

Research



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Seroprevalence of *Toxoplasmosis* and associated risk factors among HIV/AIDS patients attending ART clinic at Fort Portal Regional Referral Hospital in Kabarole district, Western Uganda: a hospital-based cross-sectional study

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Abstract

Introduction: *Toxoplasmosis is a neglected opportunistic protozoan infection that occurs among patients with HIV/AIDS, thereby affecting response to Anti-Retroviral Therapy (ART). This study determined the seroprevalence of Toxoplasmosis and associated factors among HIV/AIDS patients at Fort Portal Regional Referral Hospital (FRRH) ART Clinic in Kabarole District, Western Uganda. **Methods:** a hospital-based cross-sectional study design was used to recruit 368 study participants between May 2025 and June 2025 at the ART Clinic of FRRH. Study participants were sampled purposively, consented, and blood specimens were collected aseptically; socio-demographic characteristics were collected using a standard questionnaire. Data was entered into Microsoft Excel 2021, cleaned and exported into statistical data analysis (STATA) version 17 for analysis. Descriptive statistics were conducted using measures of central tendency. Categorical data was presented in the form of frequency distribution tables. The prevalence of Toxoplasmosis was expressed as a percentage of HIV/AIDS participants who had Toxoplasma gondii (T. gondii) antibody-positive test. Bivariate and multivariate logistic regression were conducted for the factors associated with Toxoplasmosis, and results were reported using crude and adjusted*

*odds ratios at 95% CI. Statistical significance was at $p < 0.05$. **Results:** the prevalence of Toxoplasmosis was 6.8% (95% CI: 4.6 - 9.9). Owning a cat(s) within the household was significantly associated with T. gondii infections ($aOR = 4.25$, 95% CI = 1.35-13.33, $p = 0.013$). **Conclusion:** the findings revealed that undiagnosed Toxoplasmosis exists in some people living with HIV/AIDS while on therapy at ART clinic of Fort Portal Regional Referral Hospital. Furthermore, the presence of pets, mostly cats, as reservoirs or primary hosts within the household increases the likelihood of Toxoplasmosis. Therefore, routine screening for Toxoplasmosis among people living with HIV/AIDS on therapy should be done in addition to health education about deworming all the pets, and improved hygienic and sanitation practices in households with pets.*

Introduction

Toxoplasmosis is a parasitic infection caused by Toxoplasma gondii (T. gondii), which poses a significant public health concern among immunocompromised individuals such as those living with HIV/AIDS [1]. The infection is primarily transmitted through ingestion of undercooked meat containing tissue cysts, contact with contaminated soil or water, and exposure to infected animal feces [1,2]. While the infection remains asymptomatic in immunocompetent individuals, it can lead to severe complications such as encephalitis, pneumonitis, retinochoroiditis, and death in individuals with weakened immune systems [3,4]. Globally, it is estimated that one-third of the population is seropositive for T. gondii, and approximately 36.7 million people are living with HIV/AIDS [5]. Sub-Saharan Africa bears a dual burden of high HIV prevalence and endemic tropical infections like Toxoplasmosis [6]. In Uganda, the national HIV prevalence is about 6.5% [7], while in Kabarole District it stands significantly high at 10.6%, and up to 17.8% in Fort Portal City (Uganda AIDS Commission, 2022). Studies in Uganda report

Toxoplasmosis seroprevalence rates among HIV patients ranging from 34% to 54% [8,9], underlining the growing public health threat. Despite this burden, *T. gondii* is not routinely screened for in most Ugandan health facilities, including Fort Portal Regional Referral Hospital (FRRH), leading to diagnostic delays and poor clinical outcomes. Several HIV/AIDS patients attending the ART clinic present with neurological symptoms indicative of *Toxoplasmosis*, but due to limited diagnostics, many go undiagnosed or misdiagnosed, resulting in inadequate treatment and increased risk of complications such as encephalitis and death [4,10-12].

