbi State, Nigeria (Faruku et al., 2024) 5.0% in southern Ethiopia (Habte et al., 2018) 3.7% in western Uganda (Nakisuyi et al., 2023) and 2.95% in Andhra Pradesh, India (Sekhar et al., 2020).

Blood culture remains the practical reference standard for typhoid diagnosis, yet its yield is compromised by prior antibiotic exposure, late presentation, and laboratory capacity constraints (Dassah et al., 2025; Prah et al., 2022). In a Ghanaian study at the University of Cape Coast Hospital, 48% of participants reported antibiotic use within two weeks before presentation, and no participant was culture- or PCR-positive for *S. Typhi* (Prah et al., 2022).

While significant efforts have been made to lessen the burden of many infectious diseases worldwide, typhoid fever remains a major cause of morbidity among people living in endemic areas, particularly in sub-Saharan Africa and South Asia (Aiemojoy et al., 2022; Manesh et al., 2021; Qamar et al., 2020). Recent seroepidemiological data indicate that current estimates of typhoid fever incidence are significantly underestimated in many endemic countries due to insufficient surveillance and diagnostic methods (Aiemojoy et al., 2022; Munira et al., 2026). In Ghana, febrile illnesses are among the major drivers of health care seeking, and malaria historically has been the focus. However, growing evidence shows that many febrile patients have non-malarial infections such as typhoid fever, which complicates clinical diagnosis and treatment decision-making (Ofosu et al., 2026; Rufai et al., 2023). This is especially significant in Ga West Municipality because environmental conditions, population growth, and unequal access to potable water may sustain the transmission of enteric pathogens. Additionally, symptom-based empirical treatment is often used, which may lead to incorrect antimicrobial prescriptions because the clinical features of typhoid fever overlap with those of malaria and other bacterial infections (Manesh et al., 2021; Mina et al., 2023; Roy et al., 2021). Although the Widal test is widely used in many health facilities, blood culture is still the recognised reference standard for the diagnosis of typhoid fever, as it is very specific and can be used to isolate *Salmonella Typhi* for laboratory identification and antimicrobial susceptibility testing (Birhanu et al., 2025; Karajacob et al., 2025; Roy et al., 2021). However, epidemiological data from blood cultures are scarce in most municipalities in Ghana, including Ga West, limiting evidence-based decision-making in disease control areas such as disease surveillance, antimicrobial stewardship, and prevention (Frickmann et al., 2025; Haselbeck et al., 2021; Saeed et al., 2026). In this context, the present study aimed to assess the prevalence of typhoid fever among febrile patients attending selected health facilities in Ga West Municipality, using blood culture as the diagnostic method. The findings are expected to produce robust epidemiological data to inform the burden of laboratory-confirmed typhoid fever within the municipality, factors associated with infection and evidence that can support clinical diagnosis, enhance antimicrobial stewardship, and inform public health interventions to reduce the burden of enteric fever in Ghana (Aiemojoy et al., 2022; Haselbeck et al., 2021; Rufai et al., 2023).

However, blood culture is considered the reference diagnostic laboratory procedure for typhoid fever because it allows direct isolation of *Salmonella Typhi* from the bloodstream and antimicrobial susceptibility testing (Birhanu et al., 2025; Karajacob et al., 2025; Roy et al., 2021). However, there is disagreement regarding its application in resource-poor environments. While some highlight its relative specificity, which suggests routine use despite financial and infrastructural constraints, others focus on constraints to routine use due to delayed results, prior

antibiotic use, and limited laboratory capacity (Akinyemi et al., 2021; Meyer Sauter et al., 2020; Mina et al., 2023). Despite these concerns, there is a clear consensus that blood culture is more likely to yield reliable epidemiological data for estimating typhoid prevalence and guiding clinical and public health decision-making than serological methods (Aiemi et al., 2022; Haselbeck et al., 2021; Rufai et al., 2023).

This study aims to determine the prevalence of typhoid fever among febrile patients in Ga West Municipality, Ghana, using blood culture as the reference diagnostic method, and to examine the demographic and clinical factors associated with laboratory-confirmed infection.

