

KIBOGORA POLYTECHNIC

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES

PREVALENCE OF TOXOPLASMA GONDII AMONG PREGNANT WOMEN ATTENDING KIBOGORA DISTRICT HOSPITAL

Period: 2020-2021

Undergraduate research thesis submitted in partial fulfillment of the requirements for the award of Bachelor's degree with honor in Biomedical Laboratory Sciences

PREPARED BY:

NTAGISANIMANA Dyna

Reg. No: 1800502

And

NYIRABATONI Solange

Reg. No: 1800494

SUPERVISOR:

HITAYEZU Elysee (Msc)

Kibogora, july, 2022

DECLARATION

Declaration by the Candidates

We, NTAGISANIMANA Dyna and NYIRABATONI Solange, hereby declare that this is our own original research proposal and not a duplication of any similar academic work. It has therefore not been previously or concurrently submitted for any other degree, diploma or other qualification to Kibogora Polytechnic or any other institution. All materials cited in this paper which are not our own have been duly acknowledged.

1. NTAGISANIMANA Dyna

Signature.....

Date.....

2. NYIRABATONI Solange

Signature.....

Date.....

Declaration by the Supervisor

I declare that this work has been submitted for examination with my approval as KP Supervisor

Supervisor's name:

Signature.....

Date.....

ABSTRACT

This research was conducted to find out the prevalence and associated risk factors of *Toxoplasma gondii* among pregnant women attending Kibogora Hospital from 2020 up to 2021. *Toxoplasma gondii* is a health problem worldwide with major consequences on human health.

Our main objectives were to determine the prevalence of *Toxoplasma gondii*, its associated risk factors and preventive measures against it among pregnant women who attended Kibogora Hospital. A retrospective study design and both qualitative and quantitative study approaches were used to determine the prevalence of *Toxoplasma gondii* and its associated risk factors among pregnant women attending Kibogora Hospital, and our sample size was 235 pregnant women who attended Kibogora Hospital, medical records documentation were used for collecting data.

According to our data analysis presentation, among 235 pregnant women who attended Kibogora Hospital from 2020 up to 2021 were tested, 36 of them were tested positive and 199 were not, this shows the prevalence of *Toxoplasma gondii* among pregnant women attending Kibogora Hospital at 15.32%, The main risk factors of *Toxoplasma gondii* were eating unwashed fruits and using contaminated water and vegetables.

As a conclusion, this study concludes that the prevalence of *Toxoplasma gondii* among pregnant women in Kibogora Hospital is 15%. This study recommends the local authority leaders to do their best to help the population get healthy food as it was proven that dirty food constitutes the principal causes of *Toxoplasma gondii* in the pregnant women attending Kibogora Hospital.

DEDICATION

To:

The Almighty God,

Our beloved parents,

All our brothers and sisters

Our friends,

This study work is dedicated

ACKNOWLEDGMENTS

First and foremost, we would like to thank God for his care and protection during the writing of this project proposal.

Secondly we are heavily grateful to the staff of the Faculty of Health Sciences, particularly Biomedical Laboratory Sciences Department, in Kibogora Polytechnics for providing us with knowledge and skills for writing this academic study.

We wish to express our gratitude to our supervisor HITAYEZU Elysee for his guidance through the process of writing this research project.

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May God bless you all!

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LIST OF ABBREVIATIONS AND ACRONYMS

% : Percentage

C : Celsius

F : Fahrenheit

SOPs : Standard Operational Procedures.

T : Toxoplasma

CHAPTER ONE: GENERAL INTRODUCTION

1.0. INTRODUCTION

Chapter one discusses the background of the study, problem statement, Objective of the study, research questions and significance of the study, limitations and scope of the study.

1.1. BACKGROUND OF THE STUDY

Globally, *Toxoplasma gondii* causes most of the death worldwide, Two main routes of transmission have been described in humans is by oral ingestion of the parasite and transplacental transmission (from mother to child). And can be transmitted to human by accidental ingestion of water, food, or soil contaminated with *T. gondii* oocysts or by accidental ingestion of oocyst stage of the parasite after cleaning an infected cat's litter box. Other routes of transmission include accidental ingestion of the parasite in contaminated soil and drinking water, and consumption of infected raw meat. It can also be transmitted congenitally during pregnancy .Generally, it is estimated that about one third of the World's population is infected with *T. gondii*. High prevalence of the infection have been reported among pregnant women and women of childbearing age from different foci in Latin America, parts of Eastern/Central Europe, the Middle East, parts of south-east Asia and Africa . (Liu Q et al, 2012)

Therefore, about 30% of the all population worldwide is seriously infected with *T. gondii*. The seroprevalence of toxoplasmosis ranged from 10 to 50% in developed countries and over 80% in developing tropical countries. Globally, there are 190,100 new cases of congenital toxoplasmosis; 26, 500 (2/1000 live births) being in the Africa region. In Ethiopia there was also high seroprevalence of *T. gondii* (74.73%) infection with higher odds of infection in pregnant women, (Bahia-Oliveira, 2003)

In Africa, overall seroprevalence rate as high as 92.5% has been reported. However, the prevalence of infection varies widely between countries (from 10% to 80%) and often within a given country or between different communities in the same region. The variations in socio-economic factors between communities and countries have been described to account for the observed difference in prevalence of *Toxoplasma gondii*. (Rosso et al., 2008).

Furthermore, *T. gondii* infection causes severe and dangerous consequences in human beings and particularly it is a great health concern to pregnant women and the developing fetus or new-borns.

In East Africa, about 82% women of childbirth have immunity to *T. gondii*; the rest may be at risk of developing an acute infection if exposed to the *T. gondii*. Maternal infection of *T. gondii* is associated with birth defects or problem after the baby is born and pregnancy outcomes including abortion, stillbirth and psychomotor retardation. In women, infection was associated with anxiety, depression, swollen lymph nodes and fatigue (Zapata M, 2005).

