Factors Contributing to increased Cases of Typhoid Fever among patients aged 18-45 Years in Kakira Health Centre III, Jinja District. A Descriptive Study.

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Abstract

Background:
This study aimed at determining the factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health center III, Jinja District.

Methodology:
A descriptive study design was employed for both qualitative and quantitative data collection, a simple random sampling technique was used to select respondents from which data was collected. The respondents were selected using a simple random sampling method.
Well-designed, semi-structured questionnaires written in the English language with open and closed-ended questions and pre-tested questionnaires were used to collect data on a sample of 50respondents, data was later analyzed manually systematically by compiling it inform of percentages, tables, pie charts, and bar graphs.

Results:
People do not complete their treatment for typhoid fever, do not know how typhoid fever is transmitted from one person to another, that there was miss management of wastes, food, do not boil water for drinking, the majority do not have latrines, move long distances to seek health services, the health facility does not have required laboratory equipment to facilitate routine typhoid testing and diagnosis, and gaps in the general examination of patients were discovered.

Conclusion:
Infectious disease awareness among people was very high because a bigger percentage of the respondents had ever heard of the disease.

Recommendation:
Uganda National Water and Sewerage Corporation should improve water supply and treatment more sensitization of people on how to prevent communicable diseases. People in the community should always be encouraged to always boil water before drinking and routine of the health facility for general body checkups.

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1 Background of the study

Typhoid fever is a systemic disease caused by salmonella enteric Serovar Typhi a Gram-negative bacterium.

Humans are the only host and transmission most commonly occurs through ingestion of water or food contaminated with feces from an acutely ill or convalescent patient or an asymptomatic carrier. (Kabwama *et al.,* 2017). The hazard of the disease is high in Underdeveloped Countries where typhoid salmonella is endemic due to poor hygiene and Sanitation and the non-availability of safe suste-

nance and water (Antillon M, Warren JL& Crawford FW, 2017)

The classic presentation of typhoid fever is fever, malaise, diffuse abdominal pain, and constipation, and if untreated may progress to delirium, obtundation, intestinal hemorrhage, bowel perforation, and death within one month of onset. Survivors may be left with long term or permanent neuropsychiatric complications (John L Brusch, 2019)

Typhoid fever is a threat to many tropical countries showing a worldwide estimate of about 212 million cases with 129,000 deaths yearly with children and young adults being the vulnerable groups (Steele et .al.,BurgessDCH, DIAZ, Carey ME,ZaidAKM. Challenges and opportunities for typhoid fever control: A call for coordinated action. Clinical infectious Diseases.2016). In 2017, typhoid and paratyphoid fever were estimated to cause 10.9 and 3.4 million illnesses globally(GBD 2017 Disease and Injury Incidence and Prevalence Collaborator).

The recommended test to confirm if the person has enteric fever is to grow the salmonella from their blood. It takes at least 48hours to give a result, so cannot help health care workers make a diagnosis the same day the blood culture is taken. Therefore, rapid diagnostic tests (RDT) that is widal are diagnosed to be easy to use and deliver quick results without a need for blood culture.

In Southeast Asia and the central south on assessment of knowledge and risk perception towards typhoid fever, enteric fever incidence was estimated to be 219.8 per 100,000Populations (GBD 2017 Typhoid and Paratyphoid Collaborators).

In Europe, in 2014 the highest incidence rates of typhoid fever were reported in France (0.65 cases per 100,000 population), the United Kingdom (0.55 per 100,000), and Denmark (0.48 cases per 100,000). ((Cyprus, Hungary, Iceland, Latvia, Malta, Romania, and Slovakia) (ControlECf DPa.Typhoid and paratyphoid fever (2016).)

In Indonesia, a study conducted in the slums of Jakarta estimated the incidence rate of typhoid at 148.7 per 100000-person-years Typhoid and paratyphoid fever in the age group 2–4 years old, 180.3 in the age group 5–15 years old and 51.2 in those over 16 years of age, with a mean age of onset of 10.2 years (Alba *et al* 2016).