The specific objectives of the study are to:

1. Determine the prevalence of blood culture-confirmed typhoid fever among patients attending selected health facilities in Ga West Municipality, Ghana.
2. Examine the association between selected sociodemographic characteristics of febrile patients and blood culture-confirmed typhoid fever.
3. Assess the relationship between selected clinical presentations and laboratory-confirmed typhoid fever among febrile patients.
4. Identify the predictors of blood culture-confirmed typhoid fever among patients in Ga West Municipality using appropriate statistical analysis.

The following null hypotheses will be tested at a significance level of 0.05:

H₀₁: There is no statistically significant association between the socio-demographic characteristics of patients and blood culture-confirmed typhoid fever in Ga West Municipality.

H₀₂: There is no statistically significant association between the clinical characteristics of febrile patients and blood culture-confirmed typhoid fever in Ga West Municipality.

H₀₃: Socio-demographic and clinical characteristics do not significantly predict blood culture-confirmed typhoid fever among patients in Ga West Municipality.

2. Methods

2.1 Study Design

A cross-sectional quantitative study design was used to assess the prevalence of blood culture-confirmed typhoid fever in patients with fever who were attending selected health facilities in Ga West Municipality in the Greater Accra Region in Ghana.

2.2 Study Area

The municipality has urban and peri-urban communities, hospitals, a polyclinic, health centres, and Community-based Health Planning and Services compounds; thus, it is suitable for studying laboratory-confirmed typhoid fever in patients.

2.3 Study population and sample size

Patients who presented with clinical features suggestive of typhoid fever at the seven selected health facilities, namely Ga West Municipal Hospital, Mayera Faase Health Centre, Akramaman Health Centre, Joma Health Centre, Obeyeyie Health Centre, Oduman Polyclinic and Kotoku Health Centre, formed the study population. Participants who provided informed consent, and assent from guardians for those below 18 years, were included; those ineligible to participate were those with terminal illness, cognitive impairment and those vaccinated against typhoid fever within the past three years. The study sample comprised 284 participants. The forty-seven (47) facilities in the Municipality were grouped into seven strata using a stratified sampling method, after which a simple random sampling method was used to select the seven facilities. Consecutive sampling was then used to recruit participants from each facility until the desired number of eligible participants from each facility was met.

2.4 Sampling technique

A structured questionnaire was used to collect data, including socio-demographic and clinical information, along with laboratory investigations. After obtaining informed consent, 10mL of venous blood was aseptically drawn from each individual by trained staff. 5 mL of the sample was used for routine clinical investigations, and the remaining sample was sent to the Microbiology Laboratory of Ga West Municipal Hospital, where the blood culture was processed and the organism was identified as *Salmonella* Typhi by standard microbiological procedures. Blood culture was the reference standard for confirming typhoid fever.

2.5 Data collection

Data were entered, cleaned and analysed using suitable software. Descriptive statistics summarised participant characteristics and blood culture prevalence, while inferential analyses such as Chi-square and logistic regression were used to determine factors associated with laboratory-confirmed typhoid fever. Statistically significant p-values were set at < 0.05 . The study was approved by the appropriate ethics review committee, and confidentiality and participant anonymity were maintained throughout.

2.6 Blood Culture Procedure

After obtaining informed consent, 10 mL of venous blood was collected aseptically from each participant. Five millilitres were used for routine clinical investigations, and the remaining 5 mL was immediately inoculated into an aerobic blood culture bottle containing tryptic soy broth (or BACTEC aerobic medium). Bottles were incubated at 37°C and examined daily for turbidity, haemolysis, or gas production for up to 7 days. Blind subcultures were performed on days 1, 3, and 5 onto MacConkey agar and 5% sheep blood agar. Plates were incubated aerobically at 37°C for 18–24 hours. Colonies resembling *Salmonella* were identified using Gram stain, oxidase test, triple sugar iron agar, urease, citrate utilisation, and agglutination with *Salmonella* O and H antisera. *Salmonella* Typhi was confirmed by standard biochemical and serological tests. Antimicrobial susceptibility testing was performed by Kirby–Bauer disk diffusion according to CLSI guidelines. Blood culture was considered the reference standard; a positive result was defined as isolation of *Salmonella* Typhi.

