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Prevalence and Factors Associated with Typhoid Fever among Patients in Hoima Regional Referral Hospital

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ABSTRACT

In 2016, Typhoid cases were reported throughout Uganda, with the central region, including Kampala, Wakiso, Mubende, and Luweero, reporting the highest numbers. The northern region, particularly Gulu, Arua, and Kotido, also reported significant cases. Hoima district had 8 reported cases in 2016, and there has been an increase in reported cases in 2019. Surprisingly, there has been no published research on the knowledge and practices of the community regarding typhoid fever in the Hoima district and the broader Bunyoro region. To address this gap, a study was conducted at Hoima Regional Referral Hospital in western Uganda. The study aimed to determine the prevalence of typhoid fever and assess the factors influencing its occurrence among patients. The study used a facility-based cross-sectional approach, involving 87 study participants selected through simple random sampling. Data collection and analysis were done using Microsoft Excel 13.0 and STATA version 14.0, respectively. Most study participants were females (59.77%), aged 18-27 years (41.38%), and engaged in farming occupations (41.38%). Additionally, 40.23% had a secondary level of education. The overall prevalence of typhoid fever was found to be 17.24% (95% CI: 09.14 – 25.34). A majority of study participants (87.36%) had a high level of knowledge about typhoid, with a 95% confidence interval of 80.23 – 94.48. However, 12.64% had a low level of knowledge (95% CI: 05.52 – 19.77). Several practices were identified as influencing the occurrence of typhoid fever, including not drinking boiled water (cOR 16.00, 95% CI 4.36-58.77, P<0.001), not treating drinking water (cOR 7.08, 95% CI 1.83-27.39, P=0.005), not seeking treatment for signs or symptoms of Typhoid (cOR 3.70, 95% CI 1.10-12.48, P=0.035), and not washing hands after visiting the latrine (cOR 7.11, 95% CI 1.23-40.99, P=0.028). In conclusion, Typhoid fever remains a significant public health challenge in Hoima Regional Referral Hospital. Curbing its prevalence could free up resources for other healthcare projects and initiatives

Keywords: Typhoid fever, Public health, Drinking water, Salmonella, Gram-negative bacteria.

INTRODUCTION

Typhoid fever is a serious systemic infection caused by Gram-negative bacteria, specifically *Salmonella enterica* serotype *typhi* and *Salmonella enterica* serotype *Paratyphi* [1, 2]. This disease is endemic in low- and middle-income countries, particularly in Asia and Africa, due to inadequate hygiene and the lack of access to safe drinking water. It is transmitted through the oral/fecal route [3–5]. Upon entering the host, these bacteria colonize the small intestine and start multiplying vigorously. They then invade the gastrointestinal tract and spread to different vital organs, including the spleen, liver, and bone marrow [6]. Clinical symptoms of typhoid fever include sustained fever, severe headache, malaise, anorexia, nonproductive cough, and bowel disturbances, commonly leading to constipation[7]. Serious complications such as intestinal perforation, cerebral dysfunction, and slight deafness can also occur[8]. Typhoid fever is diagnosed by detecting the *Salmonella typhi* bacteria in blood or stool samples [4]. Despite various preventive measures, typhoid fever remains a major cause of hospital admissions [9]. The significance of this research is to fill the knowledge gap and improve practices related to typhoid fever occurrence through the district health office. It can also serve as literature for other researchers and inform health policy makers in formulating appropriate policies and interventions to address typhoid fever occurrence. The term "Typhoid" was coined by Louis in 1829 to distinguish it from typhus fever [10]. Typhoid fever is closely associated with poor sanitation and the lack of clean drinking water [11]. Typhoid and paratyphoid fever exhibit similar acute clinical manifestations with an incubation period ranging from 5 to 12 days[12]. However, characteristic symptoms of typhoid fever include general malaise, abdominal manifestations, roseola, sweating, headache, anorexia, cough, weakness, sore throat, dizziness, muscle pain, and neuropsychiatric manifestations (occurring in 5-10% of cases)[13]. In severe cases, patients may experience bradycardia, splenomegaly, and hepatomegaly [14]. Between the third and fourth week of infection, 10-15% of patients may develop gastrointestinal bleeding, intestinal perforation, encephalopathy, and shock. Complications such as disseminated intravascular coagulation, pneumonia, arthritis/arthralgia, altered mental status, hepatitis, and meningitis can also occur [15]. If left untreated, typhoid fever