In Africa, it is estimated about a total of 400,000 cases occur annually with an incidence of 50 per 100,000 persons per year (Soomro S., *et al.* "Seasonal variation and recent status of typhoid fever in a tertiary care hospital". International Journal of Endorsing Health Science Research 2.2 (2014))

In Lao People's Democratic Republic that the annual incidence of typhoid was 4.7 per 100,000 persons and paratyphoid was 0.5 per100, 000 persons (2020 by The American Society of Tropical Medicine and Hygiene)

In Uganda, the incidence rate of Typhoid fever at the national and district level was ~ 160 and60 cases per 100,000 persons per year, respectively, predominantly in the urban area. (Mirembe, 2019). Countries like Uganda, with a very high population growth rate and ample annual participation but with inadequate safe water access experience multiple large outbreaks of typhoid every year (Mirembe, 2019). For example, a recent typhoid outbreak in Kampala capital city was attributed to an unconfined aquifer which 10,230 suspected cases and 1,920 of which were confirmed. The specific objectives were to determine the individual related factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health center III, Jinja District, to determine the community-related factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health center III and also to determine the health-related factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health center III in Jinja district.

2 Methodology

Study area

The study was conducted in Kakira Health center III in the Jinja district. The Health facility was established by the government and funded by the local government and the ministry of health to provide health care services to the workers of Kakira sugar limited industry and their families, and the citizens within the area when they fall sick and any members of the community. The health center offers services like Antenatal care, Maternal, and child health care services, HIV/AIDS counseling testing, and treatment, conducts birth deliveries, and management of medical conditions, and they also have a functioning Laboratory. They also offer inpatient services to patients.

Study design

The study was a descriptive cross-section study. This is because the study did not involve follow-up of the respondents.

Study Population

The study population was adult patients aged 18 to 45 years diagnosed with Typhoid fever in Kakira Health center III

Sample size determination

The sample size was determined using the Kish and Lisle (1967) formula which states that:

N=a2c/x2

Where

N= desired sample

A=standard normal deviation is usually set at 1.96 which corresponds to 95 %(0.625) (Louis Muwazi)

C=probability that researcher will get a certain amount of error.50% is considered to cater for that.

X=maximum error=5 %(0.05)

N=a2c/x2, where;

N=360 responds

However, due to time and financial constraints, a sample of 50 respondents was used

Sampling technique

Simple random sampling technique was used to choose the participants for the study.

Simple random sampling is a non-biased probability sampling technique as it ensures that everyone has an equal opportunity of participating in the study

Defining of variables

The dependent factor was increased cases of Typhoid fever among patients aged 18 to 45 years while the Independent variable was the factors contributing

Data collection tools

Data were collected using a structured questionnaire. This is defined as a predetermined, written list of questions that are answered by the respondents without supervision and minimalist no explanation from the interviewer. This, therefore, helped to reduce bias from the respondents and researcher; it also enabled the researcher to collect data from a large number of respondents within a short period.

Data collection procedure

An introduction letter was obtained from the Principal of Kampala School of health sciences and the taken to the medical superintendent of Kakira Health center III. I was then granted permission to collect data from the facility. The researcher was assisted by a trained research assistant who is knowledgeable in the local language. After data collection, the participants were thanked and the researcher checked that data was filled before the respondents leave the study area.

Pre-testing of questionnaires

The questionnaires were tested at the Kampala school of health sciences to evaluate the reliability of the study tool.

Data management procedure

After data was collected, it was checked for completeness and accuracy. Those which were not completed or correctly filled were completed before the respondents left the facility. The forms were then kept in a locked cupboard to maximize confidentiality and ensure access to the research team only.

3 Data Analysis:

Data was counted by tallying using a pen and A4 sheets of paper. It was then entered into Microsoft Excel to generate tables, graphs, and pie charts for easy analysis.

Ethical consideration

The researcher introduced the topic, purpose, and significance of the study to respondents.

The respondents were assured of confidentiality in the study as no names were used and thereafter asked to sign a consent form. No respondent was forced to participate in the study. Each respondent was interviewed alone and information got from any respondent was not shared with other colleagues. The data collected was kept in a locked cupboard.

Quality Control

This was to ensure the reliability of the validity of the instruments used to collect data. Reliability refers to the ability of the instrument to deliver consistent results after repeated trials on the same population, it is ensured by testing the instrument. Validity refers to assurance with which a study instrument can be able to provide relevant results, it is ensured through proper supervision as well as a judgment by experienced people.

The research assistant was trained on how the study was conducted, and how to deal with study tools as well as the respondents when carrying out the study.

