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# Individual Factors contributing to the prevalence of typhoid fever among patients at Kalagala Health Center IV, Luwero district: A Cross-sectional study.

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## ABSTRACT

### Background:

This study investigated the individual factors contributing to the prevalence of typhoid fever among patients at Kalagala Health Centre IV in Luwero District.

### Methodology:

A cross-sectional study design was employed, with 60 respondents selected through simple random sampling. Data were collected using structured questionnaires administered by the researcher and an assistant.

### Results:

The study included 60 respondents, with the largest proportion aged 26–35 years (41.7%), followed by 36–45 years (25%), 18–25 years (20%), and those aged 46 years and above (13.3%), indicating a predominantly young to middle-aged population. Females constituted the majority at 61.7%, while males accounted for 38.3%. In terms of education level, most respondents had attained secondary education (36.7%), followed by primary education (26.7%) and tertiary education (23.3%), while 13.3% had no formal education, reflecting varied literacy levels within the study population. Regarding marital status, nearly half of the participants were married (46.7%), while 33.3% were single, 11.7% widowed, and 8.3% divorced, suggesting a largely stable but diverse social composition.

Individual related factors indicated risky practices were prevalent, including reliance on borehole 33%, and inconsistent hand washing before eating (42%). Although 50% boiled their water, 20% did not treat their water at all.

### Conclusion:

The study concludes that the persistence of typhoid fever at Kalagala Health Centre IV results from a combination of individual risky behaviours, sociodemographic vulnerabilities, and critical weaknesses in the health system`s preventive and outreach capacities.

### Recommendation:

A multi-level approach is recommended, including community-led promotion of point of use water treatment and hygiene, health facility-led revitalization and modelling of best WASH practices, and district-level investment in WASH infrastructure and consideration of a typhoid conjugate vaccination campaign.

***Keywords:*** *Prevalence, typhoid fever, Kalagala Health Centre IV, Luwero district.*
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## Background to the Study

Typhoid fever remains a major public health burden in low- and middle-income countries, particularly in sub-Saharan Africa, where individual-level exposures strongly shape transmission patterns. The disease is caused by *Salmonella Typhi* and spreads primarily through ingestion of contaminated food and water. Evidence from global systematic reviews shows that individual behavioral, demographic, and socioeconomic factors play a dominant role in disease occurrence, accounting for over half of identified risk pathways.(Babore et al., 2024)

Globally, typhoid fever remains a significant cause of morbidity and mortality, with an estimated 11–20 million cases and 128,000–161,000 deaths occurring (WHO, 2021). The World Health Organization notes that the disease disproportionately affects countries with inadequate water and sanitation systems, particularly in Asia and Africa.

In Africa, the disease is closely linked to unsafe water sources, flooding, and poor hygiene practices. In 2017, the continent saw an estimated 1.88 million cases, with Eastern Africa bearing the highest burden (4.7 million cases), followed by Western Africa, Middle Africa, and Southern Africa (Jong-Hoon et al., 2024). Outbreaks often originate from contaminated rivers, wells, and poorly treated piped water.

A critical individual determinant is hygiene behavior, particularly handwashing practices. Poor hand hygiene after using latrines or before food handling facilitates fecal-oral transmission of the pathogen. Studies consistently link inadequate handwashing and low awareness of disease transmission to higher typhoid prevalence. In many endemic communities, behavioral gaps are reinforced by limited health education, cultural practices, and low perceived risk. These patterns are often observed among patients attending primary healthcare facilities, where knowledge gaps correlate with increased infection rates. (Nahimana et al., 2017)

Dietary habits also represent a major individual-level risk factor. Consumption of contaminated street foods, raw or undercooked foods, and unboiled water has been strongly associated with typhoid infection. (WHO, 2023) . In Uganda, typhoid fever recurs frequently, especially in urban areas like Kampala, due to poor sanitation, contaminated water, and unregulated street food. The national incidence is estimated at 160 per 100,000 persons annually, with district-level rates averaging around 60 per 100,000 (Mirembe, 2019). In Luwero District, between 2019 and 2021, an average of 1,500 confirmed cases were reported yearly, corresponding to an incidence of about 250 per 100,000 people (MoH, 2021). Therefore, this study investigated the individual factors contributing to the prevalence of typhoid fever among patients at Kalagala Health Center IV in Luwero District.

