FACTORS CONTRIBUTING TO THE PREVALENCE OF TYPHOID FEVER AMONG PATIENTS ATTENDING TO KIRYANDONGO GENERAL HOSPITAL IN KIRYANDONGO DISTRICT

BY

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BMS/ 0004/ 141 / DU

A RESEARCH REPORT SUBMITTED TO FACULTY OF CLINICAL MEDICINE AND DENTISTRY IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF BACHELOR OF MEDICINE AND BACHELOR OF SURGERY OF KAMPALA INTERNATIONAL UNIVERSTY, UGANDA

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DECLARATION

I **OKECH EMMANUEL AKENO** hereby declare that to the best of my knowledge and ability, this research report entitled: *"Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District"* carried out between September 2018 and March 2019 is my own original work and has never been presented in Kampala International University or any other tertiary institution or university for award of diploma or degree.

Sign .....Date..18.../APRIL./2019.....

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APPROVAL

I hereby certify and confirm that this research report entitled *"Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District"* carried out between September 2018 and March 2019 has been done under my close supervision and is ready for submission to the Faculty of Clinical Medicine and Dentistry for the award of the Degree of Bachelor of Medicine and Bachelor of Surgery of Kampala International University, with my approval as the supervisor.

Sign ..... Date 23/04/2019

DR. ATUHAIRWE MICHAEL

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LIST OF ABBREVATIONS

CFCD	Christian Foundation for Community Development
DDHS	Director of District Health Services
KIU	Kampala international university
MDG	Millennium Development Goal
MOH	Ministry of Health
NGOs	Non-Governmental Organizations
TF	Typhoid Fever
VHT	Village Health Team
WFFCG	World Fit for Children Goal
WFP	World Food Program
WHO	World Health Organization
WWD	World Water Day
VIP	Ventilated Improved Pit latrine
KIU WC	Kampala international university western campus

DEFINITON OF TERMS

Epidemiology	The Scientific study of infectious diseases and their causes.
Morbidity	Relating to or caused disease
Mortality	The number of deaths within a particular area or group of people over a specified period of time.
Constraints	Something that limits your freedom to do what you want.
Environmental sanitation	Conditions and processes relating to people health and their surroundings especially the system that supply water and deal with human waste.
Immunization	Practice of preventing someone from getting a particular illness by putting a substance into their body, especially using a needle.
Homestead	A place occupied by people of its origin.

ABSTRACT

Introduction

Typhoid fever (TF) continues to be a major public health problem in many developing countries. In Uganda, an outbreak of typhoid fever in Kasese District sickened 8092 persons from 27 December 2007 to 30 July 2009, resulting in at least 249 intestinal perforations and 47 deaths.

Objectives

The study was aimed at assessing risk factors contributing to the prevalence of typhoid fever among patients attending to Kiryandongo General Hospital in Kiryandongo district. Specifically, was to determine the personal and food hygienic factors, identify sanitary factors in homesteads and identify availability of clean and safe water in the homesteads of patients attending to Kiryandongo General Hospital that may contribute to the prevalence of typhoid fever.

Methodology

The study was a cross sectional descriptive study which involved interviewing 138 respondents with questionnaire forms. The questionnaire was designed according to the objectives of the study.

Results

35% of respondents do not have latrines at home and over 70% of respondents don't control flies densities from their latrines. About 60% of respondents wash hands but without soap and 20% totally do not wash hands after visiting the latrine. Furthermore, up to 49% of respondents do not have rubbish pits at home.

The study also indicates that most of the respondents do not or seldom wash their hands before preparing food (39% and 36% respectively) while 27.54% leave cooked food uncovered and only a very few preserve their cooked food in refrigerator (14.49%), and a further 57% eat fresh fruits after gathering without washing or pealing. It also shows that 44.93% of respondents eat food from restaurants and 14.49% eat food sold along the road.

The study also revealed that a majority of the respondents drink untreated and un-boiled water (65.22%) got from boreholes (57.97%), and rain water and swamps (20.29%).

It also showed that 21.74% estimated the distance of water source to be less than 30 meters from nearby latrine and 50.72% store water in jerrycans while 34.78% store in pots after collection.

Conclusion

Most respondents do not control fly densities in their latrines. Most of them also wash hands without soap; a few do not wash hands after visiting the latrine. Furthermore, most respondents do not or seldom wash their hands before preparing food and eat fruits without washing or pealing.

A significant number of respondents also eat food from restaurants or food sold along roadside. About half of the respondents do not have rubbish pits at home. The majority drink untreated and un-boiled water direct after collecting from boreholes, rain water or water from swamps.

There are therefore very significant risks of eating contaminated food, getting into contact with fecal matter or drinking contaminated water and exposure to typhoid fever among the respondents.

Recommendations

Residents should be sensitized on control of fly densities from their latrines, washing hands with soap and clean safe water after visiting the latrine and before preparing or eating food. They should also be sensitized on washing and/ or pealing fresh fruits before eating and how to treat water at home before drinking using cheap, simple and effective methods like filtration, boiling and using water treatment agents like aqua safe and water guard.

Local health and law enforcement authorities should strengthen and enforce food preparation and safety in hotels, restaurants and roadsides and enact and enforce laws requiring households in this area to have rubbish pits and pit latrines to avoid ‘potential’ outbreak of typhoid fever.

CHAPTER ONE

INTRODUCTION

This chapter looks at the background to the study, problem statement, hypothesis, objectives of the study, research conceptual framework and ends up with the rationale for the study.

1.1 Background of the Study

Typhoid fever (TF) continues to be a major public health problem in many developing countries including Uganda. Globally, TF is an important cause of morbidity and mortality in many regions of the world, with an estimated 12 - 33 million cases leading to 216,000 - 600,000 deaths annually (DeRoeck, 2007). The disease still causes a devastating burden in many low- and middle-income countries, with recent estimates of global incidence ranging between 11.9 million (Mogasale *et al*, 2014) and 26.9 million (Global Health, 2012) cases per year, and mortality estimates ranging between 129 000 and 161 000 annually (The Lancet, 2015), based on an assumed case fatality rate of 1% (Steele, 2016). In the Journal of American Medical Association published on 15 June 1907 (Typhoid Mary), George Soper discovered that the family's cook, Mary Mallon was a healthy carrier of the typhoid bacteria who spread typhoid in the restaurants she served as a cook.

The disease is endemic to areas of Africa, India, South and Central America, as these areas have rapid population growth, increased urbanization, and limited safe water, infrastructure and health systems (Uneke, 2008).The first population-based study from an urban slum in Africa, suggested very high rates of bacteremia with typhoid fever where rates per 100,000 children per year in children 2–4 years of age were 340, 573, and 1,870, respectively. It is likely that because of dense population and severely limited options for sanitation and safe water, people living within urban slums in Africa and in Asia, are at higher risk for typhoid fever (Breiman, 2012).

According to the study conducted by Kibiru Andrew Benjamin Nguri in East Africa (Kenya); majority (63%) of the study population had suffered typhoid episode at one time or another in

their lifetime, while (37%) did not, hence the high prevalence of typhoid in the area (Kibiru, 2011).

In western Uganda, from December 27, 2007 to July 30, 2009, 577 cases were reported, 289 were hospitalized, and 249 were Out Patients; 47 deaths from typhoid fever occurred; *Salmonella typhi* was isolated from 27 (33%) of 81 patients (Neil, 2012).

A study by Agwu found that typhoid is highly (36.6%) prevalent among febrile patients aged (10-29 years old) attending clinics in Bushenyi (Agwu, 2011).

According to WHO report during the month of December 2015, typhoid cases were reported by nearly all districts, with 68 cases from Kiryandongo district (WHO Uganda, 2016).

According to Kiryandongo general hospital laboratory record, a total of 254 cases of typhoid fever were diagnosed using Widal tests in the year 2018.

1.2 Causative Agent, Spread and Clinical Features of Typhoid Fever

Typhoid fever is a life-threatening illness caused by the bacterium *Salmonella typhi* and *Salmonella Para-typhi*. Typhoid fever is still common in the developing world, where it affects about 12.5 million persons each year (CDC, 2010). It is a serious disease, spread by contaminated food and water; Symptoms of typhoid include lasting high grade fevers, weakness, abdominal pains, headache, and loss of appetite while some patients have constipation, and some have a rash. Internal bleeding and death can occur but are rare (CDC, 2013).

Harris John Bosco explained that *Salmonella typhi* is spread through contaminated food, drinks, or water. If you eat or drink something that is contaminated with the bacteria, the bacteria enter your body and travel into your intestines, and then into your blood. In the blood, they travel to your lymph nodes, gallbladder, liver, spleen, and other parts of the body where they multiply further (Harris and Ryan, 2015).

About 300 people get typhoid fever in the United States each year, and most of these people have recently traveled. About 22 million cases of typhoid fever and 200,000 related deaths occur worldwide each year (CDC, 2013).

1.3 Prevention of Typhoid Fever

Prevention of typhoid fever involves eating safe foods i.e. eat food that is cooked and served hot, hard-cooked eggs, fruits and vegetables you have washed in clean water or peeled yourself, and consuming pasteurized dairy products (CDC, 2013). It is advised you don't eat food served at room temperature, food from street vendors, raw or soft-cooked eggs, raw or undercooked meat or fish, unwashed or unpeeled raw fruits and vegetables, peelings from fruit or vegetables, condiments (such as salsa) made with fresh ingredients, salads, unpasteurized dairy products and “Bush meat” like monkeys, bats, or other wild game products (CDC, 2013).