3.1 Study Findings

Social demographic characteristics of respondents

From table 1 above, the majority of respondents 27 (54%) were between the age range of 18 to 24 years, and a minority 4(8%) of the respondents were 39 to 45 years of age, the majority 76% of the respondents was female and the minority 24% of the respondents was male, majority of the respondents 22(44%) were married, 18 (36%) were single, 8 (16%) divorced or separated and lastly 2(4%) were widowed, majority of respondents 46% completed their secondary level of education and the minority 4% of the respondents had no formal education at all, majority of respondents 30% do not work and minority 12%of the respondents were working in factories and the majority of the respondents 16(32%) were protestants, and the minority 4(8%) of the respondents were born again.

3.2 Individual related factors contributing to increased cases of typhoid fever

From the figure 1 above results show that majority of the respondents (60%) had ever had heard of typhoid fever and minority of the respondents (40%) had never had of typhoid fever.

From table 2 above the majority 30(60%) said they had ever heard of typhoid fever before and minority 20(40%) have never heard of typhoid fever.

From table 3 above results show that majority 40 (80% of the respondents do not complete their treatment for typhoid fever and the minority 10 (20%) of the respondents complete treatment for typhoid fever when they fall sick.

From figure 2 above results show that majority 54% of the respondents only wash hands when they are going to eat and minority 10% of the respondents do not totally wash their hands

From table 4 above results show that majority 31(64%) of the respondents did not have latrines and minority 4 (8%) of the respondents do not know the type of latrines they have

From figure 3 above results show that majority 80% of the respondents who have pit latrines lack pit latrine covers and minority 20% of the respondents who have pit latrines have pit latrine covers.

3.3 Community related factors contributing to increased cases of typhoid fever.

From the above table 5 results show that the majority 42% of the respondents get their water from the tap and minority 2% of the respondents get their water from spring

From the above figure 4 results show that majority of the respondents 52% do not know what contaminates water in their community and minority of the respondents 8% say that water bis contaminated by animal and human wastes disposed near water source.

From the above figure 10 results show that majority 58% of the respondents dispose their wastes in the back yards and minority 2% of the respondents burry wastes in the ground.

3.4 Health related factors contributing to increased cases of typhoid fever

From table 6 above results show that half 50% of the respondents move for above 5km from their homes to reach the nearby health facility and minority 14% of the respondents move for less than a kilometer to reach the nearby health facility.

From figure 4 above results show that almost all respondents 98% pay for testing for salmonella typhi and very few of the respondents 2% say that they do not pay for testing for typhoid fever.

From table 7 above results show that half of the respondents 25 (50%) said that health workers at the facility do not general body up including vitals of patients when they are sick and minority of the patients 4 (8%) said they health workers do examine them when they are requested

4 Discussion, conclusions and recommendations:

5 Discussion:

Individual related factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health centre III, Jinja district.

According to the study findings majority of the respondents (60%) had never heard of typhoid fever. This implies that infectious disease awareness among people was very effective. This is in disagreement with a study which was conducted in

Table 1. Shows the distribution of respondents according to their demographic data **(n=50)**

Age	**Frequency(f)**	**Percentage (%)**
18-24 years	18	36
25-31 years	24	48
32-38years	10	20
39-45years	4	8
Total	**50**	**100**
Religion		
Catholic	15	30
Muslim	4	8
Born again	10	20
Anglican	16	32
Others	**5**	**10**
Total	**50**	**100**
Primary	10	20
Secondary	14	28
Tertiary	15	30
None	1	2
Total	**50**	**100**
Marital status		
Single	18	36
Married	22	44
Separated/ divorced	10	20
Total	**50**	**100**
Sex		
Male	12	24
Female	38	76
Total	**50**	**100**

Table 2. Shows the distribution of respondents by whether they have ever had of typhoid fever or not (n=50)

Response	**Frequency**	**Percentage (%)**
Yes	**30**	**60**
No	**20**	**40**
Total(n)	**50**	**100**

Table 3. Shows the distribution of respondents according to whether they complete treatment of typhoid or not (n=50)

Response	**Frequency**	**Percentage (%)**
Yes	**40**	**80**
No	**10**	**20**
Total(n)	**50**	**100**