In Rwanda, the risk factors of *T. gondii* infection among pregnant women is largely unknown. Specific vectors for transmission may also differ based on geographic location. The water in different regions is thought to be contaminated by *T. gondii* oocysts that originate from the infected cat feces and wild felids, survive or bypass sewage treatment, and travel to the coast through river systems, (Murebwayire E., 2017). Furthermore, this study will have to assess the prevalence of toxoplasma gondii among pregnant women attending Kibogora district hospital.

1.2. PROBLEM STATEMENT

Globally, in spite of the fact that toxoplasmosis is one of the diseases distributed worldwide, there is scarce information on the prevalence and epidemiology of the disease, the level of the transmission, epidemiology, and in Africa, the prevalence of toxoplasmosis in different areas have not previously been reported to determine the characteristics of the study population that was associated with toxoplasmosis. (Rosso et al., 2008).

Despite *T. gondii* is one of the zoonotic pathogen, there is no national survey that shows the multiple disorders it causes in humans, its impact in animal production, its worldly and geographical distribution and the risk factors associated with the occurrence of the toxoplasma gondii in Rwanda, (Murebwayire E., 2017).

Despite the fact that, in East Africa region, *T. gondii* infection in pregnancy is associated with significant morbidities and miscarriage, serological screening of pregnant women for this infection is however, not routinely carried out during antenatal care in Rwanda, (Murebwayire E., 2017). As a result, little is known about the prevalence and risk factors of the toxoplasma gondii the among pregnant women in Kibogora district hospital. Thus, this contributes to the issue for which the present study is to assess the prevalence of toxoplasma gondii among pregnant women attending Kibogora district hospital.

1.3. PURPOSE OF THE STUDY

The purpose of the study was to assess the prevalence of toxoplasma gondii among pregnant women attending Kibogora district hospital, throughout the period of 12 months from December, 2020 up to November, 2021.

1.4. OBJECTIVES OF THE STUDY

The study seeks to achieve the following objectives:

1. To determine the prevalence of toxoplasma gondii among pregnant women attending Kibogora District Hospital.
2. To assess risk factors associated with toxoplasma gondii among pregnant women attending Kibogora District Hospital.
3. To analyse the preventive measures taken to fight against toxoplasma gondii among pregnant women attending Kibogora District Hospital.

1.5. RESEARCH QUESTIONS

Based on the objectives of the study, the below research questions are formulated:

1. What is the prevalence of toxoplasma gondii among pregnant women attending Kibogora District Hospital?
2. What are the risks factors associated with toxoplasma gondii among pregnant women attending Kibogora District Hospital?
3. What are the preventive measures taken to fight against toxoplasma gondii among pregnant women attending Kibogora District Hospital?

1.6. SIGNIFICANCE OF THE STUDY

The choice of this subject will embrace the interest at three levels: Personal interest, Scientific and academic interest as well as scholar community interest.

1.6.1. Personal interest

This study helps the researchers to improve knowledge and skills acquired in biomedical laboratory sciences. This research study will also allow the researchers to be rewarded Bachelor's Degree with honour in Health Sciences.

1.6.2. Scientific and academic interest

This study will also have benefits for academicians as it may add new knowledge on existing literature, and may serve as a reference to other researchers who may be interested in the same area.

1.6.3. Community interest

This study will be of a great importance to both social and economic benefits because it will help the society in acquiring the basic knowledge on toxoplasma gondii parasite and its associated risk factors as a way of strengthening preventive measures.

1.7. LIMITATIONS OF THE STUDY

This study met the limitation as follows:

Limited financial means was a barrier because, as the topic is to study the prevalence of toxoplasma gondii among pregnant women, the researchers lacked sufficient financial funds to reach all concerned medical areas and contributed to the reason why the researchers got limited to Kibogora district hospital.

1.8. THE SCOPE OF THE STUDY

Any scientific work has to be delimited in content, geographic area and time and this research must apply this principle too.

1.8.1. Time scope

The time period for this study was summarized in 12 months starting from December, 2020 up to November, 2021.

1.8.2. Geographic scope

The present study was carried out in Kibogora district hospital, operating in Kanjongo sector, Nyamasheke district of Western province.

1.8.3. Content scope

This study focused in medical domain, on the level of prevalence of toxoplasma gondii among pregnant women.

CHAPTER TWO: LITERATURE REVIEW

2.0. INTRODUCTION

This chapter defines and explains the key concepts which are used during this scientific work, and will provide theoretical review about the related literature as developed from different authors as well.

2.1. DEFINITION OF KEY CONCEPTS/TERMS

2.1.1. Prevalence

Prevalence is the proportion of a population in community who have a disease or condition in a given time period. Especially, it is the time the percentage of a population that is affected with a particular disease at a given time. (Dardé, M. L et al, 2011)

prevalence is a measure of the proportion of people in a population who have a disease or condition at a particular time, It is like a snapshot of the disease in time. It can be used for statistics on the occurrence of a disease. (Dubey, J. P., 2010).

2.1.2. Toxoplasma gondii

Toxoplasmosis is a disease that results from infection with the *Toxoplasma gondii* parasite, one of the most common parasites in the world. Infection usually occurs by consuming undercooked contaminated meat containing *T.gondii* oocyst, exposure from infected cat faeces, or transplacental transmission (mother-to-child transmission during pregnancy). (Israili ZH, 2014)

Toxoplasma gondii is a protozoan parasite that infects most species of warm-blooded animals, including mammals, and causes the disease toxoplasmosis in humans. (Vondrová M, 2011)

2.1.3. Pregnant women

Pregnant woman means a woman of any age who is determined to have one or more embryo or fetus in utero.