2.7 Data analysis

We double-entered, cleaned, and analysed the data using IBM SPSS Statistics version 22. Categorical variables were summarised as frequencies and percentages, while continuous variables were summarised as mean $\pm$ SD or median with interquartile range. We calculated the prevalence of blood culture-confirmed typhoid fever with 95% confidence intervals using the Wilson score method. Associations were assessed using Pearson's chi-square test or Fisher's exact test where expected counts were < 5 . Binary logistic regression was used to identify independent predictors, reporting adjusted odds ratios with 95% confidence intervals; model fit was assessed using the Hosmer–Lemeshow test and Nagelkerke R^2 . Statistical significance was set at $p < 0.05$ (two-tailed). Missing data were handled by complete-case analysis. Given only 8 positive cultures, logistic regression results were interpreted as exploratory.

2.8 Ethical Considerations

Ethical clearance was obtained from the relevant Ghana Health Service Research Ethics Committee (GHS-ERC:002/08/25) and the Municipal Health Directorate before the study commenced. Written informed consent was obtained from all participants before data collection. Confidentiality, anonymity, and voluntary participation were maintained throughout the study in accordance with ethical guidelines for biomedical research.

3. Results

3.1 Clinical Characteristics of Study Participants

A total of 284 febrile patients were recruited from seven selected health facilities in Ga West Municipality, and all patients completed the study. Clinical presentations were varied and suggestive of enteric fever. Fever was the predominant presenting symptom, affecting 243 participants (85.6%), followed by headache in 161 (56.7%), loss of appetite in 141 (49.6%), abdominal pain in 138 (48.6%), vomiting in 127 (44.7%), fatigue or malaise in 127 (44.7%), myalgia in 123 (43.3%), diarrhoea in 84 (29.6%), cough in 75 (26.4%), nausea in 68 (23.9%), while rose spots were

observed in only three participants (1.1%). These results show that the clinical picture of suspected typhoid fever was predominantly nonspecific among febrile cases, and only a very small proportion of them had classical typhoid fever.

Table 1. Presenting Clinical Symptoms among Febrile Patients (N = 284)

Clinical Symptom	Frequency (n)	Percentage (%)	Rank
Fever	243	85.6	1
Headache	161	56.7	2
Loss of appetite	141	49.6	3
Abdominal pain	138	48.6	4
Vomiting	127	44.7	5
Fatigue/Malaise	127	44.7	5
Myalgia	123	43.3	7
Diarrhoea	84	29.6	8
Cough	75	26.4	9
Nausea	68	23.9	10
Rose spots	3	1.1	11

Source: Field Survey (2025-2026).

Table 1 shows that fever was nearly universal (more than four-fifths of patients) and remained the chief presenting symptom for medical care in patients with suspected typhoid fever. However, headache, anorexia, abdominal pain, vomiting, fatigue and myalgia were also common, suggesting a significant overlap in symptoms between typhoid fever and other causes of febrile illness. Rose spots, a traditional clinical sign of typhoid fever, were seen in only 1.1% of participants. This result indicates that relying only on clinical manifestations is inadequate and underscores the need for laboratory confirmation by blood culture.

3.2 Prevalence of Blood Culture Confirmed Typhoid Fever

All study participants were tested using blood culture, a reference laboratory method. However, of the 284 blood samples processed, only 8 were positive for *Salmonella Typhi* (2.8%; 95% CI: 1.2%–5.4%) and 276 (97.2%) of the patients were blood culture negative. The results show that typhoid fever still exists within Ga West Municipality, but most febrile ailments were due to causes other than acute bloodstream infection with *Salmonella Typhi*.

Table 2. Blood Culture Confirmed Prevalence of Typhoid Fever (N = 284)

Blood Culture Result	Frequency (n)	Percentage (%)	95%CL
Positive	8	2.8	1.2-5.4
Negative	276	97.2	-
Total	284	100.0	-

Note: Prevalence = 2.8%; 95% CI = 1.2%–5.4%. **Source:** Field Survey (2025-2026).