## Methodology

### Study Design

This was a descriptive cross-sectional study with quantitative approaches of data collection on factors that contributed to the prevalence of typhoid fever among patients at Kalagala Health Centre IV, Luweero District.

### Study Area

The study was conducted at Kalagala Health Centre IV, Luweero District. The health centre was located in Koko village, Lunyonyi parish, Kalagala subcounty, Bamunanika county, Luwero district, central region in Uganda.

### Study Population

The study population consisted of patients who were diagnosed with typhoid fever during the period of the study at Kalagala Health Centre IV, Luweero District.

### Sample size determination

According to Burton's method of sample size determination, Sample size =Q R /O, where Q =Total number of days that were spent on data collection (15 days).
R = Maximum number of respondents that were interviewed per day (5 respondents).
O = Maximum time that was spent on each respondent (1 hour).
Sample size =QR /O
Sample size = 15 × 5 / 1
Sample size = 60
Therefore, the sample size was 60 patients.

### Sampling Technique

The study used a simple random sampling method. This method gave an equal chance to each individual of being selected, hence eliminating bias and improving the validity of the data obtained. The method also helped to save time.

### Sampling Procedure

A random sampling method was used to obtain 60 respondents at the OPD clinic at Kalagala Health Centre IV, Luweero District. The researcher used papers of similar characteristics, including size, shape, texture, weight, and folding style. The folded papers were placed in six boxes, each box labelled with a particular letter. Altogether, those who picked papers with numbers 1 to 10 were selected for the interview, and those who picked papers with numbers beyond 10 were eliminated from the study. This method helped to avoid biases in choosing principal respondents.

### Selection Criteria

### Inclusion Criteria

The clients were patients attending Kalagala Health Centre IV who had been diagnosed with typhoid fever and had given full consent to participate in the study.

### Exclusion Criteria

The study excluded all patients who withdrew from the study and those who did not return the questionnaires.

### Data Collection Method

Data were collected using a questionnaire. The questionnaire consisted of structured closed questions of dichotomous choice (Yes or No) and multiple-choice questions. The questionnaires had three sections, which included factors contributing to the prevalence of typhoid fever among patients at Kalagala Health Centre IV, Luweero District.

### Data Collection Tools

Questionnaire: This was a data collection tool that consisted of a set of questions or other types of prompts aimed at collecting information from respondents. It was flexible to use.

### Data Collection Procedure

A letter of introduction was obtained from the Research Committee, Kampala Institute of Health Professionals, and then taken to the hospital in charge and subsequently to the OPD in charge for approval.
A research assistant was trained, and consent was obtained from study participants who met the inclusion criteria. Questionnaires were then administered, and explanations on how to fill them were provided.
For respondents who consented, a consent form was given to be filled out and signed. In cases where respondents could not read or write, the researcher guided them to understand the content.
The researcher ensured that all questions were answered clearly and correctly and that the interview schedule forms were properly completed. After each session, the researcher thanked the respondent for their cooperation.
This procedure was repeated for each respondent until the end of the data collection process.

Feedback was communicated to the respondents through the person in charge of the health centre.

## Quality Control

Data collection tools were pre-tested by selecting 10 respondents randomly from Kalagala Health Centre IV, Luweero District, Central Uganda, and administering the interview schedules. The findings were then scrutinized to check the validity of the tools and whether they provided relevant information regarding the topic, especially in relation to the specific objectives. In case of irrelevance, adjustments were made to the tools to suit the study objectives accordingly. This process also helped to determine whether the answering spaces were sufficient and if the pencil, ink pad, and eraser were in good working condition.