Pregnant woman means a woman during pregnancy and the post-partum period, which begins on the date the pregnancy ends, extends 60 days, and then ends on the last day of the month in which the 60-day period ends. (Smith, J., 2011)

Being pregnant means the act of having a baby or other offspring developing in the body; with child or young, as a woman or female mammal. (Manceaux, L. 1908)

2.2. PREVALENCE OF TOXOPLASMA GONDII

The prevalence of *T. gondii* infection in the general population of several countries including France, Belgium, and the United Kingdom and the incidence of congenital toxoplasmosis have been reported to be decreasing over the past few decades. The United States, with a lower overall seroprevalence than Western Europe, has also attested a decreased seroprevalence in the general population. (Angel SO, 2012)

Several studies have shown a higher overall seroprevalence (> 60%) in Central America and South America (especially in El Salvador,1,4 Costa Rica,5 and Brazil6–8). However, most studies from the latter regions have not addressed trends of seroprevalence over the past 3 decades with the exception of a study from Costa Rica that revealed a decrease in seroprevalence in the central valley region of the country. (Knoll et al, 2019).

Although it has been suggested that toxoplasmosis is a common health problem in Colombia, it has received little or no attention. In 1980, the Ministry of Public Health and the National Institutes of Health of Colombia performed a national seroprevalence study by using an indirect immunofluorescence antibody test to detect IgG toxoplasma antibodies in a randomly selected sample of 9,139 people widely representing the Colombian population. This national survey determined the overall age-standardised prevalence at 47%, with an increasing prevalence of the infection with age. Important was the observation of variations among geographical regions. The seroprevalence was higher in the Atlantic coast (63%) and lower in the Pacific region (36%). (Sullivan WJ, 2015)

Currently in Cali (the largest city of the Pacific region), local physicians, including infectious diseases specialists, ophthalmologists, obstetricians, pediatricians, and general practitioners believe that toxoplasmosis appears to be both a common and significant cause of clinical disease. Despite these perceptions, epidemiologic or clinical studies have not been performed in Cali or adjacent areas to determine toxoplasmosis is a cause of significant disease in high-risk individuals, including immunocompromised patients or those with ocular disease and whether it is a significant cause of infection during gestation thereby placing the offspring and new-born at risk. (Angel SO, 2012)

2.2.1. Causal agent

The only known definitive hosts for *Toxoplasma gondii* are members of family Felidae (domestic cats and their relatives). Unsporulated oocysts are shed in the cat's feces. Although oocysts are usually only shed for 1–3 weeks, large numbers may be shed. Oocysts take 1–5 days to sporulate in the environment and become infective. Intermediate hosts in nature (including birds and rodents) become infected after ingesting soil, water or plant material contaminated with oocysts of *T.gondii* parasite. (Macdonald DW, 2000)

Oocysts transform into tachyzoites shortly after ingestion. These tachyzoites localize in neural and muscle tissue and develop into tissue cyst bradyzoites. Cats become infected after consuming intermediate hosts harboring tissue cysts. Cats may also become infected directly by ingestion of sporulated oocysts. Animals bred for human consumption and wild game may also become infected with tissue cysts after ingestion of sporulated oocysts in the environment. Humans can become infected by any of several routes, (Macdonald DW, 2000): Eating undercooked meat of animals harboring tissue cysts; Ingestion of food or water contaminated with cat feces or by contaminated environmental samples (such as fecal-contaminated soil or changing the litter box of a pet cat); Blood transfusion or organ transplantation; Transplacentally from mother to fetus; (Macdonald DW, 2000)

In the human host, the parasites form tissue cysts, most commonly in skeletal muscle, myocardium, brain, and eyes; these cysts may remain throughout the life of the host. Diagnosis is usually achieved by serology, although tissue cysts may be observed in stained biopsy specimens, (www.cdc/toxoplasmosis/biology)

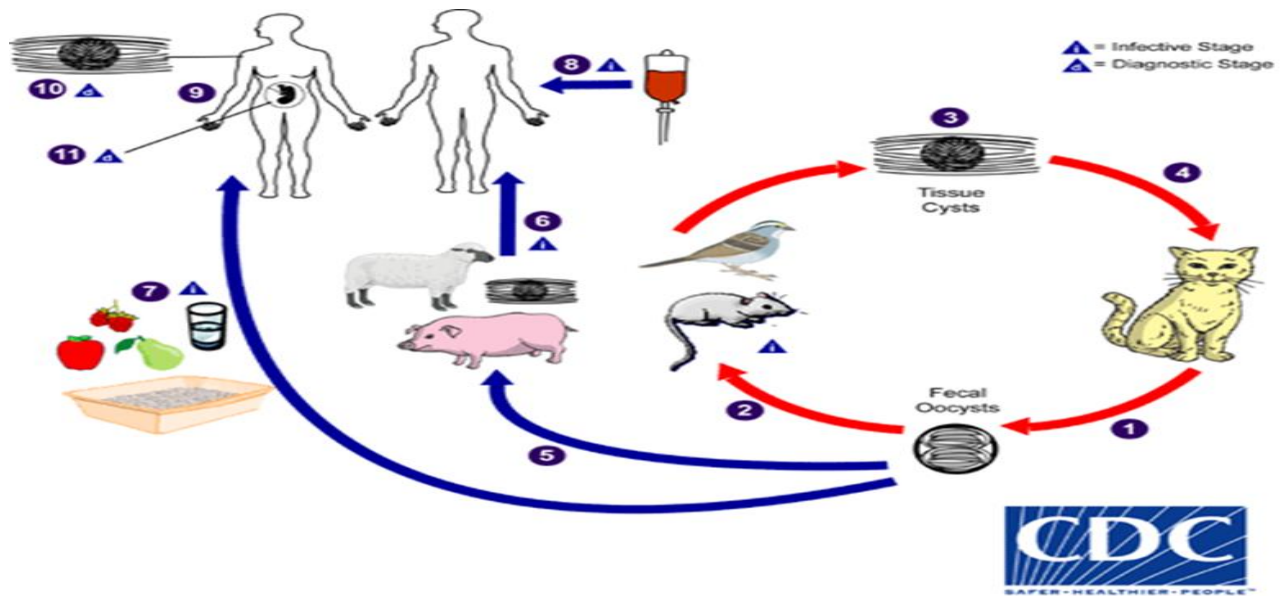


Figure 1 Toxoplasma life cycle

Source: (www.cdc/toxoplasmosis/biology)