Table 2 shows that only eight patients were confirmed with typhoid fever out of 284 febrile patients, a prevalence of 2.8%. This finding means that laboratory-confirmed typhoid fever was a small proportion of febrile illness presentations in the health facilities in this study. Thus, virtually all individuals who had signs and symptoms of typhoid fever had other infectious or non-infectious conditions. The relatively narrow confidence interval also indicates that the prevalence estimate is fairly accurate for the study population. The results also highlight the need for laboratory confirmation to avoid overdiagnosis and overtreatment of typhoid fever.

3.3 Blood Culture Confirmed Typhoid Fever According to Age Group

The prevalence of blood culture-confirmed typhoid fever varied across age groups (Table 3). It was highest among participants aged ≥60 years (10.0%; 2/20), followed by those aged <18 years (4.3%; 2/47), 30–44 years (3.0%; 2/67), and 45–59 years (2.7%; 2/73). No positive cultures were recorded among participants aged 18–29 years (0.0%; 0/77). Although the highest prevalence occurred in the oldest age group, there was no consistent linear increase with age.

The differences across age groups were not statistically significant, indicating that age alone was not a significant risk factor for typhoid fever in this study population.

Table 3. Blood Culture Confirmed Typhoid Fever by Age Group

Age Group (Years)	Male Positive(n)	Female Positive(n)	Total Positive(n)	Total Tested(n)	Blood Culture Prevalence (%)
< 18	2	0	2	47	4.3
18–29	0	0	0	77	0.0
30–44	0	2	2	67	3.0
45–59	2	0	2	73	2.7
>60	1	1	2	20	10.0
Total	5	3	9	284	2.8

Source: Field Survey (2025-2026).

Table 3 shows variation in blood culture-confirmed typhoid fever across age groups. The highest prevalence was among participants aged ≥ 60 years, while no positive cultures were found among those aged 18–29 years. The pattern did not show a consistent linear trend with age. However, this association was not statistically significant, indicating that age was not an independent predictor of laboratory-confirmed typhoid fever in the study group, as other demographic, environmental, behavioural, or clinical factors may be more significant.

3.4 Blood Culture Confirmed Typhoid Fever According to Sex

The distribution of blood culture-confirmed typhoid fever by sex showed minimal variation between male and female participants. The prevalence among five male participants was 2.9%, compared with 2.7% among three female participants. This marginal difference indicates a nearly equal distribution of laboratory-confirmed typhoid fever between both sexes. Statistical analysis showed that sex was not significantly associated with blood culture positivity, suggesting that male and female participants had comparable risks of acquiring typhoid fever within the study setting.

Table 4: Blood Culture-Confirmed Typhoid Fever by Sex

Sex	Positive (n)	Total Testing(n)	Blood Culture Prevalence (%)
Male	5	171	2.9
Female	3	112	2.7
Total	8	284	2.8

Source: Field Survey (2025-2026).

Table 4 revealed that the prevalence of blood culture-confirmed typhoid fever was nearly the same for both males and females. The observed difference was just 0.2 percentage points, indicating little effect of sex on the occurrence of laboratory-confirmed typhoid fever in the study population. This discovery suggests that the risk factors for typhoid fever, such as exposure to contaminated food, unsafe water and poor environmental sanitation, are similar among both men and women in Ga West Municipality. As such, interventions and public health education campaigns should aim to reach the general population and not primarily one sex, as the burden of laboratory-confirmed infection seems to be similar for both sexes.

3.5 Test of Research Hypotheses

Selected socio-demographic characteristics, clinical characteristics and blood culture-confirmed typhoid fever were analysed for relationships using inferential statistical analysis. Pearson's chi-square test was used to test the association of categorical variables with blood culture positivity, and binary logistic regression was used to identify independent factors associated with laboratory-confirmed typhoid fever. Each statistical test was carried out at the 95% confidence level, and a probability value of < 0.05 was considered statistically significant.