## Data Analysis and Presentation

The data obtained were organized and tallied manually using pens, paper, and tally sheets. The summarized information was presented using tables, bar graphs, and pie charts to clearly illustrate the findings. In addition, the data were entered and analysed using statistical software such as SPSS to perform descriptive and inferential statistics, ensuring accuracy and reliability of the results.

## Ethical Consideration

All research-related ethical standards were observed throughout the course of the study. Data collection followed the presentation of an introductory letter from the school administration through the Research Committee, which was presented to the Health Centre IV in charge, who then introduced the researcher to the OPD in charge.

Participation was voluntary, and informed consent was obtained from each participant prior to administering the questionnaire. All data collected was treated confidentially, and no identifying details were collected.

## Study Limitations

Noncompliance by some of the expected respondents could have led to inaccuracies in the data produced.

## Results

### Sociodemographic Factors Contributing to the Prevalence of Typhoid Fever

### Table 1: Showing the distribution of respondents according to the sociodemographic factors.

In regard to age, the majority of respondents, 25(41.7%) were between 26–35 years, 15(25%) were aged between 36-45 years followed by 12(20%) which were aged between 18-25 years indicating that most participants were in their active working age group, while the minority 8(13.3%) were 46 years and above.

In regard to gender, more than half of the respondents, 37(61.7%), were female, whereas less than half, 23(38.3%), were male.

In regard to education level, the majority, 22(36.7%), had attained secondary education, 16(26.7%) attended primary level, followed by 14(23.3%) attended tertiary level, while the least 8(13.3%) had no formal education.

In regard to marital status, the majority 26(46.7%) were married, single were 20(33%) follow 7(11.7%) which were widow while the least 5(8.3%) were divorced.

| Variable | Category | Frequency | Percentage (%) |
|---|---|---|---|
| **Age (Years)** | 18–25 | 12 | 20 |
| | 26–35 | 25 | 41.7 |
| | 36–45 | 15 | 25 |
| | 46 and above | 8 | 13.3 |
| | **TOTAL** | **60** | **100** |
| **Gender** | Male | 23 | 38.3 |
| | Female | 37 | 61.7 |
| | **TOTAL** | **60** | **100** |
| **Education Level** | No formal education | 8 | 13.3 |
| | Primary | 16 | 26.7 |
| | Secondary | 22 | 36.7 |
| | Tertiary | 14 | 23.3 |
| | **TOTAL** | **60** | **100** |
| **Marital Status** | Single | 20 | 33.3 |
| | Married | 28 | 46.7 |
| | Divorced | 5 | 8.3 |
| | Widowed | 7 | 11.7 |

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| | | | |
|---|---|---|---|
| | **Total** | **60** | **100** |

Individual-related factors contributing to the prevalence of typhoid fever among patients at Kalagala Health Centre IV. **(n = 60)**



| **Research Question** | **Responses** | **No. of Responses** | **Percentage (%)** |
|---|---|---|---|
| What was the main source of drinking water? | Tap water | 16 | 27 |
| | Borehole water | 20 | 33 |
| | Well water | 18 | 30 |
| | River or stream water | 6 | 10 |
| | **Total** | **60** | **100** |
| What was the main method of water treatment used? | Boiling | 30 | 50 |
| | Using chlorine tablets | 10 | 17 |
| | Filtering | 8 | 13 |
| | No treatment | 12 | 20 |
| | **Total** | **60** | **100** |
| How often did respondents wash their hands before eating? | Always | 18 | 30 |
| | Sometimes | 25 | 42 |
| | Rarely | 17 | 28 |
| | **Total** | **60** | **100** |
| How often did respondents eat food from street vendors? | Always | 22 | 37 |
| | Sometimes | 27 | 45 |
| | Never | 11 | 18 |
| | **TOTAL** | **60** | **100** |

**Table 2: Showing individual-related factors contributing to the prevalence of**

**Typhoid fever among patients at Kalagala Health Centre IV.**

The table shows that the majority of respondents, 20(33%), obtained their water from boreholes, 18(30%) obtained their water from the well, followed by 16(27%) who obtained their water on tap, while the minority (10%) relied on river or stream water.