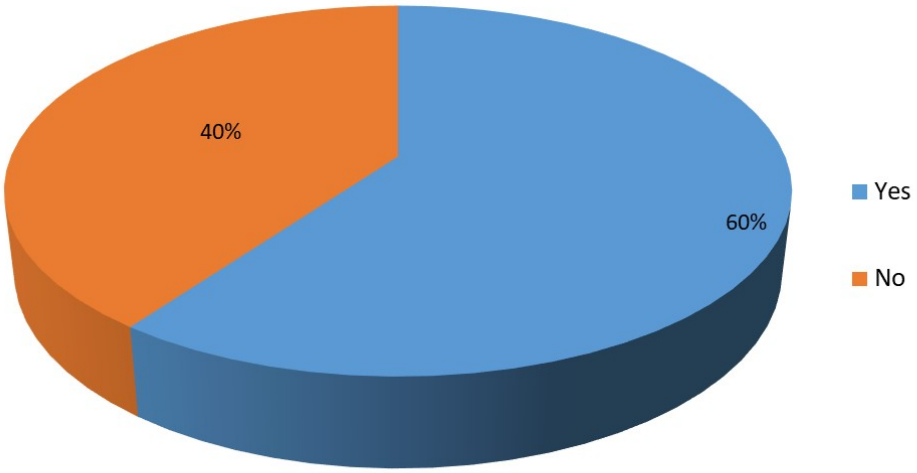

Figure 1. Shows the distribution of respondents according to whether they have ever heard of typhoid fever or not. (n=50)

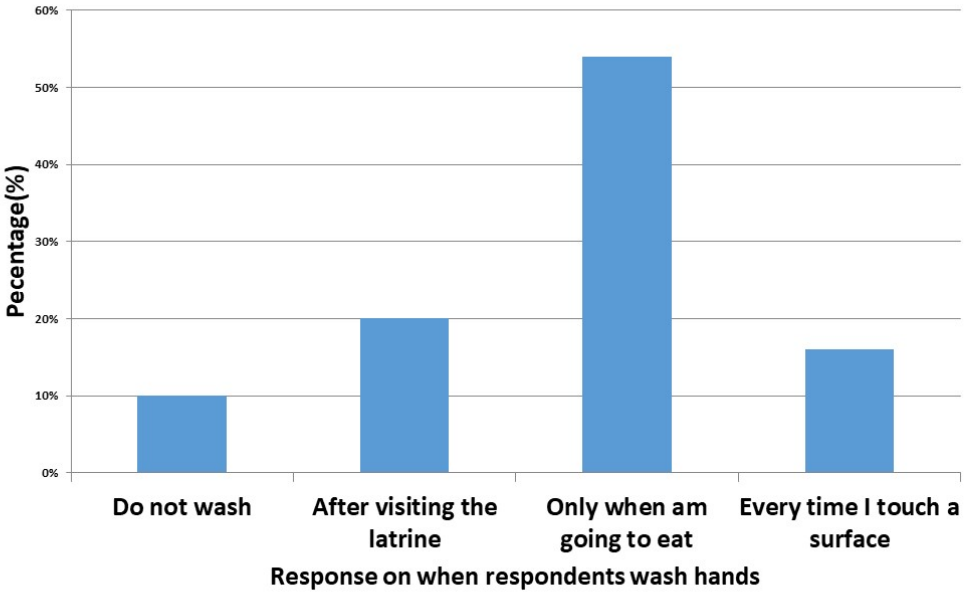

Figure 2. Shows the distribution of respondents according to how often do respondents wash their hands (n=50)

Table 4. Shows the distribution of respondents according the type of latrines they had. (n=50)

Response	Frequency	Percentage (%)
Pit latrine	10	20%
I do not have one	31	62%
I do not know	4	8%
Toilet	5	10%
Total (n)	50	100