has a mortality rate close to 10-15%, but this can be reduced to 1-2% with adequate and timely antibiotic treatment [16, 17]. Some reviews suggest that in children under four years old, the lethality rate is 10 times higher than in older children [18]. Proper monitoring of this disease is crucial to determine its geographical distribution and the most affected populations, enabling targeted vaccination strategies [19]. Typhoid fever is a major cause of mortality and morbidity worldwide[20]. In endemic areas, the disease is most commonly found in children aged 5–19 years[20]. Visitors from non-endemic areas are also at risk if unvaccinated [20]. The global burden of the disease in low- and middle-income countries in 2010 was estimated to be 11.9 million cases, including 129,000 fatalities, after adjusting for water-related risk factors [21]. There are an estimated 11–21 million cases of typhoid fever and approximately 128,000–161,000 deaths annually, compared to an estimated 6 million cases of paratyphoid fever and 54,000 deaths annually [22]. In Uganda in 2011, the Ministry of Health (MOH) reported an outbreak of typhoid fever in Kasese District, which sickened 8,092 persons from December 27, 2007, to July 30, 2009, resulting in at least 249 intestinal perforations and 47 deaths. Additionally, numerous typhoid cases were reported in Kasese and neighboring Bundibugyo District, with many more intestinal perforations and the emergence of multidrug-resistant strains[23]. WHO Uganda reported in 2016 that during the month of December 2015, typhoid cases were reported by nearly all districts. The central region reported the highest number, with Kampala, Wakiso, Mubende, and Luweero contributing to the bulk of these numbers. In the north, high numbers were reported by Gulu, Arua, and Kotido. Hoima District had 8 cases reported, and as of this year, 2019, more cases are being reported [23].

METHODOLOGY

Study design

A non-experimental descriptive cross-sectional study was used to collect data using quantitative and qualitative methods[24].

Area of Study

This study was conducted at Hoima Regional Referral Hospital in Hoima city, Western Uganda. It is headed by an administrator who is a physician and has the following departments: outpatient department, inpatient department, antenatal care clinic, laboratory, ART clinic, MCH, theatre, and it offers the following services: family planning, immunization, antenatal care, safe female circumcision, deliveries, and laboratory screening for malaria and other infections. It serves a population of 12,527 people. This area was selected because there had been an increasing number of cases of Typhoid fever at Hoima Regional Referral Hospital in recent years, and yet there was no existing literature about people's knowledge and practices on the prevention of typhoid fever.

Study population

The study population comprised patients seeking health services from Hoima Regional Referral Hospital in Hoima District.

Inclusion criteria

- All patients seeking for health services in Hoima regional referral hospital, Hoima city.
- Patients who were available at the time of data collection.
- Patients who consented to answer the questionnaire.

Exclusion criteria

- ❖ All patients who were not seeking for health services in Hoima regional referral hospital atthe time of the study were not included.
- ❖ All patients who declined to participate in the study were not included.
- ❖ Patients who were not available at the time of data collection were not included in thestudy.
- ❖ Patients who will consented but withdrew before they finished answering thequestionnaire were not included in the study.

Sample size

The sample size was calculated using Yamane 1967 formula. Sample size was determined byYamane formula [25];

$$No = \frac{Z^2P(1-P)N}{Z^2P(1-P) + Ne^2}$$ (Yamane, [25])

Where Z=the standard Normal Deviation set at 1.96 and it corresponds to 95% confidence level. P=proportion of the population with particular characteristics estimated at 50% =0.5

N= Target population. On average, Hoima regional referral hospital admits 8 patients per day andthe study took 2 weeks so the target population was calculated as 8*14 to get 112 which was the population sample, N.

e= expected error estimated at 0.05

Define No?

$$No = \frac{1.96^2(0.5)(1-0.1)(112)}{1.96^2(1-0.5) + 112*0.005^2}$$

$$No = \frac{3.8416(0.5)(0.5)(112)}{3.8416(0.5)(0.5) + 112*0.0025}$$

$$No = 107.5648 / (0.9604+0.28)$$

$$No = 107.5648/(1.2404)$$

No=86.719

Therefore 87 respondents will be enrolled in the study.

Sampling procedure

The study was conducted among patients at the Hoima Regional Referral Hospital who met the inclusion and exclusion criteria. A simple random sampling technique was employed, wherein the researcher prepared numerous small pieces of paper. These papers were marked with either "yes" or "no." The respondents who willingly consented to participate were invited one by one to select a paper. Only clients who picked papers with the word "yes" were included in the study, while those who selected "no" were reassured. Respondents were chosen randomly to reach the required number for study participation. This sampling technique was employed to minimize bias and ensure credibility.

Research instruments

The questionnaire included semi-structured questions for demographic data. Tables were provided for measuring knowledge, and a checklist was provided for measuring practices. The statements/questions concerning knowledge and practices had 'yes' or 'no' responses, and participants were allowed to answer according to their understanding.