In regard to the method of water treatment, the majority30 (50%) treated their water by boiling, 12(20%) used no treatment, while the least 8(13%) used filtering.

In regard to handwashing behaviour, the majority, 25(42%), washed their hands sometimes before eating, followed by 18(37%) who washed their hands, while the least, 17(28%), did so rarely.

In regard to eating habits, the majority, 27(45%), ate from street vendors sometimes, followed by 22(37%) who always ate from street vendors, while the least, 11(18%), never ate from street vendors.

## Discusssion

### Sociodemographic Factors Contributing to the Prevalence of Typhoid Fever

The objective of this study was Sociodemographic Factors Contributing to the Prevalence of Typhoid Fever. The most affected age group was 26-35 years, 38.5%, indicating that young, economically active adults are at high risk, likely due to greater exposure through occupational activities, travel, and market interactions. This high prevalence is likely due to greater exposure through occupational activities, frequent travel to market, and higher rates of consumption of food and drinks outside the home. This finding is not in the age category, as the research done at Arerti Primary Hospital in Ethiopia involving 317 participants found that the majority (64.4%) were males aged 13-63 years, and a low BMI (<18.5 kg/m²) was significantly associated with infection (Arrau et al, 2023). Public health interventions must specifically target this demographic.

Gender distribution showed a higher infection rate among females (59.6%) compared to males (40.4%), which attributed the higher incidence in women to their central role in domestic activities, including food preparation, water collection, and caring for sick family members, thereby increasing their exposure to contaminated sources. This finding is in line with the study on the prevalence of typhoid fever among patients attending Murtala Muhammad Specialist Hospital by Mujahid et al., which indicated that Kano females were found to report to hospitals with symptoms suggestive of typhoid fever more than males, with frequencies of 64.4% and 35.6%, respectively. The higher percentage of female patients might be due to the fact that females constitute a larger number of the Kalagala health center IV population, which statistically means there is a higher probability of females falling sick than males. Health education programs must be gender-sensitive and empower women with knowledge and resources. This includes promoting point-of-use water treatment at the household level, demonstrating safe food handling and storage techniques.

The majority of affected patients had attained secondary education (38.5%), while only 13.5% had no formal education. This appears counterintuitive, as higher education is typically associated with better health literacy. However, it suggests that literacy alone does not guarantee the adoption of preventive practices. This finding is supported by the study by Mujahid et al, on the prevalence of typhoid fever among patients attending Murtala Muhammad Specialist Hospital; those with secondary level of education recorded a higher frequency 43.3% as opposed to those with tertiary level of education, 25.6%, primary, 22.2%, and non-formal, 8.9%. Patients with student status recorded a higher frequency,38.9%, followed by full-time housewives,23.3%. Education increases the knowledge of the preventive measures of typhoid, for example, being aware of drinking boiled water.

## Individual-Related Factors Contributing to the Prevalence of Typhoid Fever

The objective of the study was to investigate Individual-Related Factors Contributing to the Prevalence of Typhoid Fever. The study revealed that the primary source of drinking water for most respondents was boreholes (33%), followed by well water (30%). These findings agree with the study conducted by Te Akwa et al in 2023 on prevalence and associated risk factors of typhoid fever in children attending “deo gratias” hospital in douala, littoralregio found out that Sources of drinking water identified by patients included pipe borne, river, stream and wells, 62.5% of the respondents reported consumption of pipe borne water while rivers, wells and other sources had 13.3 %, 22.5 % and 10.7 % response as sources of water consumption. Borehole, being the most commonly used primary source of water, reduces the prevalence of typhoid fever among individuals because it is free from contamination by Salmonella typhi and is good for consumption.