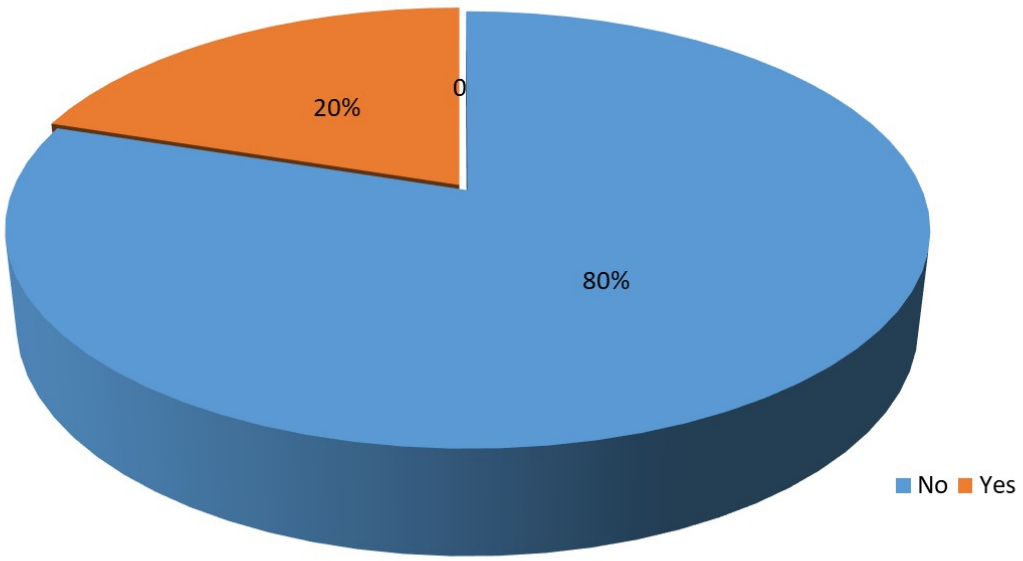

Figure 3. Shows distribution of respondents according to those with pit latrines who have pit latrine covers

Table 5. Shows the distribution of respondents according to the source of water in the community (n=50)

Response	Frequency	Percentage (%)
Well	5	10
Springs	1	2
Borehole	14	28
Tap	21	42
Others	9	18
Total(n)	50	100

Table 6. Shows the distribution of respondents according to how far is the nearest health facility from their homes. (n=50)

Response	Frequency	Percentage (%)
Less than 1km	8	16
1-3km	7	14
3-5km	25	50
Above 5km	10	20
Total(n)	50	100

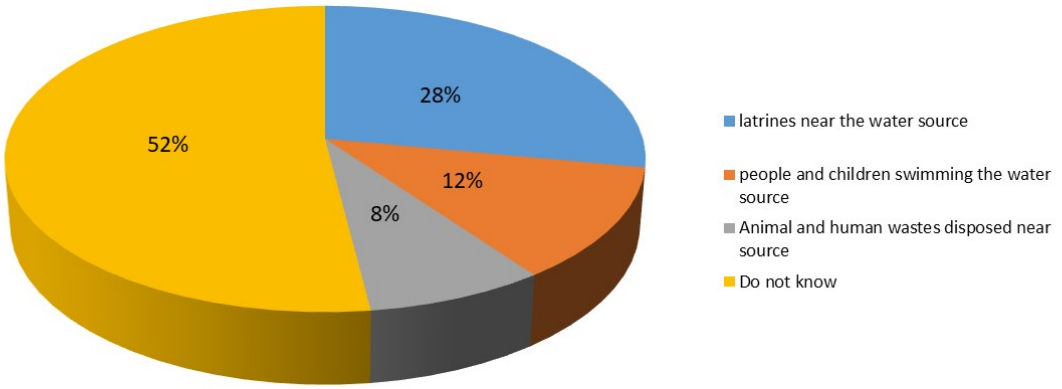

Figure 4. Shows distribution of respondents according to what contaminates water in their community (n=50)

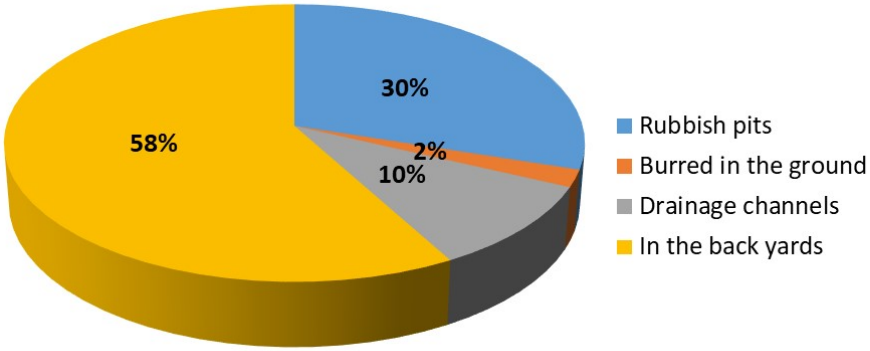

Figure 5. Shows the distribution of respondents according to how wastes are disposed in their community (n=50)