2.3. ASSOCIATED RISK FACTORS

Risk factors for *T. gondii* infection in humans and warm-blooded animals have been identified as follows (Mc Conkey GA, 2013):

By consuming raw or undercooked meat containing *T. gondii* tissue cysts. The most common threat to citizens in the United States is from eating raw or undercooked pork; By ingesting water, soil, vegetables, or anything contaminated with oocysts shed in the feces of an infected animal. Cat fecal matter is particularly dangerous: Just one cyst consumed by a cat can result in thousands of oocysts. This is why physicians recommend pregnant or ill persons do not clean the cat's litter box at home. These oocysts are resilient to harsh environmental conditions and can survive over a year in contaminated soil; From a blood transfusion or organ transplant; From transplacental transmission from mother to fetus, particularly when *T. gondii* is contracted during pregnancy; From drinking unpasteurized goat milk; from raw and treated sewage and bivalve shellfish contaminated by treated sewage. (Mc Conkey GA, 2013)

A common argument in the debate about whether cat ownership is ethical involves the question of *Toxoplasma gondii* transmission to humans. Even though "living in a household with a cat that used a litter box was strongly associated with infection," and that living with several kittens or any

cat under one year of age has some significance, several other studies claim to have shown that living in a household with a cat is not a significant risk factor for *T. gondii* infection. (Soldati-Favre D., 2020)

2.4. PREVENTIVE STRATEGIES AGAINST THE INFECTION

The following precautions are recommended to prevent or greatly reduce the chances of becoming infected with *T. gondii*. This information has been adapted from the websites of United States Centers for Disease Control and Prevention and the Mayo Clinic, (McCallum, H., 2013).

2.4.1. From food

Basic food-handling safety practices can prevent or reduce the chances of getting infected with *T. gondii*, such as washing fruits and vegetables before use, and avoiding raw or undercooked meat, poultry, and seafood. Other unsafe practices such as consumption of unpasteurized milk or untreated water can increase odds of infection. As *T. gondii* is commonly transmitted through ingesting microscopic cysts in the tissues of infected animals, meat that is not prepared to destroy these presents a risk of infection. Freezing meat for several days at subzero temperatures (0 °F or -18 °C) before cooking may break down all cysts, as they rarely survive these temperatures. (Dubey, J. P., 2010)

2.4.2. From environment

Oocysts in cat feces take at least a day to sporulate (to become infectious after they are shed), so disposing of cat litter daily greatly reduces the chance of infectious oocysts developing. As these can spread and survive in the environment for months, humans should use gloves when gardening or working with soil, and should wash their hands promptly after disposing of cat litter. These precautions apply to outdoor sandboxes/play sand pits, which should be covered when not in use. Cat feces should never be flushed down a toilet. (McCallum, H., 2013).

2.4.3. Vaccination

As of 2016, no approved human vaccine exists against *Toxoplasma gondii*. Research on human vaccines is ongoing. For sheep, an approved live vaccine sold as Toxovax (from MSD Animal Health) provides lifetime protection. (McCallum, H., 2013).