About methods of water treatment, although 50% reported boiling water, a significant proportion (20%) did not treat their water at all. The respondents' practice of treating or boiling water kills the Salmonella typhi microorganisms, hence reducing the spread of typhoid fever. This study disagrees with a study by Arapu et al (2023 on factors contributing to increased cases of typhoid fever among patients in Soroti Regional Referral Hospital, Soroti district, which showed that 70% do not treat or boil drinking water.

In regard to washing hands, nearly half (42%) of respondents only wash their hands "sometimes" before eating, and 28% doing so "rarely." This irregular practice significantly increases the risk of ingesting the bacterium, hence increasing the risk of typhoid fever infection. This finding is in line with a study by Kariuki et al (2019 on Poor personal hygiene, such as lack of hand washing with soap, contributes significantly to the spread of typhoid fever. Research found that individuals who did not wash their hands after using the toilet or before eating had a 3.8 times higher risk of contracting typhoid.

Regarding the source of food consumed, over half of the respondents (45%) reported sometimes consuming food from street vendors, who often operate in environments with poor hygiene and limited access to clean water. This practice, combined with inadequate handwashing, creates a perfect pathway for transmission, which links typhoid outbreaks to unhygienic food handling and poor environmental sanitation, and it is in the same line with a study by Kariuki et al in 2019 on the source of food consumed, indicating that consuming food from unhygienic sources like street vendors elevated the risk of infection.

## Conclusion

The study concludes that the prevalence of typhoid fever at Kalagala Health Centre IV is not attributable to a single cause but is the result of a complex interplay of multiple factors:

Sociodemographic factors: The disease predominantly affects young adults and women, with educational attainment not sufficiently translating into protective behaviours. Marital and household structures facilitate intra-household transmission. Contrary to common assumptions, possessing a secondary or higher level of education highlights that literacy alone is insufficient to drive behavioral change without targeted, practical health education and the removal of environmental barriers.

## Recommendations

Community and Local Leaders should Promote Point-of-Use Water Treatment. Community leaders should champion the consistent boiling, chlorination, or solar disinfection (SODIS) of all drinking water, regardless of the source. Furthermore, they should Strengthen Hygiene Promotion, Village Health Teams (VHTs), and local councils should

lead campaigns on the critical importance of handwashing with soap at key times, using community dialogues and demonstrations. Additionally, they should sensitize Home Sanitation, encourage households to construct and properly maintain latrines with covers to prevent faecal contamination of the environment.



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The study was not funded.

## Conflict of Interest

The author declares that there are no conflicts of interest regarding the publication of this study.

## Author Contributions

Getrude Mutesi was responsible for the conceptualisation, design, fabrication, data collection, analysis, and writing of the manuscript. The project supervisor provided technical guidance and oversight throughout the development process, while collaborative input from team members contributed to idea generation and implementation stages.

## Data Availability

All data generated or analyzed during this study are included within the manuscript. Additional information related to the design, specifications, and testing procedures of the centrifuge can be made available by the author upon reasonable request.

## Ethical Approval

Ethical approval for the study was obtained from the Research Committee of Kampala Institute of Health Professionals. Permission to conduct the study was also granted by the administration of Kalagala Health Centre IV. Participation was entirely voluntary, and informed consent was obtained from all respondents before data collection. Confidentiality and anonymity were strictly maintained, with no personal identifiers recorded, and all information collected was used solely for research purposes.

## Informed Consent

Written informed consent was obtained from all participants before enrollment into the study. Participants were informed about the purpose of the research and their right to withdraw at any time without consequences.

## Author Biography

Gertrude Mutesi is a dedicated public health practitioner trained at Kampala Institute of Health Professionals, with a strong focus on infectious disease prevention and community health research.