Data collection procedure

Data collection was followed by obtaining consent from the responsible Head of Department at Hoima Regional Referral Hospital. To the participants in the study, data was collected using a questionnaire. The interviews were conducted among patients at Hoima Regional Referral Hospital. The responses of the participants were recorded in the questionnaire by the researcher and research assistants. This method was chosen because it allowed for accurate recording of responses from both illiterate and literate respondents.

Data management

Questions in the tools were pre-coded to help the researcher obtain uniform, qualified data, and coding frames were created, facilitated by the codes provided for responses in the tool (questionnaire). This made the process of presentation and analysis easier. The research instruments were checked for errors and omissions to ensure consistency, completeness, and accuracy. This was done in the field before going to the respondents. Both electronic and non-electronic data were used to store data with codes to prevent unauthorized access and enhance confidentiality.

Data analysis

Data was analyzed using STATA Version 14.0. The data was presented using various tables, pie charts, and representative figures to ease the process of interpreting the findings.

RESULTS

Description of the Socio-demographic Characteristics of study participants

Table 1 below shows the socio-demographic characteristics of the study participants. From the table it can be observed that majority of the study participants 52 (59.77%) were females aged 18– 27 years 36 (41.38%) involved in farming occupation 36 (41.38%) with secondary level of education 35 (40.23%), belonged to Anglican religion 41 (47.13%), married 63 (72.41%), had 3 – 4 family members 25 (28.74%) with 3≥ Rooms in the home 49 (56.32%) and were Munyoro 76 (87.36%). On the other hand, minority of the study participants 25 (40.23%) were males aged ≥68 Years 01 (01.15%), civil servants 13 (14.94%) having diploma or above 05 (05.75%), belonged to Muslim religion 09 (10.34%), were widowed 03 (03.45%), had family size of ≥9 members 10 (11.49%) with only one room 04 (04.60%) and belonged to Munyankole tribe 10 (11.49%).

Table 1:Shows demographic characteristics of the respondents

Variable	Category	Frequency(N)	Percentage(%)
Gender	Male	35	40.23
	Female	52	59.77
	Total	**87**	**100.00**
Age	18-27 Years	36	41.38
	28-37 Years	25	28.74
	38-47 Years	10	11.49
	48-57 Years	12	13.79
	58-67 Years	03	03.45
	≥ 68 Years	01	01.15
	Total	**87**	**100.00**
Occupation	Farming	36	41.38
	Business	18	20.69
	Student	13	14.94
	Civil Servant	13	14.94
	Daily Laborer	00	00.00
	House Wife	07	08.05
	Total	**87**	**100.00**

Continuation of table 1			
Education	Can"t read and write	01	01.15
	Can Read And Write	10	11.49
	Primary School	21	24.14
	Secondary	35	40.23
	Certificate	15	17.24
	Diploma And Above	05	05.75
	Total	**87**	**100.00**
Denomination	Catholic	25	28.74
	Anglican	41	47.13
	Moslem	09	10.34
	Others	12	13.79
	Total	**87**	**100.00**
Marital Status	Single	18	20.69
	Married	63	72.41
	Divorced	03	03.45
	Widowed	03	03.45
	Total	**87**	**100.00**
Family Size	1-2 Members	17	19.54
	3-4 Members	25	28.74
	5-6 Members	22	25.29
	7-8 Members	13	14.94
	≥9 Members	10	11.49
	Total	**87**	**100.00**
Number of Rooms	1 Room	04	04.60
	2 Rooms	34	39.08
	3≥ Rooms	49	56.32
	Total	**87**	**100.00**
Tribe	Munyankole	10	11.49
	Munyoro	76	87.36
	Others	01	01.15
	Total	**87**	**100.00**

The Prevalence of Typhoid Fever in Hoima Regional Referral Hospital

The Overall Prevalence of Typhoid Fever

Table 2 shows the overall prevalence of typhoid fever among the study participants. As observed from the table, the prevalence of typhoid fever was 17.24% with a 95% CI of 09.14 – 25.34.

Table 2: The Overall Prevalence of Typhoid Fever.

Typhoid Fever	Frequency (n)	Percentage (%)	95% Confidence Interval
No	72	82.76	74.66 – 90.86
Yes	15	17.24	09.14 – 25.34