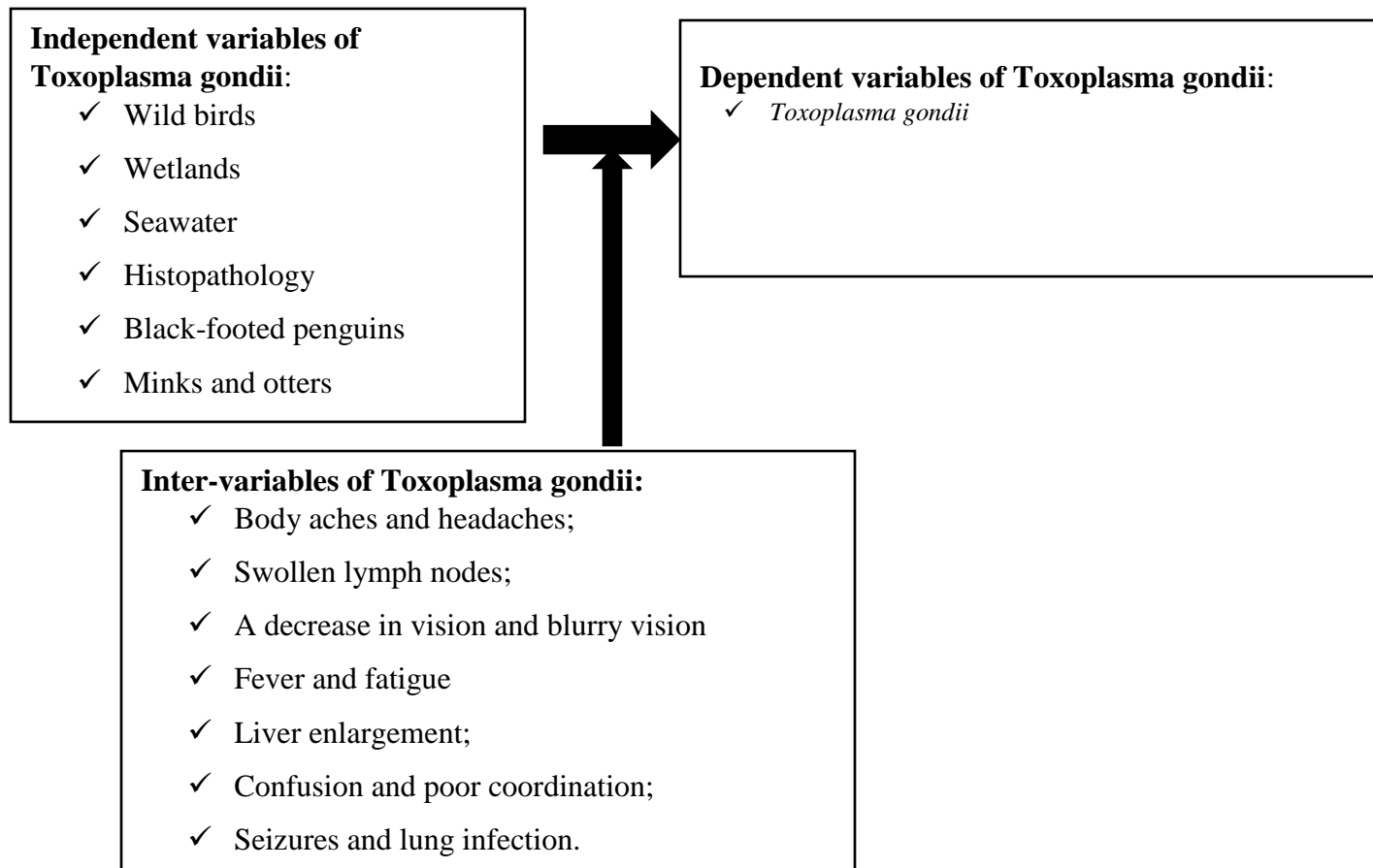
2.4.4. Treatment

In humans, active toxoplasmosis can be treated with a combination of drugs such as pyrimethamine and sulfadiazine, plus folinic acid. Immune-compromised patients may need continuous treatment until their immune system is restored. (Dubey, J. P., 2010)

2.5. CONCEPTUAL FRAME WORK

A conceptual framework is an analytical tool that is used to get a comprehensive understanding of a phenomenon. It can be used in different fields of work and is most commonly used to visually explain the key concepts or variables and the relationships between them that need to be studied. Furthermore, the risk factors of *Toxoplasma gondii*, in terms of independent variables, should indirectly lead to different causes which resulted in *Toxoplasma gondii* symptoms as shown by the figure below:

Figure 2: Conceptual framework



Source: Researcher compilation, March, 2022

2.6. RESEARCH GAP

Although, there are abundant studies on the prevalence of toxoplasma gondii and its associated factors worldwide among pregnant women as it is empirically developed by different authors. Therefore, according to earlier studies in southern Africa, T. gondii seroprevalence among pregnant women ranges between 15 and 23% and HIV-Toxoplasma co-infection was about 8%. and, in sub-Saharan Africa, more recent studies among pregnant women pointing through T. gondii-seroprevalences ranging between 5.9% and 85.5%. However, this study was mainly fill in the gap by assessing the prevalence of toxoplasma gondii and its associated factors among pregnant women, taking into account Kibogora District Hospital.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0. INTRODUCTION

This chapter explain the methodological approach and techniques that has been used in the study. It include the area of study and the study population. It also shows the methods and techniques used in choosing sample and data collection. It was further describe how data have been collected, processed and finally analyzed to give the implication of findings.

3.1. RESEARCH APPROACHES AND DESIGN

3.1.1. Research approaches

This study uses both quantitative and qualitative approaches. Therefore, quantitative and qualitative data collection methods have been used. This research work was qualified to be of quantitative study because during the study, numerical data was used, collected and analyzed. But also qualitative data collection technique since non-numerical data have been used.

3.1.2. Research design

This study was retrospective in nature. Health problems or events as regards a particular disease or condition was detected and identified in this study. Frequency and population parameters have been determined by this kind of research. It was a retrospective study as it includes case-report, case series and cross-sectional studies. Therefore, this research design fit the present study, for it helps us to determine the prevalence of toxoplasma gondii among pregnant women attending Kibogora District Hospital.

3.2. TARGET POPULATION

This study involved only pregnant women having attended Kibogora district hospital, in laboratory department and Maternity service, as the targeted population, from 2020 up to 2021 for serologic test to measure immunoglobulin G (IgG), who are in number of 235 pregnant women attending kibogora district hospital. (Kibogora hospital, 2022).

3.3. INCLUSION CRITERIA

All the pregnant women attended kibogora district hospital (2020-2021)

3.4.EXCLUSION CRITERA

All other patients except pregnant women attended kibogora district hospital (2020-2021)

3.5. SAMPLING PROCEDURES

Grinnell and William (1990) defined a sample size as the number of objects in the sample. A sample can further be defined as all people or classes selected to take a part in research study due to the nature of the research. Therefore, researchers decided to use systematic random sampling procedure due to the fact that the number of targeted population was too small and all were concerned.

3.6. SAMPLE SIZE

Due to the facts that the results from the whole population are accurate than those from the sample, the whole target population under study was considered as the sample size of the study in area under the study within the specified time period. Therefore, the sample size was all pregnant women tested serology to measure immunoglobulin G (IgG) from Kibogora district Hospital medical laboratory was equal to the target population, sample size was 235 pregnant women.

3.7. DATA COLLECTION PROCESS

The research instruments used as a practical means of attaining or achieving special relevant information related to the relevance of toxoplasma gondii among pregnant women.

3.7.1. Documentation

After obtaining the permission to conduct a research from Kibogora District Hospital, all data from laboratory recorded documents on serology test to measure immunoglobulin G (IgG), considering inclusion criteria have been used in our study and patients' request forms have been considered to obtain data on the prevalence of Toxoplasma gondii data among pregnant women.