1.4 Problem Statement

Typhoid fever is a major cause of mortality and morbidity worldwide. In endemic areas, the disease is most commonly found in children 5–19 years of age. International visitors from non-endemic areas are also at risk if unvaccinated (Heymann, 2014).

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 (Mogasale, *et al*., 2014).

The new data from Africa give further evidence to the need to move swiftly toward interventions to address this problem. Broad economic development, sustained improvements in water, sanitation, strengthened health systems and food safety policies went a long way toward reducing the burden of typhoid fever (Steele, 2016).

In Uganda, an outbreak of typhoid fever in Kasese District sickened 8092 persons from 27 December 2007 to 30 July 2009, resulting in at least 249 intestinal perforations and 47 deaths (Neil *et al*., 2012). In 2011, numerous typhoid cases were again reported in Kasese and neighboring Bundibugyo District with many more intestinal perforations and emergence of multidrug resistant strains (Walters *et al*., 2015).

According to Agwu (2011), typhoid is highly prevalent among febrile patients aged 10-29 years old attending clinics in Bushenyi and that febrile illnesses have continued to escalate in South-Western Uganda despite using multidisciplinary studies and interventions to control the syndrome.

According to WHO report during the month of December 2015, typhoid cases were reported by nearly all districts, with 68 cases from Kiryandongo district (WHO Uganda, 2016).

According to a study done by Naku and Alphonse (October 2017), 48 cases of typhoid fever were diagnosed medically in patients attending to Panyadoli health center in Kiryandongo district. According to Kiryandongo general hospital laboratory record, a total of 254 cases of typhoid fever were diagnosed using Widal tests in the year 2018, and 68 cases were also diagnosed using Widal tests in the months January to March 2019.

1.5 Study Objectives

1.5.1 Broad Objective

The study was aimed to assess risk factors contributing to the prevalence of typhoid fever among patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital in Kiryandongo district of Uganda.

1.5.2 Specific Objectives

i. To determine the personal hygienic factors contributing to the prevalence of typhoid fever in patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital in Kiryandongo district.

ii. To identify sanitary factors in homesteads of respondents contributing to the prevalence of typhoid fever in patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital in Kiryandongo district.

iii. To identify the availability of clean and safe water in the homesteads of patients attending to Kiryandongo General Hospital that may contribute to the prevalence of typhoid fever.

1.6 Research Questions

i. What are the personal hygienic factors contributing to the prevalence of typhoid fever in patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital in Kiryandongo district?

ii. What are the sanitary factors in homesteads contributing to the prevalence of typhoid fever in patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital in Kiryandongo district?

iii. What are the sources of water available in the homesteads of patients who were medically confirmed with typhoid fever attending to Kiryandongo General Hospital that may contribute to the prevalence of typhoid fever?

1.7 Justification of the Study

For a disease that has been well known throughout history and has been successfully addressed in many countries across the world through many ways, evaluation in infrastructure, water, sanitation, and food safety is very important to estimate. It will therefore be helpful to the local community of Kiryandongo district to eliminate this disease.

This study is hoped will be helpful to:

- Enable policymakers to develop effective policies geared towards improving awareness and promoting sanitation practices that will be helpful in safeguarding the community from typhoid fever infection.
- Identify risk factors in homesteads within Kiryandongo district that predisposes to increased risk of contracting typhoid fever.
- Improve on the identified risk factors to contracting typhoid fever for better improvement of livelihoods.

1.8 Scope of the Study

1.8.1 Geographical Scope

Kiryandongo General Hospital is located in Kikuube parish, Kiryandongo sub-county in Kibanda county Northern part of Kiryandongo district. It is located opposite Kiryandongo district headquarters, about 225 kilometers along the Kampala-Gulu highway. It is approximately 50 kilometers North-East of Masindi General Hospital, about 211 kilometers North of Mulago National Referral Hospital, in Uganda.

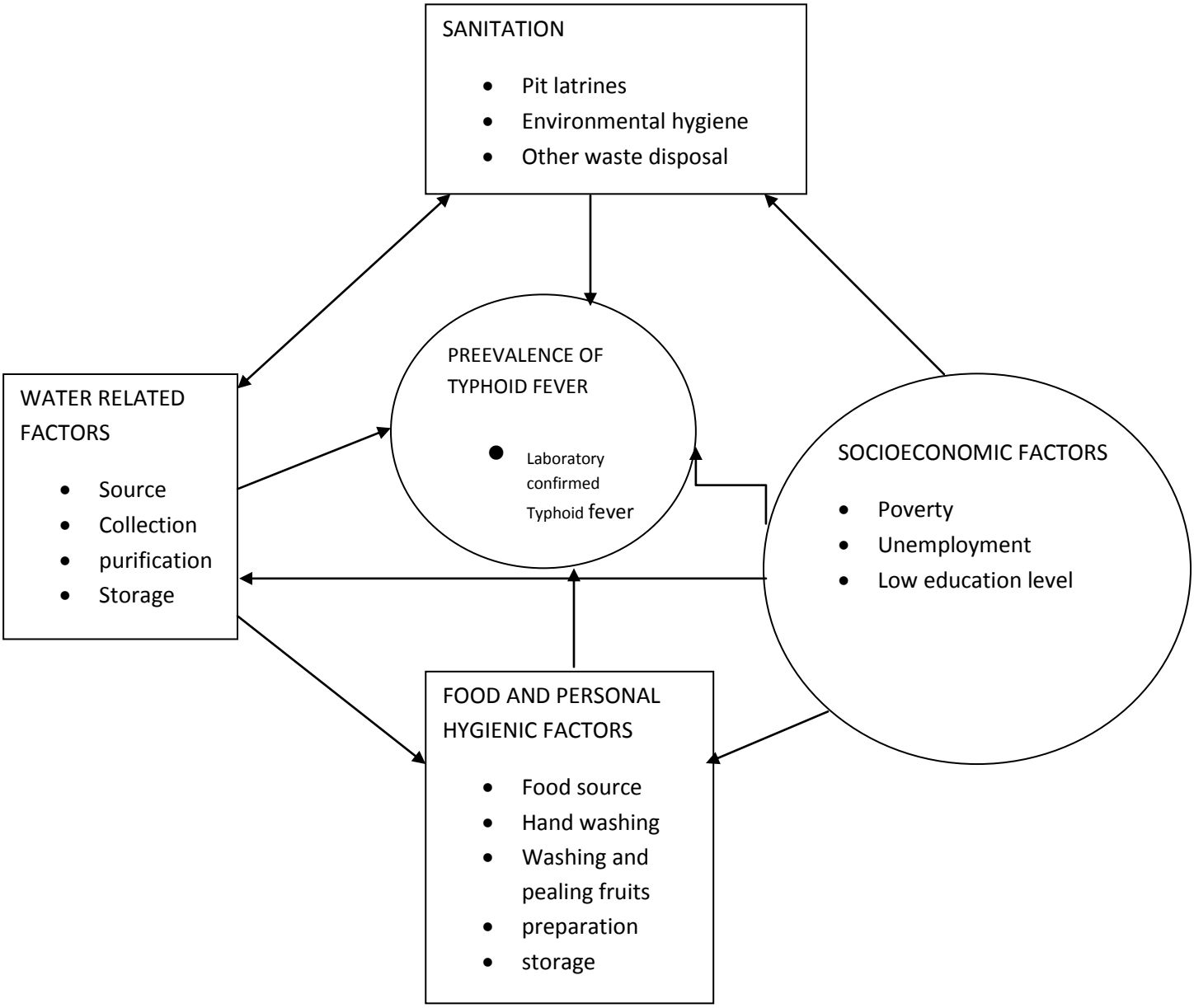
1.8.2 Content Scope

This study will be carried out on patients attending to Kiryandongo General Hospital in Kiryandongo district that will meet the inclusion criteria. The study will be focused on the personal hygiene, home sanitation, water related and food hygienic factors in homes of these patients that may predispose them to typhoid infection.

1.8.3 Time Scope

This research will be carried out between the month of September 2018 and March 2019. This time duration covers for proposal development, data collection and analysis, and compiling of the report.

Figure 1: The Conceptual Frame Work



Explanation

Lack of water can lead to poor environmental hygiene and also poor environmental hygiene can lead to water contamination. In the same way, food can be contaminated by either contaminated water or untidy environment and poor personal hygiene; also poor socioeconomic status can lead to food contamination, water contamination and poor sanitation. These factors interact together and contribute to the prevalence of typhoid fever.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents review of literature according to the study objectives as presented by different authors and researchers in the globe.

2.1 Water Related Factors Associated with Typhoid Fever

In developing countries, where safe water and sanitation systems have not been well-established, large-scale typhoid and paratyphoid outbreaks sometimes occur (Polonsky *et al*., 2012). Walters *et al*., (2015) reported that during a previous typhoid outbreak in Kasese and Bundibugyo districts of Uganda in 2009–2011, which affected 8092 persons, the vehicle of transmission was found to be unclean water.

According to the study conducted by Steven Ndugwa, he reported that the outbreak of typhoid fever in Kampala city was likely caused by consuming contaminated water from unprotected ground water sources. He continued by saying that Kampala city has more than 200 unprotected ground water sources, most of which serve as unprotected sources of water for economically disadvantaged people in the city (Ndugwa, 2015).

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 (UBOS *et al.*, 2011). 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 (Merkel *et al*., 2012).

A study by Kibiru Nguri (2011) showed that 39.4% of people did not wash their hands because of unavailability of adequate water and 28% did not wash their hands due to the cost of water, while 23.7% did not wash hands because they had not suffered from typhoid fever before.

According to Dewan (2013), a statistically significant inverse association was found between typhoid incidence and distance to major water bodies.