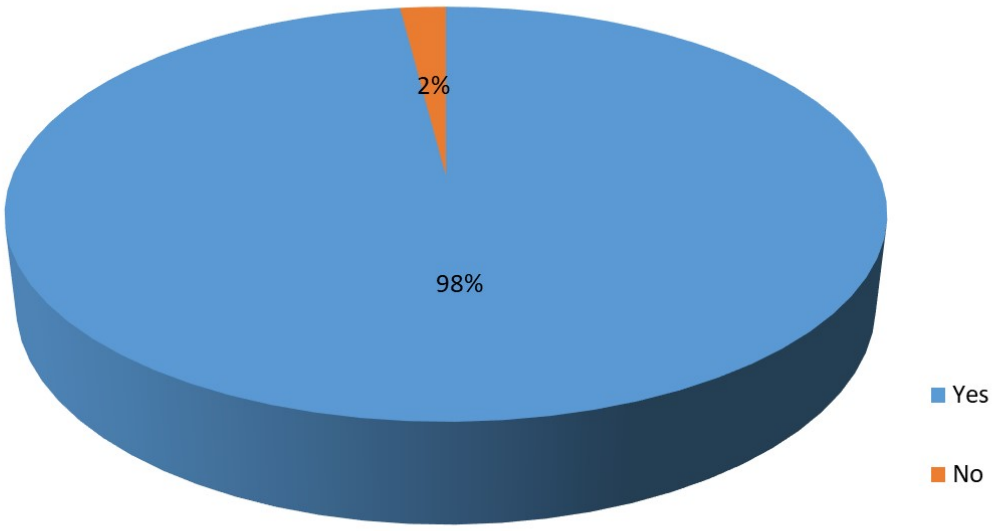

Figure 6. Shows the distribution of respondents according to whether they pay for testing for typhoid fever or not. (n=50)

Table 7. Shows how often health workers do general body check up of patients when they visit the health facility (n=50)

Response	Frequency	Percentage (%)
Every time I fall sick	10	20
They do not examine	25	50
When they are requested to examine	4	8
I do not know	11	22
Total(n)	50	100

Singida area in Tanzania (2015) on pervasiveness and requirements of typhoid fever and its control: lessons for viable control on the ailment, 53%of the respondents were unaware of typhoid fever control methods. However, few people took part in the preventive measures for the disease.

Furthermore, results revealed that most of the respondents (80%) do not complete their treatment for typhoid fever when they fall sick. This may lead to complications of the disease in the late stages which may require hospitalization of the patient. This is in agreement with the study conducted by clinical infectious diseases (2019) on the severe typhoid fever in Africa program highlights the need for the broad development of typhoid conjugate vaccines revealed that a third meta-analysis showed that 25% of hospitalized typhoid fever patients had complications, and a 36% higher prevalence of complications among those patients reporting having symptoms for ≥10 days at the time of hospitalization. Therefore, taking half a dose of typhoid is more dangerous and may also cause drug resistance. This was attributed to high costs incurred in buying of full dose for treatment and also the presence of adequate essential drugs in the health facility for the treatment of typhoid fever.

The study results also showed that most of the respondents (64%) do not have latrines and out of the few with pit latrines most of them (80%) do not have pit latrine covers. In addition, the results also showed that the majority of the respondents (54%) only wash their hands when they are going

to eat and (34%) of the respondents do not mind washing. This was in line with the study that was conducted by David Musoke *et al.* (2018) in Central Uganda on drinking water supply, sanitation, and hygiene promotion interventions revealed that the survey showed that although the majority of households (86%) had latrines, the sanitary status found at most of them was poor. This included a lack of hole covers (84%) and hand washing facilities (70%). This implies that there are poor sanitation and hygiene promotion interventions among individuals as evidenced by the results. This was attributed to the fact that most of the individuals were in rentals where many families can share one pit latrine in the community.

The study results showed that the majority of the respondents (52%) do not know what contaminates water in their community which also means that they do not know that typhoid fever can also be transmitted through drinking contaminated water. This is in line with a study done by DinkineshGetachew., *et al.* (2018), assessment of Knowledge and Risk Perception towards Typhoid Fever among Communities in Mendida Town, Ethiopia, revealed that the transmission of about half 212 (50.1%) of the respondents did not know that infected person can transmit the diseases to the healthy person. Therefore, respondents did not know how typhoid is transmitted. This was attributed to the weak village health team personnel to always health educate people in the community on how typhoid fever is spread.

Community-related factors contributing to increased cases of typhoid fever among patients aged 18-45 years in Kakira health center III.