3.8. ETHICAL CONSIDERATION

An official approval request letter to conduct this research was delivered from both Kibogora Polytechnic and Kibogora District Hospital. The data collected in Laboratory services from Kibogora District Hospital were used for research purposes only and the data from this study was kept with high confidentiality.

3.9. VALIDITY AND RELIABILITY MEASURES

To minimize bias and errors, the researchers use specified documentation. However, to ensure accuracy and consistency of data, the researchers make sure that the documentary information are clear and in the same way understandable. The researchers respected rules about conducting a

research and collect current information from December, 2020 to November, 2021. This testifies the validity of data as it is the recent period where the researchers got data. The research principles was respected and applied.

3.10. DATA ANALYSIS AND INSTRUMENTATION

Data collection sheet along with Checklist were used to gather the useful data from medical record. Data collection sheet brought out total tested and confirmed cases whereas checklist was used to provide socio-demographic information and associated risk factors of toxoplasma gondii for each patient. The data collected were checked by Microsoft excel and analyzed using statistical package of social sciences (SPSS) software version 16, and they were presented using tables. Descriptive statistics were used to calculate the frequencies and percentages.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0. INTRODUCTION

This chapter is devoted to presentation, analysis, interpretation, and discussion of findings to finally end up with summary. The main aim of this chapter is to prove the validity of objectives and research questions basing on the information acquired from the Kibogora Hospital Medical record documents.

4.1. DATA PRESENTATION AND ANALYSIS

Based on the objectives of the study, this section interpreted and analysed the collected data in order to determine the prevalence of *toxoplasma gondii*, assess risk factors associated with *toxoplasma gondii*, and analyse the preventive measures taken to fight against *toxoplasma gondii*, among pregnant women attending Kibogora Hospital.

4.1.1. Prevalence of toxoplasma gongii among pregnant women in Kibogora hospital

The prevalence of *toxoplasma gondii* among pregnant women was determined by analyzing the age, marital status, education and occupation.

4.1.1.1. Prevalence of toxoplasma gondii by age

The researchers assessed the prevalence of *toxoplasma gondii* among pregnant women examined for serologic test in study area referring to the category of their ages.

Table 1: Prevalence of toxoplasma gondii by age

Age	Frequency	Not contami nated	Contami nated	Not contami nated (%)	Contami nated (%)	Total (%)
Under 18	29	27	2	11.49	0.85	12.34
18 – 27	96	92	4	39.15	1.70	40.85
28 – 37	50	38	12	16.17	5.11	21.28
38 - 47	60	42	18	17.87	7.66	25.53
Total	235	199	36	84.68	15.32	100

Source: Kibogora Hospital, 2020-2021

Table 1 shows that among 235 pregnant women in study area and referring to their ages, 0.85% pregnant women under 18 years was contaminated of toxoplasma gondii; between 18-27, 1.70% were contaminated, 5.11% of respondents who were between 28-37 years old and among those who were between 38-47 years old, 7.66% had the virus. This implies the age bracket which is highly affected is that of between 38 – 47 years old. This also proves that, basing on pregnant women’s ages, the toxoplasma gondii was prevailing at 15.32%. This means that a small number among pregnant women attendined Kibogora hospital, especially, above 18 years old were suffering from toxoplasma gondii.

4.1.1.2. Prevalence of toxoplasma gondii by marital status

It was of great importance to evaluate the prevalence of toxoplasma gondii regarding the marital status as one of the factors of pregnancy.

Table 2: Prevalence of toxoplasma gondii by marital status

Marital status	Frequency	Not contaminated	Contaminated	Not contaminated (%)	Contaminated (%)	Total (%)
Single	18	15	3	6.38	1.28	7.66
Married	115	96	19	40.85	8.09	48.94
Widows	91	80	11	34.04	4.68	38.72
Separated	11	8	3	3.40	1.28	4.68
Total	235	199	36	84.68	15.32	100

Source: Kibogora Hospital, 2020-2021

Table 2 shows that among 235 pregnant women, 36(15.32%) pregnant women were having toxoplasma gondii and among those ones contaminated, 1.28% represented single, 8.09% represented the married ones as the riskiest group, 4.68% represented widows and the separated one was equal 1.28% of the pregnant women. This means that the toxoplasma gondii prevailed among pregnant women who are married. This implies that the married ones were the ones who were highly contaminated by this virus.

4.1.1.3. Prevalence of toxoplasma gondii by Education

The researchers assessed the prevalence of pregnant women with toxoplasma gondii basing on the level of education as the educated people could have knowledge about preventive measures against any disease.

Table 3: Prevalence of toxoplasma gondii by Education

Education	Frequency	Not contaminated	Contaminated	Not contaminated (%)	Contaminated (%)	Total (%)
Primary	26	18	8	7.66	3.40	11.06
Secondary	118	97	21	41.28	8.94	50.22
University	91	84	7	35.74	2.98	38.72
Total	235	199	36	84.68	15.32	100.0

Source: Kibogora Hospital, 2020-2021

Table 3 illustrates that among 235 pregnant women, toxoplasma gondii had affected 36(15.32%) pregnant women of whom 3.40% had primary level and 8.94% had completed secondary school whereas 2.98% had academic level. It is clear that, pregnant women with secondary education are the most infected group as they are exposed to different conditions which could be sources of contamination. This means that the prevalence of toxoplasma gondii, among pregnant women having attended Kibogora Hospital, was in the women with middle education level.

4.1.1.4. Prevalence of toxoplasma gondii by occupation

Occupation of respondents was another criterion to assess the prevalence of toxoplasma gondii as due to occupation people could get financial means to avoid the contamination of *toxoplasma gondii*.