M. I. Khan *et al.* (2012) reported that typhoid fever was found to be lower in the households using a safe drinking-water source and also reported that typhoid fever affects younger children living in areas of high population density and lack of access to safe water in Pakistan. Jakopo Zorodzail reported that water sources that had fecal contamination could have also propagated the outbreak in the same study area (Zorodzail *et al*., 2013). Surface and ground water without guaranteed safe supply for fecal matter could gain access into the water through water borne sewage system, through flush toilets, and pit latrines as found by Pruss-Urstun *et al*., (2006).

2.2. Food hygienic factors associated with Typhoid Fever

Toure reported in their study that weaning food hygiene may be among the most important determinants of diarrheal disease risk in young children, (Toure *et al*, 2012). According to Kung'u, up to 70% of all diarrheas are caused by contaminated foods, and microbial counts that may exceed those found in drinking water. Eating food prepared in hotels is therefore a risk factor towards suffering from typhoid fever. (Kung'u *et al*, 2009).

Analysis by Hussein Gasem in Pakistan showed the following as risk factors for typhoid fever: never or rarely washing hands before eating, eating outdoors food at a street food stall or mobile food vendor, consuming ice cubes in beverage and buying ice cubes from street vendors (Gasem, 2011).

2.3. Sanitation factors associated with typhoid Fever

Jakopo Zorodzail in his study found that 80.2% of the residents with temporary houses, 14.4% with semi-permanent houses and 5.4% with permanent houses suggesting that most of the residents were poor and vulnerable to poor housing which could promote poor state of sanitation. Poor sanitation practices are a cause of bacterial, viral, protozoa, and helminthic infections

(Jakopo, *et al*, 2013). Typhoid fever was associated with poor housing and inadequate food and personal hygiene (Gasem, 2011).

According to Khan *et al*, (20012), typhoid fever affects younger children living in areas of high population density and lack of access to safe water in Pakistan. Breiman also confirmed that young children are at the greatest risk of typhoid fever in densely populated urban areas with poor hygiene and sanitation infrastructure (Breiman *et al*, 2012).

Unsafe disposal of excreta and solid wastes are significant factors that contribute to contamination of ground water in Kampala City as observed by Ndugwa (2015) after an outbreak of typhoid fever. Furthermore, young children are the most likely to be exposed to fecal contamination in the immediate environment surrounding their household as observed by Ngeno *et al* (2015). A study by Jakopo in Zimbabwe reveals that open defecation, lack of hand washing facility and poor hygiene were the main risk factors for typhoid fever (Jakopo Zorodzail *et al*, 2013).

Jakopo reported that 82.9% households in Zimbabwe were dissatisfied with waste collection, and 17.1% were satisfied and typhoid fever is more common in areas with poor sanitation practices with only 25.2% of the respondents living near a clean drainage. Their study found that 62% of the residents did not have proper solid wastes disposal and only 38% had. The state of drainage was associated with the prevalence of 63% typhoid fever in regions with poor sanitation.

Salmonella typhi often spreads after water supplies are contaminated by human waste. This act of not exhausting filled up pit latrines compromised the health of the residents for wastes were spilled in the environment causing blockages of drains, contamination of surface water sources, and even emission of foul smell in the atmosphere. Where sanitation and garbage disposal are lacking, typhoid fever continues to destroy life (Jakopo Zorodzail *et al*, 2013).

2.4. Socioeconomic Factors Associated with Typhoid Fever

Improved socioeconomic circumstances in South Africa have been temporally associated with decreasing incidence rates of typhoid fever over a 35-year period. However, ongoing challenges remain including potential for large outbreaks, a large immigrant population, and emerging antimicrobial resistance (Karen *et al*, 2018).

It was evident from the study by Kibiru in Maina Slum in Kenya that majority of adults who suffered from typhoid fever (78.29%) lived in temporary houses, 15.14% in semi-permanent houses while minority (6.57%) lived in permanent houses. This indicated that three-quarter of the Maina slum residents were poor and could afford neither a semi- permanent nor a permanent house. Those respondents who were staying in temporary houses were the most infected with typhoid fever. There was a significant relationship between poverty levels depicted by the nature of houses in place and the prevalence of typhoid fever (Kibiru, 2016).

The susceptibility of suffering from typhoid was more to those with low level of education than those who had attained a higher level of education. This meant that education played a key role in the prevalence of typhoid in Maina slum. Those who were self-employed and un-employed suffered from typhoid fever in one time or another in their lifetime for both categories were above as compared to those who were employed (Kibiru, 2016).

CHAPTER THREE

STUDY METHODOLOGY

3.0 Introduction

In this chapter, the study was concerned with; study area, study population, research design, study variables, sampling procedure and sample size, research instrument, methods of data collection, data processing and analysis, limitations of the study and solution, ethical considerations and dissemination of the study results.

3.1 The Study Area

The study was conducted in Kiryandongo General Hospital, in Kiryandongo district of Uganda.

3.2 Study Population

Study population were children and adults (age group7 years old and above) who were medically confirmed typhoid fever by laboratory tests, and were obtained using the inclusion and exclusion criteria explained below and a sample of 138 respondents were chosen to participate in the study.

3.3 Study Design

The study was a cross sectional descriptive study which involved interviewing the respondents who were medically confirmed with typhoid fever with questionnaire forms. The questionnaire forms were designed according to the objectives of the study.

3.4 Inclusion and Exclusion Criteria

Older children and adults (7 years and above), who were medically confirmed with typhoid fever or suffered medically confirmed typhoid fever during the study time, or in the past 12 months, by show of medical laboratory form, were included in the research. Patients were medically confirmed with typhoid fever through laboratory tests, such as; Widal tests, blood cultures, stool

cultures, or bone marrow cultures, during the study time or 12 months earlier, however, in Kiryandongo general hospital, there is only Widal tests available.

All individuals younger than 7 years of age, and those who were not medically confirmed with typhoid fever during study time or 12 months before were excluded from the exercise.

3.5 Sampling Procedure

A random sampling method was used in the selection of the respondents. The study was carried out irrespective of the sex, tribe, race, religion, or educational status. However there was bias in the selection of the age group to include only older children and adults (7 years old and above), who were medically confirmed with typhoid fever during study time or 12 months before.

3.6 Determination of Sample Size

This sample size was obtained using Fisher *et al* (1990) formula as:

$$n = \frac{Z^2PQ}{D^2}.$$

Where; n = desired sample size

Z = standard normal deviation taken as 1.96 at confidence interval of 95%.

P = proportion of target population estimated to have similar characteristics, 90% = 0.9

D = degree of accuracy (0.05).

Q = population without the desired characteristics (1-P).

So, $n = \frac{Z^2 x P x 1\text{-}P}{D^2}$ $\quad n = \frac{1.96^2 \text{ x } 0.9 \text{ x } 0.1}{0.05^2} = 138$

Therefore the sample size was 138 respondents.

3.7 Research Instrument and Data Collection Methods

Data for the study was collected using questionnaires. Open and closed ended questions were used on the questionnaire with optional responses to make the questions easier for the respondents.

The questionnaires did not bear the respondent's name to avoid any fears and build confidence in the respondents and short questions in simple English used to make it easy for the respondents.

Data collection comprised of administration of questionnaires by the researcher and an assistant to help in interpretation. The researcher maintained privacy and strictly personal interviews while respondents were answering the questions. At the same time, the researcher assured the respondents that the information they gave will be kept confidential. Adequate time was given to attain information from each respondent.

3.8 Study Variables:

3.8.1 Independent Variables

Sanitation, socioeconomic, water and food hygienic related factors were the independent variables.

3.8.2 Dependent Variable

Prevalence of typhoid fever was the dependent variable.

3.9 Data Analysis and Data Presentation

Both qualitative and quantitative data were collected and analyzed manually for accuracy of results. Typing was done using computer to enable for easy drawing of tables and charts. Data was presented in form of tables, descriptive statistics calculated in percentages for each response and conclusion drawn from the analyzed data.

3.10 Data Quality Control

Data quality was enhanced using questionnaires using trained research assistants. Pre-testing the questionnaires and checking for their completeness was done to sort out any confusing questions.

3.11 Limitations of the Study

Some respondents were not willing to reveal issues concerning their family and this was overcome by verbally requesting and reassuring the respondents in a polite way that the information they gave will be kept confidential.

3.12 Ethical Considerations

Permission and clearance was got from the respective authorities (including medical superintendent Kiryandongo general hospital) and the study purpose was thoroughly explained to the respondents. Their consent were obtained (they were issued the consent forms) and their rights respected.

3.13 Dissemination of Study Results

These study report will be made available or presented to:

- The Faculty of Clinical Medicine and Dentistry of Kampala International University and Western Campus Library for other researchers, scholars and the general public.
- Scientific conferences and publications in medical and scientific journals and magazines.
- The Library and Information Department of Kiryandongo General Hospital.