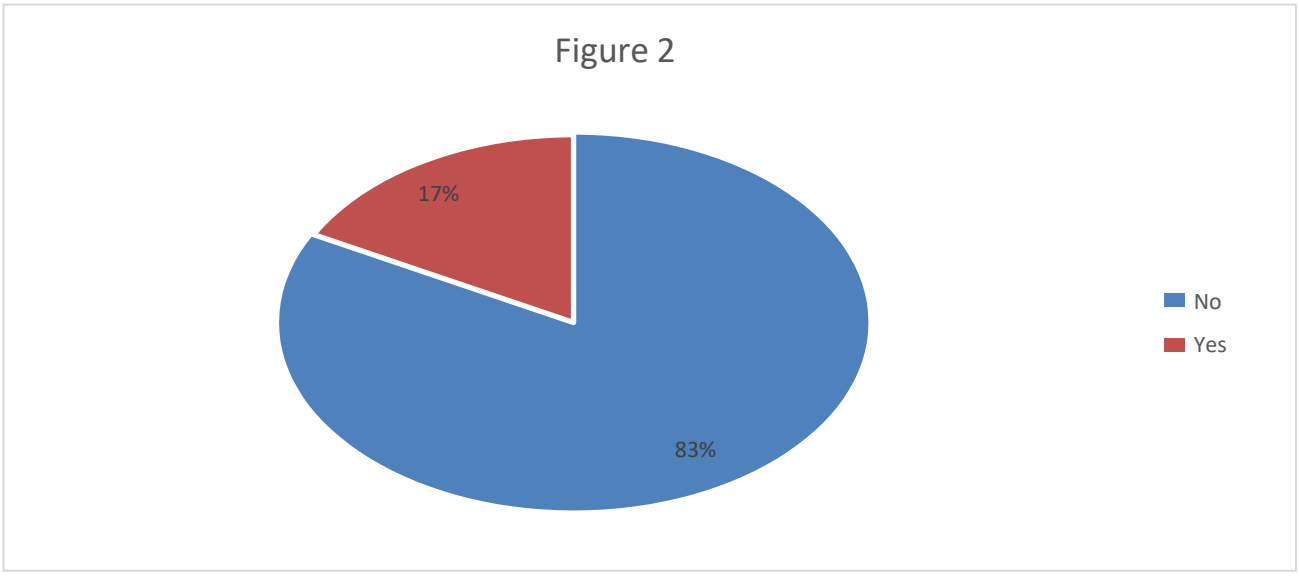

Figure 1: The Overall Prevalence of Typhoid Fever

Gender-Specific Prevalence of Typhoid Fever

Table 3 shows the gender-specific prevalence of typhoid fever among the study participants. Itcan be observed that males had the highest prevalence of typhoid fever standing at 22.86% (08/35) at a 95% CI of 08.22-37.49. The difference in the prevalence across the different genders was not statistically significant as the p value was more than 0.05.

Table 3: Gender-Specific Prevalence of Typhoid Fever

Gender	Total	Typhoid Fever		Chi Square (X^2)	P Value
		No Count, % (95% CI)	Yes Count, % (95% CI)		
Male	35	27 77.14% (62.51-91.78)	08 22.86% (08.22-37.49)	1.294	0.255
Female	52	45 86.54% (76.94-96.13)	07 13.46% (03.87-23.06)		

CI = Confidence Interval, p Value is Significant at 0.05 level

Age-Specific Prevalence of Typhoid Fever

Shown in table 4 is the age-specific prevalence of typhoid fever among the study participants. It can be observed that the age group with the highest prevalence was the age group of ≥68 years having a percentage of 100%. The difference in the prevalence across the different age groups was not statistically significant as the p value was more than 0.05.

Table 4: Age-Specific Prevalence of Typhoid Fever

Age of the participantsin Years	Total	Typhoid Fever		Chi Square (X^2)	P Value
		No Count, % (95% CI)	Yes Count, % (95% CI)		
18 – 27 years	36	31 86.11% (74.24-97.98)	05 13.89% (02.02-25.76)		
28 – 37 years	25	21 84.00% (68.56-99.44)	04 16.00% (00.56-31.44)		
38 – 47 years	10	09 90.00% (67.38-100.13)	01 10.00% (-12.62-32.62)	10.617	0.060
48 – 57 years	12	10 83.33% (58.60-100.08)	02 16.67% (-08.07-41.40)		
58 – 67 years	03	01 33.33% (-100.10-100.77)	02 66.67% (-76.76-200.10)		
≥68 years	01	00 00.00 % (--)	01 100.00% (--)		

CI = Confidence Interval, p Value is Significant at 0.05 level

The Level of Knowledge on Typhoid Fever among Patients in Hoima regional referral hospital.

Frequency of the responses of questions used to assess Knowledge of study participants

From table 5 below, it can be observed that majority of the participants 83 (95.40%) had ever heard about typhoid fever. Similarly, majority of the study participants 84 (96.55%) correctly answered that typhoid fever is caused by germs. When asked whether Typhoid fever transmitted by drinking contaminated water, majority 85 (97.70%) knew the correct answer. On the other hand, more than half of the study participants 45 (51.72%) said that the routes in the transmission of typhoid fever include foodborne and Airborne. When asked whether Typhoid fever is transmitted by eating contaminated food, 69 (79.31%) of the study participants correctly answered with a response of yes. Majority of the study participants 77 (88.51%) correctly responded that Fever is the symptom of typhoid fever infection meanwhile Loss of Appetite was said to be the symptom of Typhoid fever infection by 81 (93.10%). Furthermore, 82 (94.25%) correctly responded that Headache is the symptom of typhoid fever infection whereas 77 (88.51%) correctly said that Proper waste disposal prevents typhoid fever infection. Then finally, 74 (85.06%) of study participants correctly answered that Hand washing prevents typhoid fever infection.