Table 4: Prevalence of toxoplasma gondii by occupation

Occupation	Frequency	Not contaminated	Contaminated	Not contaminated (%)	Contaminated (%)	Total (%)
Agriculture and farming	46	18	28	7.66	11.91	19.57
Business	89	84	5	35.74	2.13	37.87
Governmental occupation	100	97	3	41.28	1.28	42.56
Total	235	199	36	84.68	15.32	100.0

Source: Kibogora Hospital, 2020-2021

Table 4 shows that, among 36(15.32%) contaminated pregnant women out of 235 pregnant women, 11.91 % were practicing agricultural and farming activities and 2.13% were dealing in business while 1.28% were working for governmental organization. This implies that the most affected were the ones dealing in agricultural and farming activities. This means that toxoplasma gondii was showing its prevalence in people with hard living conditions.

4.1.2. Risk factors associated with Toxoplasma gondii in Kibogora hospital

The researchers had to assess the risk factors associated with toxoplasma gondii among pregnant women attending Kibogora hospital through the analysis of risk factors from medical record documents at Kibogora Hospital.

4.1.2.1. Risk factors associated with toxoplasma gondii

By this, the researchers had to find out the risk factors that are associated with toxoplasma gondii, in Kibogora hospital, since these factors increased the chance of developing the disease on the side of the pregnant women.

Table 5: Causes of toxoplasma among pregnant women

Causes	Frequency	Percent
Oral exposure to infected cat faeces	3/235	1.28
Transmission from mother to child	6/235	2.55
Eating unwashed fruit	7/235	2.98
Consuming undercooked meat	2/235	0.85
Contaminated water, soil or vegetables	7/235	2.98
Blood transfusion or organ transplant	5/235	2.13

Source: Kibogora Hospital ,2020-2021

The table 6 displays that, out of 235 pregnant women, 1.28 % of them confirmed that pregnant women could get toxoplasma gondii through the oral exposure to infected cat faeces, 2.55% of them stressed on transmission from mother to child, 2.28% advanced for both eating unwashed fruit and contaminated water, soil or vegetables, then 0.85% of the pregnant women get affected for Consumption undercooked meat while 2.13% of all pregnant women acknowledged that many pregnant women could get affected by toxoplasma gondii due to the blood transfusion or organ transplant. This implies that, most of the pregnant women attending Kibogora Hospital were suffering from toxoplasma due to different factors among which eating unwashed fruits and contaminated water and vegetables seemed to be the factors that affected many pregnant women.

4.1.3. Preventive measures Against Toxoplasma gondii in Kibogora hospital

Through the information from Kibogora district hospital medical record documents, the researchers had to analyse the preventive measures taken to fight against toxoplasma gondii among pregnant women attending hospital.

4.1.3.2. Preventive measures against toxoplasma gondii

Having collected risk factors associated with toxoplasma gondii among pregnant women attending Kibogora hospital, the researchers also had to know more about what was taken as preventive measures against the disease.

Table 6: Preventive measures against toxoplasma gondii

Causes	Frequency	Percent
Disposing of cat	0	0
Washing hands after soil work	1	14.29
Washing fruits and vegetable before use	4	57.14
Use of drinkable water	2	28.57
Freezing meet before cooking	0	0
Total	7	100.0

Source: Primary data, June, 2022

The table 6 shows that the majority of the pregnant women equal to 57.14% suggested washing fruits and vegetables before use, and 2 pregnant women corresponding to 28.57% recommended for use of drinkable water, then one pregnant women equating to 14.29% proposed for washing hands after each soil work while none of them mentioned neither freezing meat before cooking nor disposing of cat.

4.2. DISCUSSION OF FINDINGS

According to our research done from December 2020 to November 2021 the prevalence of toxoplasma gondii among the pregnant women attending kibogora district hospital was 15.3% and this prevalence was low compared to the study conducted in the state of Mato Grosso do Sul found a prevalence of 91.6%, Avelino with 2004 in the city of Goiania, state of Goiás, found 65% of prevalence, Reis with 2006 in the city of Porto Alegre, state of Rio Grande do Sul, found 61.1% of prevalence, Areal and Miranda with 2008 in the city of Vitória, state of Espírito Santo, found 73.5% of prevalence and Porto in the year 2008 in the city of Recife, state of Pernambuco, found 74.7% of prevalence .

Referring to analysed data as documented from laboratory results of pregnant women having attended Kibogora Hospital for serological test in order to determine the prevalence of toxoplasma gondii, its associated risk factors and preventive measures against toxoplasma gondii from 2020 up to 2021, it was revealed as follows:

The study revealed that, respectively referring to the table 1, 2, 3 and 4, there was prevalence of toxoplasma gondii among pregnant women attending Kibogora Hospital since 15.32% of all pregnant women tested positive of toxoplasma gondii, and this rate is lower than the range of 25% to 92.5% seroprevalence among pregnant women reported elsewhere in Africa (Mwambe et al., 2013; Alsammani, 2016), where the study proved that it highly infected women of between 38-47 years old at the level of 7.66% and married women at the level of 8.09% then women having secondary academic level at the level of 8.94% while the pregnant women who are farmers had been infected by toxoplasma gondii at the level of 11.91%. This proved the prevalence of toxoplasma gondii among pregnant women through taking into consideration their age, marital status, education and profession, from which it should be deduced that the most affected are the women with either little awareness of toxoplasma gondii or little financial means, referring to the analyzed data as proven above.

In reference with the table 5, it was revealed that the prevalence of toxoplasma gondii among pregnant women, in Kibogora Hospital, had been associated with different factors such as oral exposure to infected cat faeces as confirmed by 1.28% of all pregnant women, and transmission from mother to child since it was 2.55% of all pregnant women. Moreover, both eating unwashed fruit and contaminated water, soil or vegetables was 2.98%, in addition to that 0.85% of all pregnant women consuming undercooked meat while 2.13% of all the pregnant women acknowledged that blood transfusion or organ transplant operations could result in toxoplasma gondii contamination. This proved how much these factors were associated with the prevalence of toxoplasma gondii among pregnant women in Kibogora Hospital.