The study results revealed that the majority of the respondents (42%) get their water from the tap. This was in disagreement with the study that was conducted by Ajayi *et al.*(2015)in Nigeria on the prevalence of typhoid fever among different sociodemographic groups in Ondo state revealed that at the Federal Medical Center Owo, patients who sourced their water from well had the highest frequency 98 (57.64%) of typhoid fever. This implies that there is underwater pollution through the linkages of the water as it is carried in the pipes in the ground and also the poor or inadequate treatment of water by National Water and Sewerage Corporations (NWSC).

Furthermore, the study revealed that the majority of the respondents (58%) dispose of waste in their backyards or homes more than other methods of waste management. This is in line with a study that was conducted by the American Society of Tropical Medicine and Hygiene (2020), which revealed that unsafe waste management was a risk factor for up to 55% of patients with typhoid fever (2020). In addition, results were also in line with the study conducted by David Musoke *et al.,* (2018), on drinking water sources, sanitation, and water hygiene promotion interventions in central Uganda the survey showed that the main method of solid waste disposal was dumping in open pits then burning (55%) while others buried it (11%), disposed of it indiscriminately (18%), or used skips (7%). Only 40% of the households were satisfied with the solid waste management services in their community. In addition, 48% of households lacked dustbins. This, therefore, implies that there is poor sanitation in the community. This was attributed to overcrowding of individuals in one area causing improper management of waste.

From the study, results show that the majority of the respondents 40% eat food from their homes than food vendors reducing the times they buy food from vendors. This is in this disagreement with the study conducted by Galgallo *et al,* 2015 in MoyaleSubcounty, Kenya for an investigation of a typhoid fever epidemic during the 9-hour observation, 55% of the vendors and 69% of customer's fecal-hand contamination was not followed within 15 min by hand washing and the amount of water used at these sites was low compared to the international disaster relief standards. However, food at home may be contaminated during preparation, serving, eating, and storage and this may give a chance for salmonella typhi to invade the food. This was attributed to the fact that individuals lacked adequate knowledge on how to properly manage food from places of production up to serving food for eating in their families.

From the findings majority of the respondents (70%) do not treat their drinking water or boil it. This is in agreement with the study that was conducted by the American Society of typhoid medicine and hygiene (2020) on associations between water, sanitation, hygiene, and food exposures and typhoid fever and a systematic review and meta-analysis, drinking untreated water was a risk factor of69% of patients with typhoid

fever and in the study conducted by DinkineshGetachew., *et al* (2018), conducted a study on Assessment of Knowledge and Risk Perception towards Typhoid Fever among Communities in Mendida Town, Ethiopia, only 98 (23.2%) of the respondents treat their drinking. Therefore this implies that sensitization of individuals on the importance of boiling drinking water in the prevention of typhoid was not effective. This was because people did not know that typhoid fever can spread through drinking contaminated water and also that boiling can help to kill salmonella typhi that causes typhoid fever.

Health-related factors contributing to increased cases of typhoid fever among patients aged 18-45 years

The study findings showed that half of the respondents (50%) move for a distance above 5km from their homes to reach the nearby health facility and this leaves many respondents presenting late to a health facility. This is in line with the study conducted in Karachi (2016) on revisiting typhoid fever surveillance in low and middle-income countries: lessons from a systematic literature review of population-based longitudinal studies reported that only 24 % of febrile episodes identified from house to house visits had ≥3days of fever and the rest were not referred to index surveillance facility. Sometimes only a fraction of people identified in the community reaches the index surveillance facility as observed in Karachi where 30 % of 4198 febrile illness cases with more than 3 days of duration are presented at the health facility. This, therefore, causes the late presentation to the health facility with more days of signs and symptoms of the infection. This was attributed to the lack of a nearby health facility where they can assess the health service in time before complications.

Furthermore, the study also revealed that almost all the respondents (98%) who presented with signs and symptoms typhoid fever paid money before being tested for salmonella typhi. This is attributed to the limited blood culture and diagnostic facilities of the health facility which needed to take samples elsewhere for testing. This is in line with the study that was conducted in Singida area in Tanzania (2015) on the pervasiveness and requirements of typhoid fever and its control: lessons for viable control of the ailment revealed that 75% of health facilities had no a shortage of diagnostic laboratory services indicated (©Prime Scholars Library 2015). This is therefore expensive to most of the patients leaving many of them not tested and hence not diagnosed making them potential carriers, therefore, spreading from one another. This was attributed to the fact that some people were parents and most of them were at the workplace looking for money to look after their families and missing even a single day without work caused the family to starve.