CHAPTER FOUR

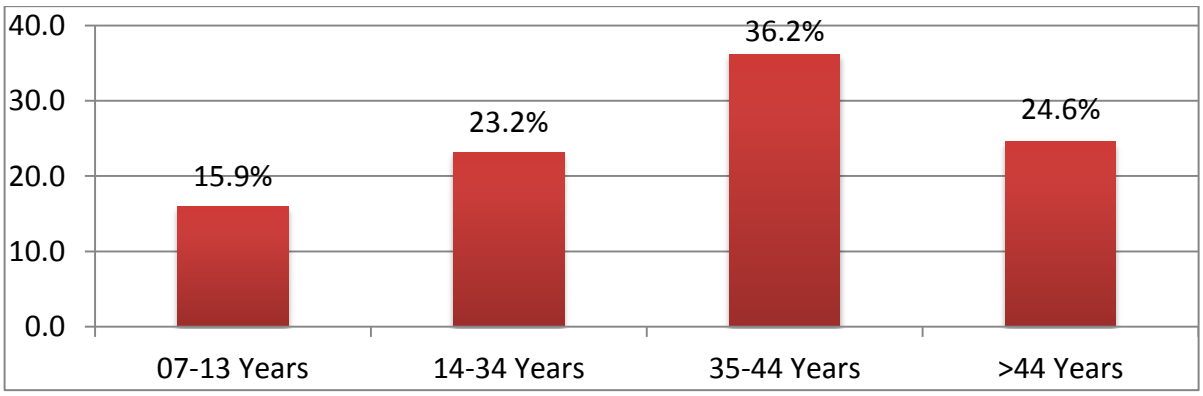
RESULTS OF THE STUDY

4.0 Introduction

In this chapter, the results of the study "*Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District*" are presented in form of tables, graphs and charts, followed by a brief description of the presentation.

4.1 Social-Demographic Description of the Study Population

Figure 2: Bar Graph Showing Ages of the Respondents



From figure 2 above, most respondents were of aged 35-44 years (36.2%), followed by above 44 years (24.6%), then those aged 14-24 years (23.2%) and lastly those aged 7-13 years (15.9%).

Figure 3: Pie Chart Showing the Occupation of Respondents

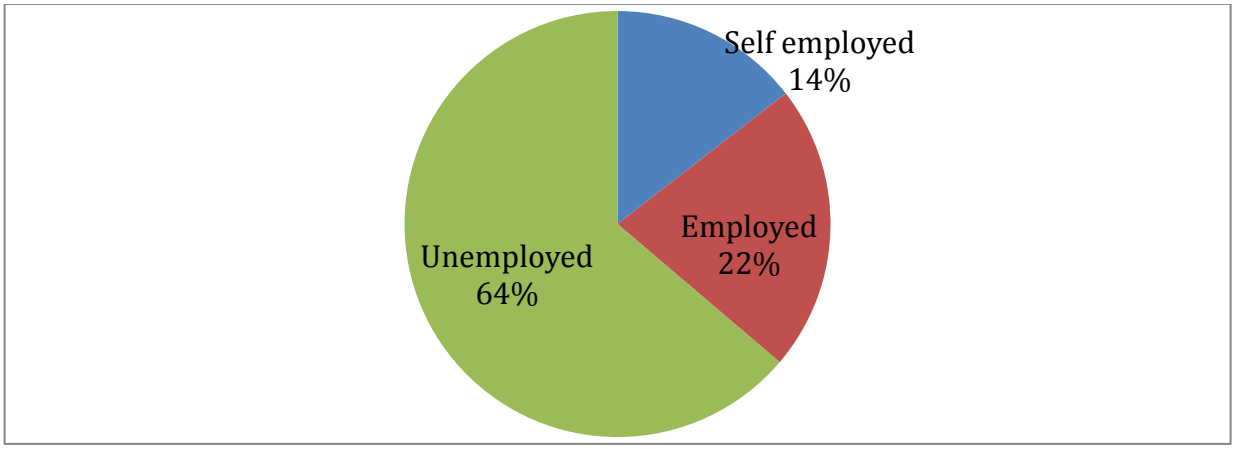


Figure 3 above shows the majority (64%) were unemployed, followed by a few (22%) who were employed and a very few (14%) were self employed

Figure 4: Pie Chart Showing the Sex of Respondents

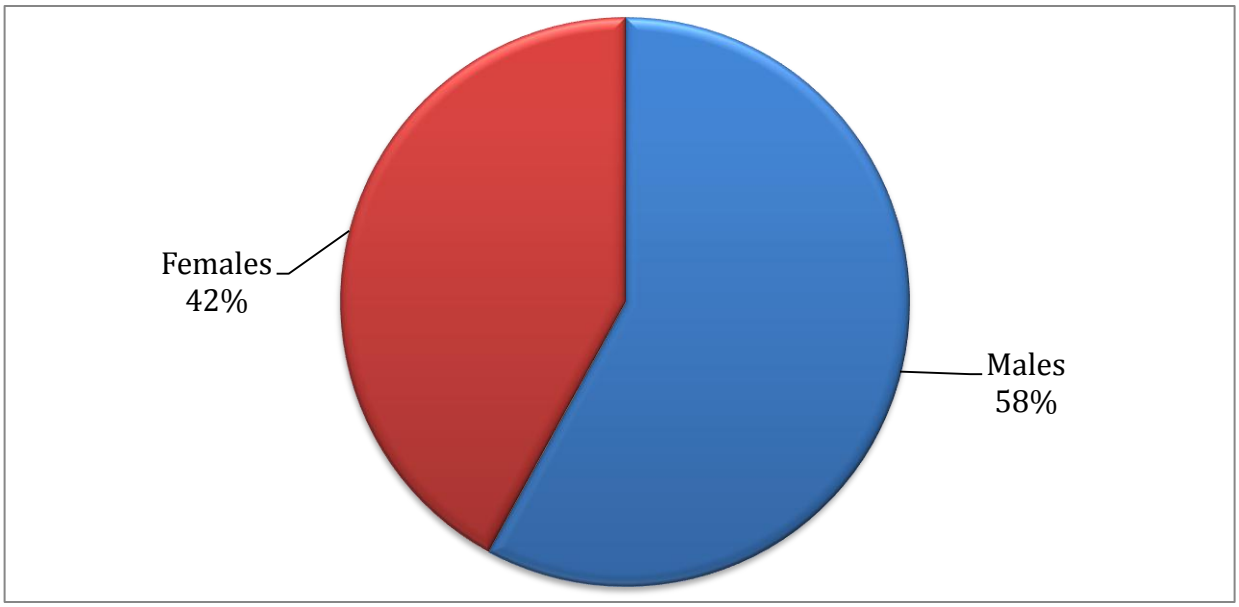
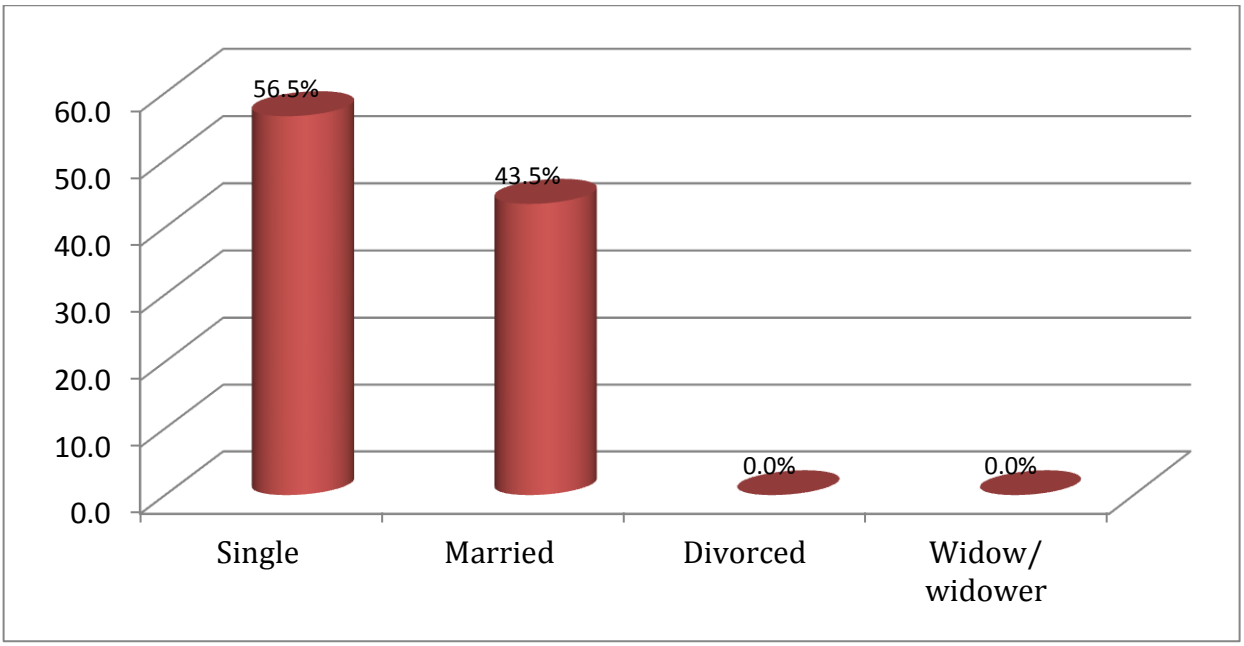