Referring to the table six, it was proven that different measures to fight toxoplasma gondii in Kibogora Hospital have been put into places where 57.14% suggested that people should be washing fruits before they eat them or vegetables before getting them cooked, and 28.57% recommended that people should not be drinking any water except the drinkable one even while cooking, to 14.29% proposed that they could take care of cleanliness by washing their hand and time they got contact with soil.

SUMMARY OF FINDINGS

As regarded the analysis was based on the data collected from the laboratory results of pregnant women, in Kibogora Hospital, consisting of 235 specimens of which 15.32% tested positive of toxoplasma gondii.

Therefore, the table 1 showed that 1.70% were between 18-27 then 5.11% were between 28-37 years old while 7.66% were between 38-47 years old. Moreover, 1.28% represented single and 8.09% represented married then 4.68% represented widows and the separated one was 1.28% as shown in the table 2. In addition, basing on the table 3, 3.40% had primary level and 8.94% had completed secondary school whereas 2.98% had academic level. Therefore, 11.91% were practicing agricultural and farming activities and 2.13% were in business while 1.28% were public employees, referring to the table 4.

The table 5, about the associated factors with toxoplasma gondii, showed that 2.98% of all the pregnant women advanced for eating unwashed fruits and use of contaminated water and vegetables, 1.28% for oral exposure to infected cat faeces, 2.55% for transmission from mother to child, and 0.85% for Consumption undercooked meat while 2.13% of all the pregnant women acknowledged for blood transfusion or organ transplant.

The table 6, about preventive measures against toxoplasma gondii, displayed that 57.14% suggested for washing fruits and vegetables before use, and 28.57% recommended for use of drinkable water, while 14.29% proposed for washing hands after each soil work.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.0. INTRODUCTION

This chapter draws the conclusions basing on the findings in order to achieve the research work's objectives. In addition, some recommendations and suggestion for future researches had to be forwarded.

5.1. CONCLUSION

The present study had to deal with prevalence of toxoplasma gondii and its associated risk factors compilation. Through qualitatively and quantitatively analyzing the findings, using SPSS computer package, the researchers determined the prevalence of toxoplasma gondii among pregnant women attending Kibogora hospital and its associated risk factors from 2020 up to 2021.

It should be concluded that one of the risk factors namely oral exposure to infected cat faeces, transmission from mother to child, eating unwashed fruit, consuming infected raw or undercooked meat, use of contaminated water, the prevalence of toxoplasma gondii among pregnant women at 15.32%, in Kibogora hospital, where the most affected were married women in the age bracket between 38-47 years old, especially those who had completed secondary school, dealing in agricultural and farming activities.

As conclusion, it should be concluded that the prevalence of toxoplasma gondii among the pregnant women attending kibogora district hospital is 15% at high risk of consuming contaminated water, soil or vegetables and eating unwashed fruits and washing fruits and vegetable before use, use of drinkable water and washing hands after soil work are the preventive measures against toxoplasma gondii among the pregnant women. Education regarding to the above preventive measures should be the best intervention to eradicate toxoplasmosis.

5.2. RECOMMENDATIONS

Having conducted this research, it is obviously clear that there are some recommendations made for local authorities forward eradicating toxoplasmosis.

5.2.1. To local authority

The toxoplasma gondii should be also presented as major issue. For this to be eradicated in order to post impressive results, the below opportunities should be zealously pursued, but new ones

could be continuously sought out during implementation and new approaches identified. The following are some of what the local authority should get strengthened:

Local authority leaders should do its best to help the population get clean nutrition as it was proven that dirty food constitutes the principal causes of toxoplasma gondii in the pregnant women by making them aware of the importance of hygiene.

5.3. SUGGESTION FOR FURTHER RESEARCH

- ❖ Same study can be conducted in other medical areas of the country to assess the prevalence and risk factors associated with toxoplasma gondii among the pregnant women
- ❖ Prospective study can be conducted by other reseachers to reach most of the population of Nyamasheke District.
- ❖ A countrywide study should be done to have real the status of this problem because this study used limited number of samples.

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B. Electronic source :

[Http://www.cdc/toxoplasmosis/biology](http://www.cdc/toxoplasmosis/biology), Retrieved 14th April, 2022

APPENDIX 1

APPENDIX 1:DATA COLLECTION SHEET

PATIENT NUMBER	ID	AGE	LABORATORY RESULT

APPENDIX 2:CHECK LIST

1. Age:.....(exact age)
2. marital status
 - single
 - married
 - divorced
 - widower
3. occupation
 - Farmer
 - Business
 - Governmental occupation
4. Education
 - Primary
 - Secondary
 - University
 - none

APPENDIX 3: APPROVAL LETTER FOR DATA COLLECTION



KIBOGORA POLYTECHNIC



STUDENT PROJECT'S LETTER

DATE: 11th June, 2022



To whom it may concern;

We write this letter to humbly request you to allow **Mrs NTAGISANIMANA Dyna** and **Mrs NYIRABATONI Solange** to conduct project work at **KIBOGORA DISTRICT HOSPITAL**

The above mentioned are bonafide students of Kibogora Polytechnic pursuing Bachelor's degree in Biomedical Laboratory Sciences.

This candidate is currently conducting a project entitled "Prevelence of Toxoplasma Gondii among pregnant women attending Kibogora District Hospital."

We are convinced that your institution will constitute a valuable source of information pertaining to their work. The purpose of this letter is to humbly request you to avail them with the pertinent information they may need. We pledge to ensure that all provided information will be used in the strict academic purpose.

Any assistance rendered to the candidate will be highly appreciated.

Approved by:

MUNYANDAMUTSA Fulgence

Head of department/Biomedical Laboratory Sciences

Kibogora Polytechnic