Table 5 Test of Research Hypotheses

Hypothesis	Statistical Test	Test Statistic	p-value	df	Decision	Conclusion
H ₀₁ : There is no statistically significant association between the socio-demographic characteristics of patients and blood culture-confirmed typhoid fever in Ga West Municipality.	Pearson's Chi-square	$\chi^2 = 2.481$	0.648	4	Fail to Reject H ₀	No statistically significant association exists between socio-demographic characteristics and blood culture-confirmed typhoid fever. Fail to reject H0
H ₀₂ : There is no statistically significant association between the clinical characteristics of patients and blood culture-confirmed typhoid fever in Ga West Municipality.	Pearson's Chi-square	$\chi^2 = 13.527$	0.036	6	Reject H ₀	Clinical characteristics were significantly associated with blood culture-confirmed typhoid fever. Reject H0
H ₀₃ : Socio-demographic and clinical characteristics do not significantly predict blood culture-confirmed typhoid fever among patients in Ga West Municipality.	Binary Logistic Regression	Model $\chi^2 = 15.214$	0.018	3	Reject H ₀	Selected clinical characteristics significantly predicted blood culture-confirmed typhoid fever, whereas socio-demographic variables were not significant independent predictors. Reject H0

Significant at $p < 0.05$.

Source: Field Survey (2025-2026).

As shown in Table 5, none of the socio-demographic characteristics was statistically significantly associated with blood culture-proven typhoid fever among the cases in the study (p -values > 0.05). Thus, the first null hypothesis was accepted. In contrast, clinical features were statistically significantly associated with laboratory-confirmed typhoid fever, and the second null hypothesis was rejected. In addition, the selected clinical variables were significant predictors of blood culture-confirmed typhoid fever, but socio-demographic variables were not. This means that, among all febrile patients in Ga West Municipality, clinical presentation is a better predictor of laboratory-confirmed typhoid fever than socio-demographic factors.

4. Discussion

This study determined the prevalence of blood culture-confirmed typhoid fever among febrile patients in Ga West Municipality, Ghana, and examined associated demographic and clinical factors. The overall prevalence of 2.8%

(95% CI: 1.2%–5.4%) provides important epidemiological data for this peri-urban setting and contributes to the growing body of evidence on typhoid burden in Ghana.

4.1 Prevalence of Typhoid Fever

The observed prevalence of 2.8% is consistent with findings from other African settings. Our estimate is lower than those reported in Kebbi State, Nigeria (6.4%) (Faruku et al., 2024), southern Ethiopia (5%) (Habte et al., 2018), and western Uganda (3.7%) (Nakisuyi et al., 2023) but comparable to the 2.95% reported in Andhra Pradesh, India (Sekhar et al., 2020). The prevalence is lower than the pooled estimate of 7.7% among febrile patients in Ghana reported in a systematic review (Dassah et al., 2025), though that review included studies with varying methodologies and diagnostic approaches. The relatively low prevalence in our study may reflect recent improvements in water and sanitation infrastructure in parts of Ga West Municipality, or differences in healthcare-seeking behaviour and prior antibiotic use that reduce blood culture yield (Prah et al., 2022; Rufai et al., 2023).

The narrow confidence interval (1.2%–5.4%) suggests that this estimate is reasonably precise for the study population. However, the true burden may be underestimated given the inherent limitations of blood culture sensitivity, which is compromised by prior antibiotic exposure, a factor reported in up to 48% of febrile patients in similar Ghanaian settings. (Prah et al., 2022).

4.2 Clinical Presentation and Diagnostic Challenges

Participants' clinical presentation was predominantly nonspecific, with fever (85.6%), headache (56.7%), loss of appetite (49.6%), and abdominal pain (48.6%) as the most common symptoms. This symptom profile overlaps considerably with other febrile illnesses common in the region, particularly malaria, underscoring the diagnostic challenges faced by clinicians (Ofosu et al., 2026; Rufai et al., 2023). The rarity of rose spots (1.1%) further confirms that classical clinical signs are neither sensitive nor specific for typhoid fever in this setting, reinforcing the need for laboratory confirmation.

Notably, clinical characteristics were significantly associated with blood culture positivity ($p=0.036$), while sociodemographic factors were not. This finding suggests that clinical presentation provides more useful information for guiding diagnostic suspicion than demographic characteristics alone. However, the nonspecific nature of symptoms means that clinical judgment alone remains insufficient for accurate diagnosis.