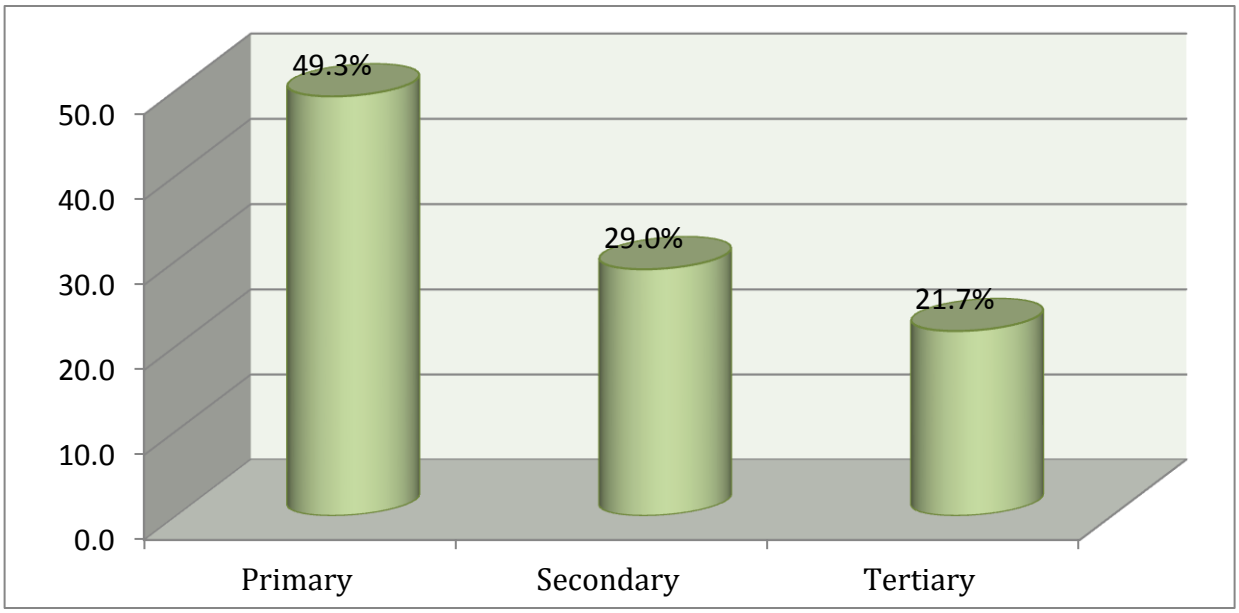
Figure above is a pie chart showing the sex of respondents; most of the respondents were males (58%) followed by females (42%).

Figure 5: Cylinder Graph Showing Marital Status of Respondents



The figure above is a cylinder graph showing marital status of respondents; the majority of respondents were single (56.5%), followed by married individuals (43.5%), but there were no divorced, widowed, nor widower respondents.

Figure 6: Cylinder Graph Showing Education Status of Respondents



The figure 6 above is a cylinder graph showing education status of respondents in terms of percentages; the majority of respondents attained only primary education (49.3%), followed by those that attained only secondary education (29.0%) and lastly those who attained tertiary education (21.7%).

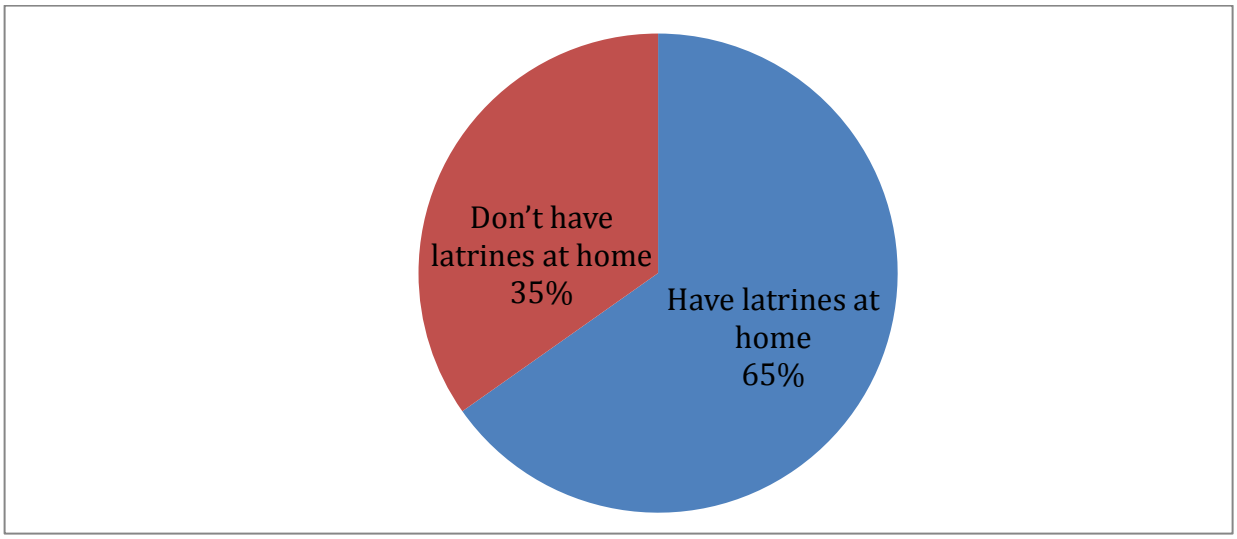
Table 1: Table Showing the Main Source of Income for the Respondents

Source of Income	**Frequency**	**Percentage**
Main source of income is peasant farming	85	61.59
Main source of income is salaries	25	18.12
Main source of income is wages	05	3.62
Main source of income is business	18	13.04
Main source of income is other ways	05	3.62
Total	**138**	**100**

From the table above, the majority of the respondents have their main source of income from peasant farming (61.59%), followed by salaries (18.12%), and followed by business (13.04%), then wages (3.62%) and finally other ways like betting and other gambling games (3.62%).

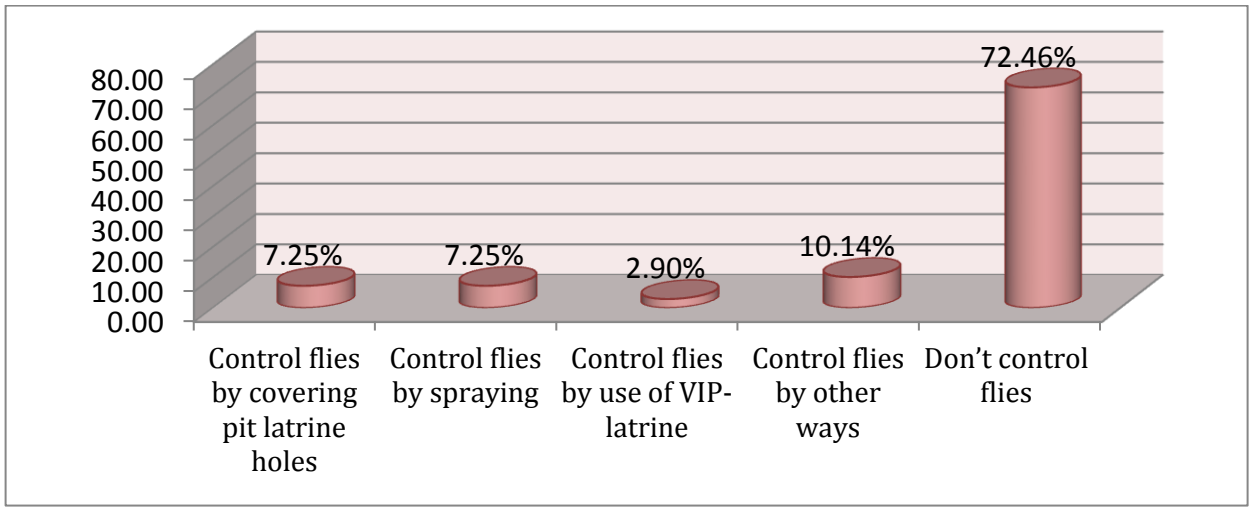
4.2 Sanitation Related Factors Associated with Typhoid Fever

Figure 7: A Pie Chart Showing the Proportion of Respondents with Latrines at Home



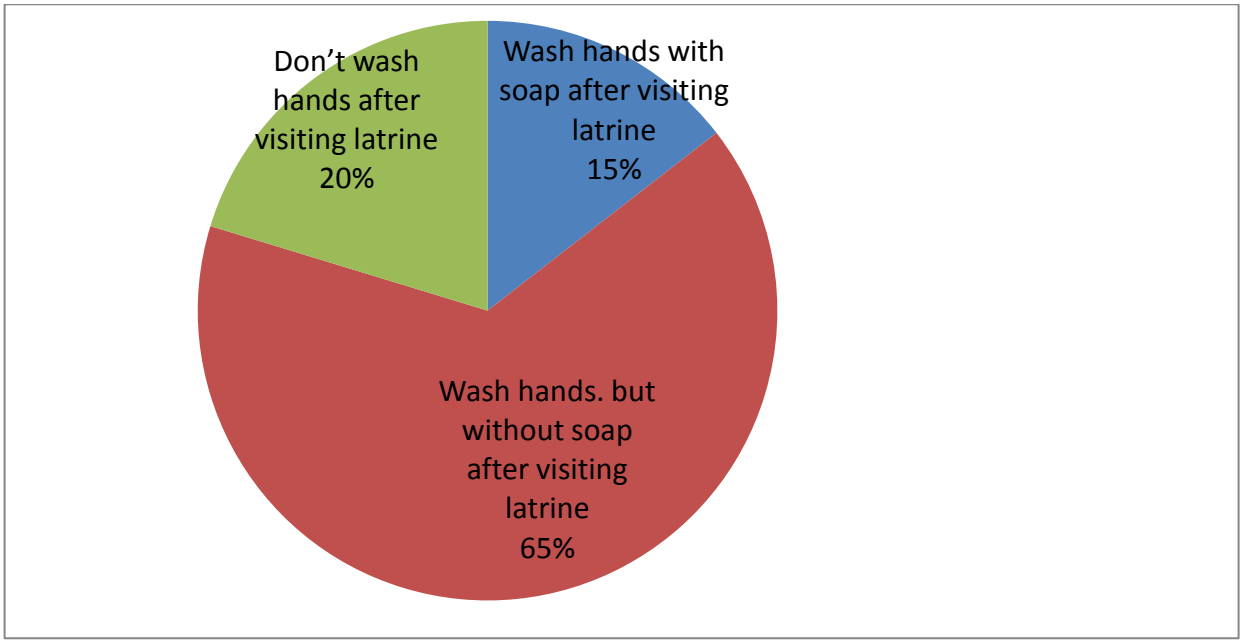
The figure 7 above is a pie chart showing the proportion of respondents with latrines at home; the majority of respondents have latrines at home (65%) and few respondents don't have latrines at home (35%).