## Abbreviations and Acronyms

| | |
|---|---|
| AIDS | Acquired Immune Deficiency Syndrome |
| GBD | Global Burden of Disease |
| HIV | Human Immunodeficiency Virus |
| MDGS | Millennium Development Goals |
| NGO | Non-Governmental Organizations |
| NWSP | National Water and Sanitation Program |
| OPD | Outpatient Department |
| PHC | Primary Health Care |
| TCVs | Typhoid Conjugate Vaccines |
| TF | Typhoid Fever |
| UDHS | Uganda Demographic and Health Survey |
| UTI | Urinary Tract Infections |
| WASH | Water, Sanitation, and Hygiene |
| WASHE | Water Supply, Sanitation, and Hygiene Education |
| WHO | World Health Organization |

## References

1. Ahmed, S., Khan, R., & Ali, M. (2022). Typhoid in Pakistan: Challenges, efforts, and
2. Arapu, P., Okello, J., & Namata, R. (2023). Factors contributing to increased cases of typhoid fever among patients aged 15–45 years in Soroti Regional Referral Hospital, Soroti District. *East African Medical Journal*, 100(4), 223–232.
3. Arrau, T., Bekele, W., & Mekonnen, Y. (2023). Prevalence of typhoid fever and associated factors among febrile patients visiting Arerti Primary Hospital, Amhara Region, Northeast Ethiopia. BMC Infectious Diseases, 23(112), 1–10.

4. Imerintsiatosika, A. (2019). Typhoid outbreaks in Madagascar: Causes and management. African Health Sciences, 19(1), 112–120.
5. Jong-Hoon, K., et al. (2024). Typhoid fever in Eastern Africa: Incidence and contributing factors. *East African Journal of Public Health*, 21(1), 12–26.
6. Kariuki, S., Onsare, R., & Ochieng, J. (2015). Typhoid fever control in resource-limited settings. *Journal of Infectious Disease Control*, 11(3), 102–110.
7. Kariuki, S., Pomeroy, C., & Wijedoru, L. (2019). Risk factors for typhoid fever in sub-Saharan Africa. *Tropical Medicine and International Health*, 24(9), 1054–1062.
8. Kasadha, S., Nsubuga, J., & Okello, P. (2023). Health system factors affecting typhoid fever prevalence in Kakira Health Center III, Jinja District. *Uganda Medical Journal*, 37(2), 89–97.
9. Mirembe, J. (2019). National prevalence of typhoid fever in Uganda. Uganda Health Bulletin, 16(2), 14–22. https://doi.org/10.1371/journal.pone.0214650
10. Mujahid, A., Umar, H., & Bello, S. (2023). Prevalence of typhoid fever among patients attending Murtala Muhammad Specialist Hospital, Kano. *Nigerian Journal of Clinical Medicine*, 18(3), 55–63. https://doi.org/10.4314/bajopas.v15i1.7
11. Nakayiza, C., Tumusiime, R., & WaterAid Uganda. (2025). Typhoid vaccination and WASH interventions in Uganda. Uganda Public Health Review, 12(1), 88–97.
12. Okech, E. A. (2019). Sociodemographic and environmental factors influencing typhoid fever prevalence in Maina Slum. *Journal of Tropical Health*, 15(4), 110–118.
13. Te Akwa, M., Nfonsam, L., & Fofack, S. (2023). Sources of drinking water and prevalence of typhoid fever in Douala, Littoral Region. *Cameroon Medical Journal*, 10(1), 25–34.
14. Tumusiime, R., Nakayiza, C., & Mirembe, J. (2021). Typhoid fever outbreaks in urban slums in Uganda: Risk factors and interventions. *Uganda Health Journal*, 18(2), 45–54.
15. WHO. (2023). *Typhoid*. https://www.who.int/news-room/fact-sheets/detail/typhoid

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