Table 5: Responses to Questions used to assess Knowledge on Typhoid Fever among Patients

Variable	Frequency	Percentage %)
Have you ever heard of Typhoid Fever?		
Yes	83	95.40
No	04	04.60
Typhoid Fever is the disease caused by Germs.		
Yes	84	96.55
No	03	03.45
Typhoid fever transmitted by drinking contaminated water		
Yes	85	97.70
No	02	02.30
The routes in the transmission of typhoid fever include foodborne and Airborne.		
Yes	42	48.28
No	45	51.72
Typhoid fever is transmitted by eating contaminated food		
Yes	69	79.31

No	18	20.69
Fever is the symptom of typhoid fever infection.		
Yes	77	88.51
No	10	11.49
Loss of Appetite is the symptom of Typhoid fever infection.		
Yes	81	93.10
No	06	06.90
Headache is the symptom of typhoid fever infection.		
Yes	82	94.25
No	05	05.75
Proper waste disposal prevents typhoid fever infection.		
Yes	77	88.51
No	10	11.49
Hand washing prevents typhoid fever infection.		
Yes	74	85.06
No	13	14.94

***Correct Response**

Summary Statistics for Knowledge Score of the study participants

The researcher awarded the study participant 1 mark for every question answered correctly andfor a question answered wrongly, the participants were awarded 0 mark. The summary statistics of the knowledge scores of the study participants are presented in table 6 above. The total score if the participant got all the questions correct is supposed to be 10. There were 87 observations; the mean score was 8.67 with a standard deviation of 1.14 from the mean. The minimum score of knowledge was 5 while the maximum knowledge score was 10 with a variance of 1.29 and a negative skewness of 0.99 meanwhile there was a lepto kurtosis 4.13.

Table 6: Shows the Summary Statistics of total Knowledge scores

Observations	Mean	Std Dev	Median	IQR	Min	Max	Variance	Skewness	Kurtosis
87	8.67	1.14	9	8, 9	5	10	1.29	-0.99	4.13

Std Dev = Standard Deviation, Min = Minimum, Max = Maximum, IQR = Inter quartile Range

Grading of Knowledge Score of the study participants

Participants who had knowledge sore of 7 out of 10 and below were considered to be having low level of knowledge meanwhile study participants who had knowledge score of 8 out of 10 and above were considered to be having high level of knowledge on Typhoid fever. As presented in table 7 above, majority of the study participants 76 (87.36%) had high level of knowledge on Typhoid with a 95% confidence interval of 80.23 – 94.48 meanwhile 11 (12.64%) had low level of knowledge with a 95% confidence interval of 05.52 – 19.77.

Table 7: Shows grading of the knowledge scores

Grading of Knowledge	Frequency	Percentage	95% CI
Low	11	12.64	05.52 – 19.77
High	76	87.36	80.23 – 94.48