4.3 Age and Sex Distribution

The prevalence of blood culture-confirmed typhoid fever varied by age group, being highest among participants aged ≥ 60 years (10.0%) and < 18 years (4.3%), followed by those aged 30–44 years (3.0%) and 45–59 years (2.7%); no positive cultures were recorded among those aged 18–29 years (0.0%). The pattern did not show a consistent linear increase with age, and the differences were not statistically significant. Five positive cases were male, and three were female; sex was also not significantly associated with blood culture positivity. This suggests that age and sex alone were not major determinants of laboratory-confirmed typhoid fever in this setting, and that environmental, behavioural, and clinical factors may be more important. Similarly, the near-identical prevalence between males (2.9%) and females (2.8%) indicates that both sexes face comparable exposure risks in this setting. This contrasts with some studies that have reported higher typhoid rates in specific demographic groups (Besigye & Oyo, 2024; Sekhar et al., 2020), but is consistent with findings suggesting that environmental and behavioural factors may be more important determinants than age or sex alone in similar contexts (Aiempjoy et al., 2022; Marks et al., 2024).

4.4 Clinical Predictors of Typhoid Fever

Binary logistic regression identified selected clinical characteristics as significant predictors of blood culture-confirmed typhoid fever (model $\chi^2 = 15.214$, $p = 0.018$), while sociodemographic variables were not independent predictors. This finding has practical implications: clinicians should prioritise clinical features, particularly the combination and duration of symptoms, when deciding which febrile patients require blood culture investigation.

However, the overlapping symptomology with other febrile illnesses means that clinical prediction rules must be validated in this population before implementation.

4.5 Implications for Clinical Practice and Public Health

The low prevalence of culture-confirmed typhoid (2.8%) has important implications for clinical practice. With fewer than 3 in 100 febrile patients having typhoid fever, empirical antibiotic treatment for all suspected cases would result in substantial overtreatment. This is particularly concerning given the rising threat of antimicrobial resistance in Ghana (Boakye Okyere et al., 2025; Kungu et al., 2025; Qamar et al., 2020)(Boakye Okyere et al., 2025; Kungu et al., 2025; Qamar et al., 2020). Our findings support recommendations for targeted diagnostic testing rather than empirical therapy, aligning with antimicrobial stewardship principles (Marks et al., 2024; Wainaina et al., 2022). The reliance on blood culture as the reference standard is both a strength and a limitation of this study. While blood culture is the most specific diagnostic method available, its sensitivity is suboptimal, particularly in patients who have received prior antibiotics(Prah et al., 2022). The true prevalence of typhoid fever in this population may therefore be higher than reported.

5. Conclusion

Blood culture-confirmed typhoid fever prevalence was 2.8% (8/284) among patients in Ga West Municipality. Prevalence varied by age (0.0%–10.0%) but was not statistically significant; males had 5 positive cases and females 3, with no significant sex association. Clinical characteristics were significantly associated with typhoid fever ($p = 0.036$) and were independent predictors ($p = 0.018$), while sociodemographic factors were not. The low prevalence highlights the need for laboratory confirmation to prevent overdiagnosis and inappropriate antibiotic use.

5.1 Study Limitations

The study was limited by a very small number of culture-positive cases (8/284), making logistic regression exploratory; blood culture's suboptimal sensitivity, especially with prior antibiotic use, may have underestimated true prevalence; the cross-sectional, single-municipality, six-month design limits causal inference, seasonal assessment, and generalizability; consecutive sampling may have introduced selection bias; no molecular/PCR confirmation was used; prior antibiotic exposure was not reported; missing data were handled by complete-case analysis; and the limitations section was incomplete, with minor data inconsistencies.

5.2 Recommendations

- Strengthen blood culture capacity and laboratory supplies in health facilities.
- Discourage empirical antibiotic treatment for suspected typhoid without laboratory confirmation.
- Train healthcare workers on evidence-based clinical algorithms.
- Improve water, sanitation, and hygiene infrastructure.
- Promote public health education on typhoid prevention and early care-seeking.

5.3 Future Research

- Use PCR and molecular methods to improve diagnostic sensitivity.
- Conduct longitudinal studies on seasonal and temporal trends.
- Investigate environmental, behavioural, and socioeconomic risk factors.
- Monitor antimicrobial resistance patterns of *Salmonella* Typhi.
- Evaluate typhoid conjugate vaccine effectiveness and health-system barriers.

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