Figure 8: Graph Showing Different Methods of Controlling Flies in Latrines by Respondents



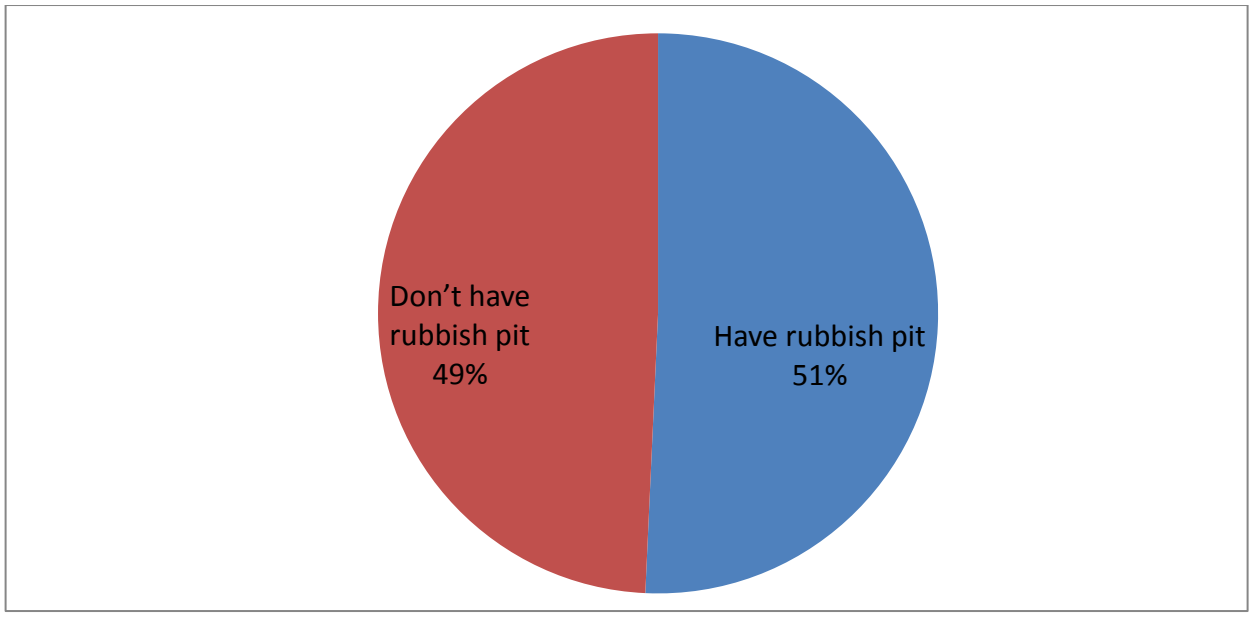
From the graph above; 72.45% of respondents don't control flies from their toilets, followed by 10.25% who control flies by other methods (like smoking the toilet, use of fly traps and direct killing of flies), and followed by 7.25% who control flies by covering pit latrine holes, then 7.25% who control flies by spraying with insecticides, and lastly 2.90% control flies by using VIP-latrine.

Figure 9: A Pie Chart Showing Hand Washing After Visiting the Latrine.



From the pie chart above; 65% of respondents wash hands but without soap after visiting the latrine, followed by 20% who totally don't wash hands after visiting the latrine, and only 15% wash hands with soap after visiting the latrine.

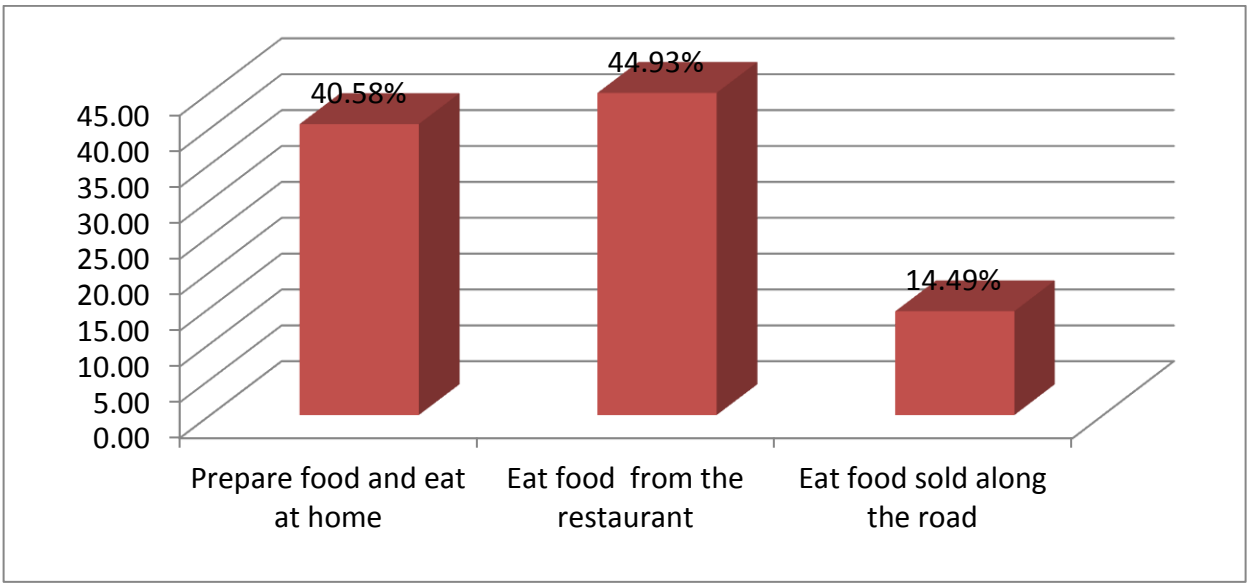
Figure 10: A Pie Chart Showing Presence of Rubbish Pit



From the pie chart above; 51% of respondents have rubbish pits at their homes while 49% don't have rubbish pit at homes.

4.3 Food Related Factors Associated with Typhoid Fever

Figure 11: A Column Graph Showing Where the Respondents Eat Food from:

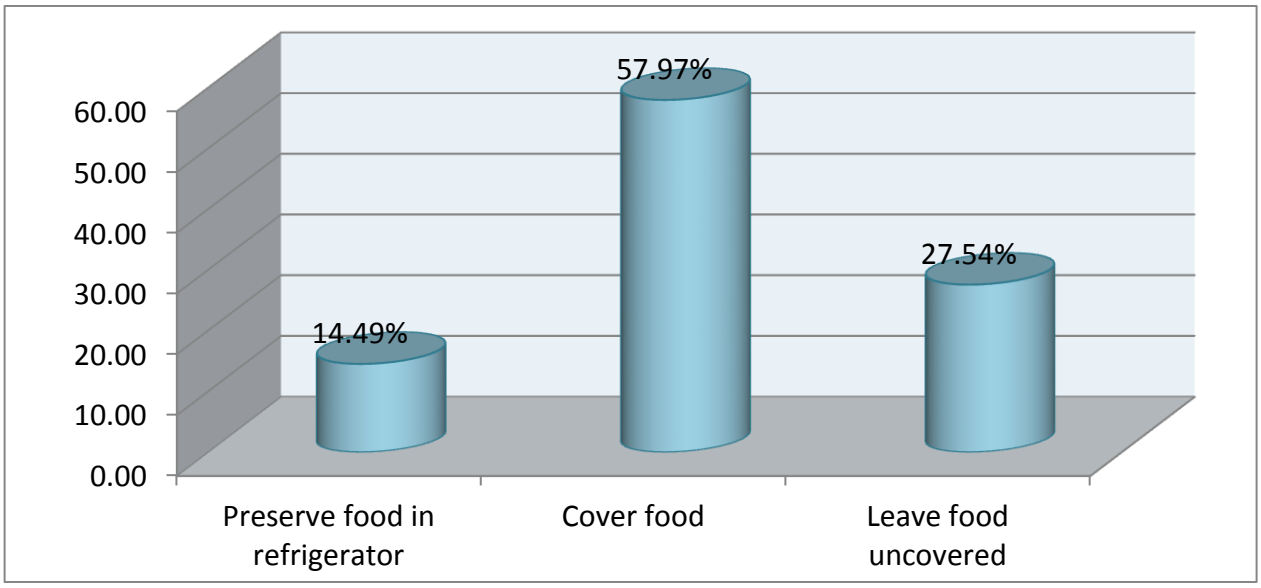


From the graph above; 44.93% of respondents eat food from the restaurant, followed by 40.58% who prepare food and eat at home, and lastly 14.49% eat food sold along the road.