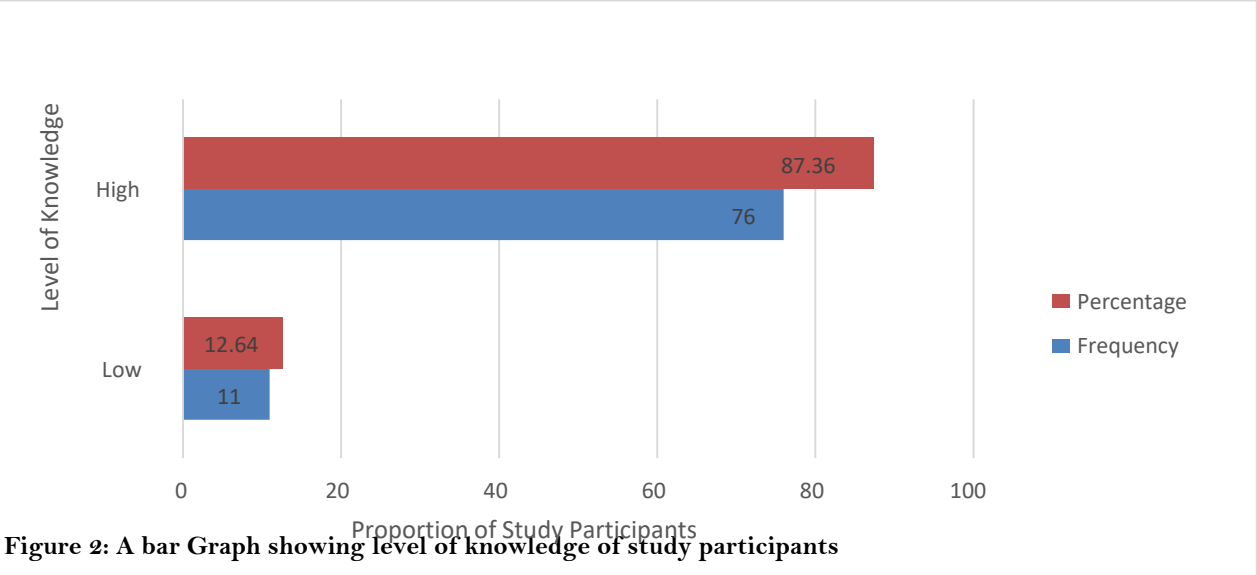

Figure 2: A bar Graph showing level of knowledge of study participants

Descriptive Statistics of Variables used to Determine Practices of Study Participants Table 8 shows that majority of the study participants 84 (96.55%) ate properly cooked food, drankboiled water 69 (79.31%) with 49 (56.32%) always treating drinking water and 80 (91.95%) disposed wastes in local pit. Furthermore, majority 70 (80.46%) sought for treatment in case they developed signs or symptoms of Typhoid, 83 (95.40%) had pit latrines at their homes and 75(86.21%) of the study participants washed their hands after visiting the latrine.

Table 8: Descriptive Statistics of Variables used to Determine Practices of Study Participants

Variable	Category	Frequency(N)	Percentage(%)
Eats properly cooked food	Yes	84	96.55
	No	03	03.45
	Total	**87**	**100.00**
Drinks Boiled water	Yes	69	79.31
	No	18	20.69
	Total	**87**	**100.00**
Always treats drinking water	Yes	49	56.32
	No	38	43.68
	Total	**87**	**100.00**
Place of Waste Disposal	Open Field	07	08.05
	Local Pit	80	91.95
	Total	**87**	**100.00**
Seeks for treatment in case ofTyphoid signs and symptoms	Yes	70	80.46
	No	17	19.54
	Total	**87**	**100.00**
Has pit latrine at home	Yes	83	95.40
	No	04	04.60
	Total	**87**	**100.00**
Washes hands after visiting Latrine	Yes	75	86.21
	No	12	13.79
	Total	**87**	**100.00**

Bivariate Logistic Regression to Show Association between Practices of Study Participants and Occurrence of Typhoid Fever.

A bivariate logistic regression was run to establish the practices influencing the occurrence of typhoid fever among the study participants and the results are presented in table 9 below. Results of the analysis showed that the practices which influenced occurrence of Typhoid fever were: Not drinking boiled water (cOR 16.00, 95%CI 4.36-58.77, P<0.001), Not treating drinking water (cOR 7.08, 95%CI 1.83-27.39, P=0.005), Not seeking for treatment in case of signs or symptoms of Typhoid (cOR 3.70, 95%CI 1.10-12.48, P=0.035), and not washing hands after visiting the Latrine (cOR 7.11, 95%CI 1.23-40.99, P=0.028).

Table 9: Bivariate Logistic Regression to Show Association between Practices of Study Participants and Occurrence of Typhoid Fever.

Variables	Typhoid Fever		cOR (95% CI)	P Value
	No Count, (%)	Yes Count, (%)		
Eats properly cooked food				
Yes	70 (83.33)	14 (16.67)	1.00	-
No	02 (66.67)	01 (33.33)	2.5 (0.21-29.49)	0.467
Drinks Boiled water				
Yes	64 (92.75)	05 (07.25)	1.00	
No	08 (44.44)	10 (55.56)	16.00 (4.36-58.77)	**<0.001**
Always treats drinking water				
Yes	46 (93.88)	03 (06.12)	1.00	-
No	26 (68.42)	12 (31.58)	7.08 (1.83-27.39)	**0.005**
Place of Waste Disposal				
Open field	05 (71.43)	02 (28.57)	1.00	
Local pit	67 (83.75)	13 (16.25)	0.49 (0.08-2.77)	0.416
Seeks for treatment in case of Typhoid signs and symptoms				
Yes	61 (87.14)	09 (12.86)	1.00	-
No	11 (64.71)	06 (35.29)	3.70 (1.10-12.48)	**0.035**
Has pit latrine at home				
Yes	69 (83.13)	14 (16.87)	1.00	-
No	03 (75.00)	01 (25.00)	1.64 (0.16-16.97)	0.677
Washes hands after visiting Latrine				
Yes	66 (88.00)	09 (12.00)	1.00	-
No	06 (50.00)	06 (50.00)	7.33 (1.94-27.70)	**0.003**

CI = Confidence Interval, cOR = Crude Odds Ratio, P Value is Significant at 0.05 level.