The study findings revealed that half of the respondents 25 (50%) said that health workers do not do a general body checkup including the vitals of patients when they are sick. This implies that some medical workers miss cardinal findings on examination.

6 Limitations of the study

Due to financial and time constraints, a small sample was used. Some participants gave wrong information while others were absent on the day of the interview

7 Conclusion:

It was discovered that the majority of the respondents had never heard of typhoid fever. This implies that infectious disease awareness among people was very high because a bigger percentage of the respondents had ever heard of the disease

The study also discovered that most of the respondents do not complete their treatment for typhoid fever when they fall sick causing complications of the disease in late stages and also becoming carriers, therefore, spreading the infection.

So, the study discovered that majority of respondents do not have latrines, and the few with pit latrines lack pit latrine covers. In addition, they also only wash their hands when they are going to eat. This makes it difficult to break the transmission chain.

The study discovered that most respondents do not know how typhoid fever is transmitted from one person to another meaning that everyone is eligible carrier of the infection unless tested.

It was also discovered that the majority of the respondents get their water from the tap and in addition agreed that this water gets contaminated by underwater pollution of linking pipes.

The study discovered that there was miss managing of waste amongst respondents where most of them disposed of waste in the open backyards only a few of them were satisfied with waste management.

It was also discovered that most respondents miss handling food right from preparation storage and eating. However, it was discovered that most of the respondents eat leftovers, especially during breakfast when it is not warmed.

The study discovered that most respondents do not treat their drinking water as neither boiled and to some extent individuals also buy unboiled water packed in polyethene bags "buvera".

It was also discovered that half of the individuals move long distances of above five kilometers which is expensive for them leaving many not attending the health facility for health services.

The study discovered that diagnostic investigations and all other routine tests for typhoid fever are paid for and this is because the health facility is supplied with few materials to carry out such tests leaving patients with signs and symptoms of typhoid not tested.

It was also discovered that most of the respondents willingly allow health workers to collect a sample from them for laboratory analysis making it easy for the health workers and therefore they are corporative.

Finally, it was also discovered half of the respondents agreed that health workers do not do a general body checkup including the vitals of patients when they are sick hence some medical workers miss cardinal findings on examination.

Recommendations :

The government of Uganda through the National Water and Sewage Corporation should improve the coverage and treatment system of water for drinking and domestic use.

The government of Uganda through the ministry of health and the Centre for Disease Control and Prevention (CDC) sensitizes people about the importance of promoting proper handwashing and constructing latrines in the community.

The government of Uganda through the ministry of health should recruit more health workers to improve service delivery at the health facility.

The government of Uganda through the Ministry of health should build more health facilities in the area and also promote the existing ones and strengthen them to higher National Drug Authority (NDA) to supply the required testing and diagnostic supplies to increase the services offered.

Health workers at Kakira health Centre III must always health educate individuals about causes, risk factors, signs, and symptoms as well as preventive measures and seek quick medical intervention in case of infection. The individuals in the community should be encouraged to always report to the health facility early in the onset of signs and symptoms of the disease before self-medication to reduce the resistance to drugs used to treat typhoid fever.

The individuals in the community should be encouraged to boil water for drinking and discourage them from eating leftovers and also encourage the proper cover food in case it remains.

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Abbreviations and Acronyms

DHO: District Health Officer

KHC III : Kakira Health centre III

MoE: Ministry of Education

MoH: Ministry of Health

MWE: Ministry of Water and Environment

NWSC: National Water and Sewerage Cooperations

UNICEF: United Nations Children Funds

WHO: World Health Organization

Definition of key terms

Bacteria: Are single-celled microorganisms that can exist either as independent organisms or as parasites

Community: A group of people living in the same place or having a particular characteristics

Fatality rate: Is the proportion of deaths within designated population of cases over the course

Fever: An abnormally high body temperature, usually accompanied by shivering headache, and in severe instances delirium.

Incidence: The measure of the risk that a person develops a new condition within the period

Infection: Is the invasion of an organism's body tissue by disease-causing agent, their multiplication, and the reaction of the host tissue to the infectious agents and the toxins they produce for the disease

Mortality rate: Is the measure of the number of death in a particular population

Portal of entry: Is the site where an infectious agent enters a susceptible host.

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Location: Wisdom Centre, P.O.BOX. 148, Uganda, East Africa.

Table 8. Reference:

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