Figure 12: Pie Chart Showing Hand Washing Before Preparing Food:

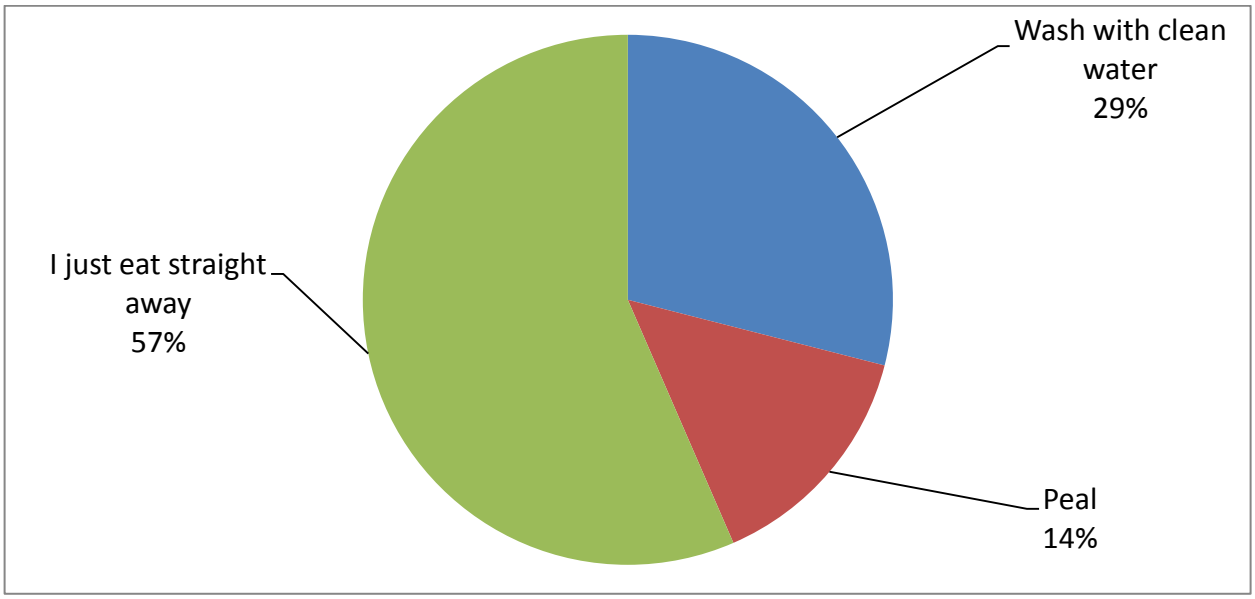
From the pie chart above; most of the respondents don't wash hands before preparing their food (39%), followed by 36% of them who sometimes wash their hands before preparing food, and only 25% wash hands always before preparing food.

Figure 13: Cylinder Graph Showing Methods of Preserving Cooked Food for Use Later:



From the graph above; the majority of the respondents preserve their cooked food for use in a later time by covering in source pans (57.97%), followed by those that leave cooked food uncovered (27.54%) and only a very few preserve their cooked food in a refrigerator (14.49%)

Figure 14: Pie Chart Showing Methods of Preparing Fresh Fruits before Eating:



From the pie chart above; 57% of respondents (majority) just eat their fresh fruits from the source straight away without doing anything about it, 29% first wash their fresh fruits with clean safe water before eating, and only 14% peal their fresh fruits before eating.

4.4 Water Related Factors Associated with Typhoid Fever

Table 2: Table Showing Sources of Water for Use at Home

Sources of water	Frequency	Percentage
Get water from tap	20	14.49
Get water from borehole	80	57.97
Get water from well	10	7.25
Get water from spring	0	0.00
Get water from other sources	28	20.29
Total	**138**	**100**

From table 2 above; most respondents get their water from the borehole (57.97%), followed by other sources like rain water and swamp (20.29%), and followed by tap water (14. 49%), then wells (7.25%) and no respondent source for water from the spring.

Table 3: Methods of Making Water Safe for Drinking

Methods of Making Water Safe for Drinking	Frequency	Percentage
Boil water for drinking	20	14.49
Treat water for drinking	18	13.04
Drink untreated water from the source	90	65.22
Use other means to make water safe for drinking	10	7.25
Total	**138**	**100.00**

The majority of respondents drink water untreated from the source (65.22%), those that boil water for drinking are 14.49%, about 13.64% treat water using tablets like aqua safe or water guard for drinking and lastly 7.25% use other means to make water safe for drinking like storing for a long time before use and filtering water.

Table 4: Ways of Storing Water for Use

Methods of Storing Water at Home	Frequency	Percentage
Store water in Jerrycans	70	50.72
Store water in pots	48	34.78
Store water in other containers	20	14.49
Total	**138**	**100**

Table 4 above shows the majority of the respondents store their water in jerrycans (50.72%), followed by those that store water in pots (34.78%) and, lastly those that store water in other containers like large source pans and tanks (14.4%).

Table 5: Distance of Water Source from Latrines

Distance of Water Sources from Nearest Latrine	Frequency	Percentage
Nearest latrine is < 30m from water source	30	21.74
Nearest latrine is about 30m from water source	50	36.23
Nearest latrine is > 30m from water source	58	42.03
Do not know	00	00
Total	**138**	**100**

The table 5 above shows most of the respondents fetch water from sources more than 30 meters away from any nearby latrines (42.03%), followed by those who estimated the distance of their water sources to be about 30 meters away from the nearby latrine were about 36.23 per cent and finally 21.74% estimated distance of their water sources to be less than 30 meters from the nearby latrine.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.0 Introduction

In this chapter, the results of "*Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District*" are discussed in details by comparing and contrasting the study findings with those of other authors and related work.

5.1 Socio-Demographic Characteristics of Respondents

Most respondents were males and not married. Over 60% of respondents were of age 35 years old and above and the majority of respondents attained only primary education and secondary education. Most of the respondents were unemployed, while the few were employed. Most of the respondents were involved in peasant farming as source of income.

5.2 Sanitation Factors Associated with Typhoid Fever

From this study, over 60% of respondents have latrines at home while the remaining few respondents don't have latrines at home. This study also revealed that over 70% of respondents don't control flies densities from their latrines and only 10.25% control flies by smoking the toilet, use of fly traps and directly killing the flies. A further 7.25% control flies by covering pit latrine holes while about 7,5% control flies by spraying with insecticides and 2,90% using VIP-latrines and about 85% of respondents include those who either wash hands without soap after visiting the latrine, or totally don't wash hands after visiting the latrine with only 15% washing hands with soap and safe clean water after visiting the latrine. Furthermore, up to 49% of respondents do not have rubbish pits at home.

Despite the majority of the households having latrines and a modest number having rubbish pits, there is still significant risk of getting into contact with fecal matter and exposure to typhoid fever among the respondents in this study.

My findings agree with Ndugwa's and Jacopo's findings; According to a study by Ndugwa (2015), unsafe disposal of excreta and solid wastes are significant factors that contribute to contamination of ground water in Kampala. Furthermore, young children are likely to be exposed to fecal contamination in the immediate environment surrounding their household (Ngeno *et al*, 2015). A study by Jakopo revealed that open defecation, not having a hand washing facility and poor hygiene were the main risk factors for contracting typhoid fever in the community (Jakopo Zorodzail *et al*, 2013).

The study also agrees with that of Pruss *et al*., (2006), who asserted that, surface and ground water without guaranteed safe supply for fecal matter could gain access into the water through water borne sewage system, through flush toilets, and pit latrines.

5.3 Personal and food hygienic related factors associated with typhoid fever

My study indicates that most of the respondents do not or sometimes wash their hands before preparing food (39% and 36% respectively), and only 25% always wash hands before preparing food while a further 57% eat fruits without washing. It also shows that 44.93% of respondents eat food from the restaurant and 14.49% eat food sold along the road. Further 57.97% of respondents preserve their cooked food for use in a later time by covering in source pans while 27.54% leave cooked food uncovered and only a very few preserve their cooked food in refrigerator (14.49%).

From my study therefore, the risks of eating contaminated food by respondents is high as many do not wash their hands before preparing food and many do not wash fresh fruits and vegetables before eating. Furthermore, a significant number of respondents leave cooked food uncovered

where flies and other household creatures like rats and cockroaches can easily get access to and contaminate it. Thus my findings are also similar to Gasem's findings.

My findings also agree with Kungu's and Gasem's findings that; eating food prepared in hotels is a risk factor towards suffering from typhoid fever (Kungu *et al*, 2009). Further analysis by Hussein Gasem (2011) showed the risk factors for typhoid fever as being never or rarely washing hands before eating, eating outdoors at a street food stall or mobile food vendor, consuming ice cubes in beverage and buying ice cubes from a street vendor.

5.4 Water Related Factors Associated with Typhoid Fever

From my study, a majority of respondents drink untreated water direct from the source (65.22%) and only 14.49% boil drinking water while 13.64% treat water for drinking using aqua safe or water guard. Most respondents also get water from boreholes (57.97%), and rain water and swamps (20.29%).

The study also showed that most respondents collect water from sources more than 30 meters away from nearby latrine (42.03%), while 36.23% estimated the distance of water sources to be about 30 meters away from a nearby latrine and 21.74% estimated the distance of their water source to be less than 30 meters from a nearby latrine. Most of the respondents also store their water in jerrycans (50.72%), and 34.78% store water in pots after collection.

It can be deduced that the risk factor of contracting typhoid fever in this area is high as most residents drink untreated water collected from bore holes and swamps, and respondents with their water sources distance 30 meters or less from a nearby latrine are at risk of consuming contaminated water.

My study also shows similar findings to Walters', Merkel's and Ndugwa's findings; Walters *et al*., (2015) reported that during a previous typhoid outbreak in Kasese and Bundibugyo districts in 2009–2011, the vehicle of transmission was unclean water. According to a study by Ndugwa, the outbreak of typhoid fever in Kampala city was likely caused by consuming contaminated water from unprotected ground water sources and continued that Kampala city has more than 200 unprotected ground water sources, most of which serve as unprotected sources of water for economically disadvantaged people in the city (Ndugwa, 2015).

Merkel *et al*. (2012) observed that 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 (UBOS *et al.*, 2011) and continued that 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. Hence, my study agrees with Merkel's and Ndugwa's findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

In this chapter conclusions and recommendations are made of the study "*Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District*" based on the significant findings.