DISCUSSION

The Prevalence of Typhoid Fever in Hoima Regional Referral Hospital

Results of this study have revealed that the prevalence of typhoid fever was 17.24% with a 95% CI of 9.14% to 25.34%. Previously in Uganda, the prevalence of Typhoid infection based on blood cultures has been largely studied during outbreaks in the general population, and results show ranges between 2.6% (2/78) to 22.6% (7/31) [26]. This blood culture-based prevalence of Typhoid fever is much higher than the 2% (11/498) previously reported in an earlier study at six regional referral hospitals [27]; 2.3% (584/25404) reported at Mulago National Referral Hospital [28], and 0.5% (1/200) [29] to 5.0% (21/421) [30], reported in blood culture-confirmed Ethiopian studies. This variation in the prevalence of Typhoid fever could be due to different sociodemographic characteristics of the study participants as well as the difference in sample sizes and sampling techniques used. In a retrospective general population study among patients attending clinics in Bushenyi district, the overall prevalence was reported to be 36.6% (251/687), affecting mainly 10-29 year-olds of low-income class [31]. However, this was a Widal Agglutination serological-based study with sensitivity and specificity concerns amidst data quality constraints of retrospective studies. Serological tests, as opposed to blood cultures, have been found to give higher prevalence rates of typhoid fever resulting from false positive results in Nigeria [32] and India [33]. In an Ethiopian study, Typhoid fever was prevalent in 19% (38/200) based on serological Widal test as opposed to 0.5% (1/200) based on blood culture [29]. This was in conformity with the findings of the present study. A blood culture study in Cameroon found typhoid fever prevalence of 2.5% (5/200) amongst febrile patients, which is too low compared to the 17.24% in the present study. Other studies in low and middle-income countries have overall found typhoid prevalence lowest amongst children below 4 years and above 15 years [6]; and highest amongst the school-going age group of 5-10 years [5]. Meanwhile, the present study investigated Typhoid fever among adults and found prevalence was highest in the age group of ≥68 years, whereas the age group of 38 to 47 years had the lowest prevalence of typhoid fever.

The Knowledge of Typhoid Fever among Patients in Hoima Regional Referral Hospital

Results of his study showed that the mean score was 8.67 with a standard deviation of 1.14 from the mean. The majority of the study participants, 76 (87.36%), had a high level of knowledge of Typhoid with a 95% confidence interval of 80.23 – 94.48. This is in line with the results of a study done among participants in rural and urban communities of Lalo Assabi District, Ethiopia, which revealed that 76.9% of the respondents had knowledge about typhoid fever [34]. The results of the present study are consistent with the results of studies done in Mendida Town, Ethiopia, which revealed that the majority, 277 (65.5%), knew that typhoid fever is caused by germs [35]. The findings of the present study are in conformity with the results of a study conducted in Tanzania which indicated that the majority of participants seemed to be remarkably aware of Typhoid fever, and some of them associated it with drinking of un-boiled water [36]. Concerning transmission, the results of the study done in Ethiopia indicated that the majority, 392 (92.7%), of the respondents answered that typhoid fever is transmitted by eating contaminated food [37], which is similar to the 79.31% who correctly answered that question in the present study. The 87.36% who were found with a high level of knowledge in the present study is higher compared to the results of a study by Getachew *et al.* [35], who found that 63.8% of the study participants had good knowledge of Typhoid fever. The difference in the level of knowledge may be due to variation in the levels of education of the study participants.

The present study showed that the participants had a high level of knowledge regarding modes of transmission of Typhoid fever, but this finding deviates from the findings of a study in Glen View Suburb in Harare city done by UNICEF in 2016, which reported that the participants said that modes of transmission were: Bad hygiene (51%), Drinking unsafe water (37%), Not washing hands (32%), Eating cooked food from vendors (15%), and almost a quarter (24%) did not know how Typhoid is transmitted. The high level of knowledge in the present study can be attributed to the fact that the present study was conducted in a hospital setting. There is a possibility that the participants could have been educated by the health workers about Typhoid fever. The results of the present study are not in agreement with the results of a study conducted in Tanzania, which revealed that very few participants were aware of the mode of transmission and control of typhoid disease. The few participants who said that the disease is transmitted through drinking of un-boiled water could not explain how water gets contaminated [36]. The discrepancy in the study findings can possibly be attributed to the different levels of social exposure of the study participants.

The Practices influencing Typhoid Fever Occurrence among Patients in Hoima Regional Referral Hospital western Uganda.

Results of this study showed that the practices which influenced the occurrence of Typhoid fever were: Not drinking boiled water not drinking boiled water: This study showed that participants who never boiled their drinking water were 16 times more likely to have Typhoid fever than those who boiled their drinking water. People who drink safe water are likely to have a lower risk of typhoid fever compared to people who drink unsafe water, which is one of several risk factors for typhoid fever [38]. Since the major routes of transmission of typhoid fever are through drinking water or eating food contaminated with Salmonella typhi, the World Health Organization (WHO) recommends the provision of safe water as one of the preventive measures for typhoid fever [11]. The result of the present study is in conformity with the results of

a study done in Karachi which used a regression model, after adjusting for all covariates, and found that the overall risk of typhoid fever was lower among households using a safe drinking water source (RR = 0.63; 95% CI: 0.41–0.99) [39]. Similar to the results of the present study, a study in Eastern Kolkata found that a significantly lower proportion of households use tap water (RR = 0.07; p-value = <0.001) in typhoid fever high-risk areas compared to typhoid fever low-risk areas [39]. This suggests that tap water is more likely to be free from pathogens responsible for causing Typhoid fever.

Not treating drinking water: Participants who did not treat their drinking water were 7.08 times more likely to have Typhoid fever than participants who treated their drinking water. According to the Uganda Demographic Health Survey 2011 [40], almost 30% of people living in urban areas and more than 60% of those living in rural areas do not treat their water before drinking it. Barriers to safer drinking water include the cost associated with establishing a piped treated water system or purchasing water treatment products for household use and the false perception that naturally occurring water sources could be safe [41]. Contaminated drinking water is a particular problem in areas where typhoid fever is endemic [41]. For that reason, it is safer to drink only bottled water or canned or bottled carbonated beverages, wine, and beer, but that remains an expensive option. People may prioritize safe water for drinking but cannot afford to purchase the medicines used for treating the water [41]. Not seeking treatment in case of signs or symptoms of Typhoid: Findings of this study indicated that participants who did not seek treatment in case of signs and symptoms of Typhoid were 3.70 times more likely to have Typhoid fever than those who sought treatment. Early diagnosis and treatment avoid complications. Now, mortality is low despite the high frequency of episodes with complications [38]. In untreated patients, approximately 10% will relapse, and 4% will become chronic carriers. Community health education about the mode of transmission, association with living standards, sanitation, prevention, signs, and symptoms, and the importance of early treatment will not only reduce the prevalence of the disease but also lower the healthcare workload. Counseling patients about treatment modalities and side effects is an important part of patient education. Not washing hands after visiting the latrine: Participants who never washed their hands after visiting the latrine were 7.11 times more likely to have Typhoid than those who washed their hands. The result of this study is in line with the results of another study, which showed that washing hands with soap and water after the utilization of toilet facilities reduced the likelihood of having Typhoid fever [36]. Personal hygiene, most especially regarding hand-washing after toilet use, before food preparation, and before starting eating, is very helpful in the prevention of Typhoid Fever [35].

CONCLUSION

This study addresses the prevalence, knowledge, and practices related to Typhoid fever at Hoima Regional Referral Hospital. It highlights the ongoing challenges posed by Typhoid fever at the hospital and suggests that by reducing its prevalence, funds currently allocated for treating the disease could be redirected to other health projects. The knowledge of Typhoid fever among patients at the hospital is considered satisfactory, but efforts are needed to maintain this level of knowledge. Factors influencing Typhoid fever occurrence among patients include not drinking boiled water, neglecting water treatment, failure to seek timely treatment for symptoms, and inadequate hand hygiene after visiting the latrine.

RECOMMENDATIONS

This study focuses on the prevalence of Typhoid Fever at Hoima Regional Referral Hospital and its public health implications. It highlights the need for educating the public about the disease, ensuring health worker training and awareness, and implementing preventive measures. The study's strengths include its location at a major district hospital, rigorous data collection methods, and scientific data analysis. The prevalence of Typhoid Fever at Hoima Regional Referral Hospital is a significant public health concern. To address this challenge effectively, it is essential for health authorities and service providers to educate the public about the disease. Health workers should be encouraged through seminars and continuous medical education to counsel women at risk of cervical cancer and promote the utilization of cervical cancer screening services. The knowledge about Typhoid Fever among patients in Hoima Regional Referral Hospital needs improvement. The Ministry of Health, in collaboration with implementing partners, should develop programs to sensitize the public about Typhoid Fever, its transmission routes, and prevention measures. Several practices influence the occurrence of Typhoid Fever among patients at the hospital. Encouraging families and individuals to boil or treat water before drinking is crucial. Clinicians must emphasize early diagnosis and appropriate antibiotic treatment to minimize complications during outbreaks. Community health workers should educate the community about the importance of handwashing after using latrines and assist in setting up handwashing facilities.

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