6.1 Conclusion

Most respondents were males aged 35 years and above and most of them were not married. Most of them attained only primary education and a few secondary educations, and the majority was unemployed but involved in peasant farming as a source of income.

In this study, most respondents have latrines at home but most of them do not control flies densities from their latrines. Most of them also wash hands without soap or totally do not wash hands after visiting the latrine. Furthermore, most of the respondents do not or seldom wash their hands before preparing food and just eat fresh fruits after gathering without washing or pealing.

A significant number of the respondents also eat food from hotels and restaurants, or food sold along roadside. However a good number cover cooked food for use later.

About half of the respondents do not have rubbish pits at home and drink untreated water from boreholes or rain water or water from swamps collected from sources at or less than 30 meters away from any nearby latrine.

There are therefore very significant high risks of eating contaminated food, getting into contact with fecal matter or drinking contaminated water and thus exposure to typhoid fever among the respondents.

6.3 Recommendations

6.3.0 Recommendations from the findings of this research;

- Residents should also be sensitized on the importance of having pit latrines at home for proper disposal of fecal matter.
- Residents should be sensitized on control of fly densities from their latrines, through covering of pit latrine holes, use of insecticides, use of VIP latrines, or smoking of pit latrines to avoid flies contaminating food and water.
- Residents should also be sensitized on the importance of washing hands with soap and clean safe water after visiting the latrine and before preparing or eating food.
- They should also be sensitized on the importance of washing and pealing fruits before eating.
- Local health and law enforcement authorities should strengthen and enforce food preparation and safety in hotels, restaurants and roadsides a significant number eat food from restaurants or food sold along roadsides.
- Local law enforcement and health authorities should also enact and enforce laws requiring households in this area to have rubbish pits.
- Lastly, but not least residents should be sensitized on how to treat water at home before drinking using cheap, simple and effective methods like filtration, boiling and using water treatment agents like aqua safe and water guard.

6.3.1 Recommendations for future research;

- It is recommended that another study be done targeting those less than 7 years old other than those who are seven years old and above (target population in this study).
- The study used the questionnaire and key informant Interview schedule as well as a checklist, as data collection tools, therefore future studies should incorporate other methods of data collection such as direct observation.

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APPENDICES

Appendix I: Introductory Letter

i

KAMPALA INTERNATIONAL UNIVERSITY – WESTERN CAMPUS

EXPLORING THE HEIGHTS

P O BOX 71, ISHAKA UGANDA
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www.kiu.ac.ug

OFFICE OF THE DEAN
FACULTY OF CLINICAL MEDICINE & DENTISTRY

11/02/2019

MEDICAL SUPERINTENDENT
Hospital
21 FEB 2019
P. O. Box 124, Mbarara

Please accord him the necessary assistance
21/02/2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: OKECH EMMANUEL AKENO (BMS/0004/141/DU)

The above named person is a fifth year student at Kampala International University pursuing a Bachelor of Medicine, Bachelor of Surgery (MBChB) Programme.

He wishes to conduct his student research in your hospital.

Topic: Factors contributing to the prevalence of typhoid fever among patients attending Kiryandongo general hospital

Supervisor: Dr. Atuhairwe Michael

Any assistance given will be appreciated.

K.I.U TEACHING HOSPITAL
11 FEB 2019
W.Campus
DEDI ASSOCIATE DEAN FCM&D

Yours Sincerely,

Dr. Akib Surat
Deputy Executive Director/Assoc Dean FCM&D

"Exploring the Heights"
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Appendix II: Consent Form

Dear respondent, I am Okech Emmanuel Akeno a medical student of Kampala international university, carrying out a research on the topic "*Factors Contributing to the Prevalence of Typhoid Fever among Patients Attending to Kiryandongo General Hospital in Kiryandongo District".* You have been chosen to participate in this research.

Purpose: To assess risk factors contributing to the prevalence of typhoid fever among patients attending to Kiryandongo General Hospital.

Benefits: It will provide information that will be important for improving health care services in this region and the country and provide information which will be a basis for other future studies.

Risks: Are limited if any, for example, some questions you may not expect or the way they may be asked, or they may make you feel bad, but in such a case, you are free not to answer them.

Confidentiality: This study will not require your personal identification and any information you give will be kept confidential. The information will only be accessible by the researcher and all records will be identified by codes and will be kept securely.

Voluntary consent: Your participation is entirely voluntary without any pay and you are free to opt out any time you wish. This study will not interfere with the ongoing services you are seeking.

Procedures: If you agree to participate in this study, it means you have consented and expected to sign this document. You will then be provided with a questionnaire to fill (or you will be assisted) and then it will be collected back.

By signing below, you indicate that you have understood the information presented to you concerning this study and that you have voluntarily given consent/and or ascent to participate in it.

Signature/thumbprint of the respondent..... Date...../...../.....

Appendix III: Questionnaire

I am **OKECH EMMANUEL AKENO**, a student of Kampala International University-Western Campus. I am carrying out a research on the topic: *Factors contributing to the prevalence of typhoid fever among patients attending to Kiryandongo General Hospital in Kiryandongo district*. Your participation in the study will be highly appreciated and your responses shall be treated with utmost confidentiality.

Respondents' number …….. Date ……/……/……..

SECTION A: DEMOGRAPHIC DATA (Tick correct option**)**

1. Age: a) 7-13yrs ☐ b) 14-34yrs ☐ c) 35-44yrs ☐ d) More than 44yrs ☐
2. Sex: a) Male ☐ b) Female ☐
3. Marital status: a) Single ☐ b) Married ☐ c) Divorced ☐ d) Widow ☐
4. Education status: a) Primary ☐ b) Secondary ☐ c) Tertiary ☐ d) None ☐
5. Employment status: a) Employed ☐ b) Self-employed ☐ c) Unemployed ☐
6. Main source of income: a) Peasant farming ☐ b) Salaries ☐ c) Wages ☐

   d) Business ☐ e) others specify ……..…….……

SECTION B: Sanitary and hygienic factors (Tick correct option**)**

7. Do you have a latrine at home? a) Yes ☐ b) No ☐
8. If no where do you dispose your fecal matter? a) Nearby bush ☐ b) In polythene bags ☐

   c) Neighbors' pit-latrine ☐ d) others specify ……...…….

9. How do you control flies from your latrine? a) Cover the hole ☐ b) Use VIP-latrine ☐

   c) Spray with insecticides ☐ d) Do not control flies ☐ e) others specify ……

10. Do you wash hands with soap before and after visiting the latrine?

    a) Yes ☐ b) No ☐ c) Wash, but without soap ☐

11. Where do you pour your rubbish? a) Rubbish pit☐ b) Along the road ☐

c) Anywhere☐

SECTION C: Food and personal hygienic factors (Tick correct option**)**

12. Where do you get your meals? a) Prepare and eat at home☐ b) Eat from the restaurant☐

c) Buy already cooked food along the road☐ d) others specify ……..……

13. How often do you wash your hands before preparing your food?

a) Always ☐ b) Sometimes☐c) Not at all ☐

14. How do you keep your cooked food for use in a later time? a) Well covered in saucepan☐

b) In a refrigerator ☐ c) Leave food uncovered☐ d) others specify ……..……

15. How do you prepare fresh fruits before you eat?

a) Wash with clean water ☐ b) peal ☐ c) I just eat straight away ☐

SECTION D: Water Related Factors (Tick correct option**)**

16. Where do you get your water? a) Tap☐ b) Borehole☐ c) Well☐

d) Spring ☐ e) others (specify)……..…..

17. What do you do to make water safe for drinking? a) Boil☐ b) Drink without boiling☐

c) Treat with tablets (aqua-safe, water guard, etc.)☐ d) Others (specify)……

18. Where do you keep your water? a) Jerrycans☐ b) Pots☐

c) Others (specify)……..……..

19. How often do you clean your water containers? ……..……

20. What is the distance of the nearest latrine from your water source?

a) < 30 m☐ b) about 30 m☐ c) > 30 m☐

The End, Thank You for Your Cooperation

Appendix IV: Work Plan

ACTIVITY	DATE	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019
Administrative Requirements	Choosing & Presentation of the research topic for approval					
Proposal Development	Writing a proposal and preparing research tools					
	Typing and binding the proposal					
	Handing the proposal to the supervisor for approval					
Gathering data	Distribution of research tools and collection					
Data analysis	Coding of questions					
	Compiling the analyzed information					
	Discussing the findings.					
Dissemination of information	Handing copies of the dissertation to KIU library and conferences					

Appendix V: Budget

ACTIVITY	ITEM	QUANTITY	UNIT PRICE	TOTAL
Proposal writing	Stationery (ream)	2	15,000/=	30,000/=
	Flash diskettes	1	35,000/=	35,000/=
Data collection Instruments	Pens	1 box	20,000/=	20,000/=
	Questionnaires	350	200	70,000/=
Transport	For approval	2	50,000/=	100,000/=
	During collection	2	50,000/=	100,000/=
Data collection	Research assistants	10	10,000/=	100,000/=
	Feeding and accommodation		150,000/=	150,000/=
Data processing	Computer services	10 days	15,000/=	150,000/=
	Data analysis	1	150,000/=	150,000/=
	Compiling the dissertation	4 copies	40,000/=	160,000/=
	Burning on a compact disc	1 copy	20,000/=	20,000/=
Miscellaneous (10%)				**108,500**
TOTAL				**1,193,500/=**

Appendix VI: Map of Uganda Showing Location of Kiryandongo District

Kiryandongo District

Appendix VII: Map of Kiryandongo District and Surrounding Areas

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