The risk of *T. gondii* infection among HIV/AIDS patients is influenced by various factors, including environmental conditions (e.g., poor sanitation, water contamination), socio-demographic characteristics (e.g., age, gender, education, marital status), and individual behaviors (e.g., consuming undercooked meat, poor hygiene practices, close contact with cats and other animals) [1,13,14]. In Uganda, one study found that 31% of goats tested positive for *T. gondii*, indicating a significant zoonotic risk to humans, especially immunocompromised individuals [15]. Furthermore, disparities in health literacy, access to ART, and socioeconomic challenges exacerbate the vulnerability of HIV/AIDS patients to opportunistic infections like *Toxoplasmosis*. Studies from across Africa and other low-resource settings consistently report higher *Toxoplasmosis* prevalence among HIV patients compared to general populations, with seroprevalence rates reaching up to 75% in countries like Sudan and the Democratic Republic of Congo [4,12].

Although international studies have provided valuable insights into the epidemiology of *Toxoplasmosis* in HIV-positive populations, there remains a scarcity of region-specific data, particularly in rural and peri-urban Ugandan settings like Fort Portal City [16]. This inadequate local evidence impedes the development of targeted interventions and informed clinical decision-making. As such, understanding the

seroprevalence and associated risk factors of *Toxoplasmosis* among HIV/AIDS patients in this region is vital for improving disease surveillance, guiding preventive strategies, and enhancing patient care [16]. This study, therefore, determined the seroprevalence of *T. gondii* and its associated factors among HIV/AIDS patients attending the ART clinic at FRRH in Kabarole district, Western Uganda.

Methods

Study design and population: this study adopted a hospital-based descriptive cross-sectional design to assess the seroprevalence of *Toxoplasmosis* and identify associated factors among HIV/AIDS patients attending the ART (anti-retroviral therapy) clinic at Fort Portal Regional Referral Hospital (FRRH) between May 2025 and June 2025.

Study setting: the study was carried out at FRRH in Kabarole district, Western Uganda. The regional referral hospital is locally known as Buhinga hospital, and it was opened in 1920 as a dispensary and upgraded to a regional referral hospital (RRH) in 1994. The referral hospital has a high enrollment of over 12,000 HIV/AIDS patients at the ART clinic, providing services like HIV/AIDS prevention, treatment, care, and support. The FRRH serves over half a million people from eight entire districts of Kabarole, Bunyangabu, Kasese, Kyenjojo, Bundibugyo, Kamwenge, Kyegegwa, and Ntoroko in the Rwenzori region and also receives patients from part of the eastern Democratic Republic of Congo (DRC) (Figure 1).

Study population: the study population included both male and female HIV/AIDS patients, young and old aged one year and above, who were already enrolled or newly admitted at FRRH-ART Clinic in Kabarole District, Western Uganda.

Inclusion criteria: all HIV/AIDS patients who were attending ART clinic of FRRH at the time of the study and presented with signs and symptoms suggestive of *T. gondii* like blindness, blurred

vision and eye pain, fever, fatigue, muscle aches, swollen lymph nodes, sore throat, headache and hepatomegaly, immunosuppressed among other clinical presentations, and have consented (18 years and above) or assented (below 18 years) to take part in this study.

Exclusion criteria: all HIV/AIDS patients in the ART clinic of FRRH with mental irregularities, drunk, and those who had undergone domestic violence were excluded from the study since their conditions would compromise their responses.

Sample size determination: the study recruited 380 participants calculated using a formula of Kish and Leslie [17], margin of error 0.05, $Z=1.96$, and $P=34\%$ [8].

Sampling technique: the study employed a purposive sampling technique. Purposive sampling allowed the researcher to intentionally select participants who met specific inclusion criteria, in this case, individuals living with HIV/AIDS and attending the FRRH ART clinic.

Study variables: in this study, the dependent variable was prevalence of *Toxoplasmosis*, and the independent variables were the factors (socio-demographic factors, socio-economical factors among others) associated with prevalence of *Toxoplasmosis*.

Data collection: quantitative data was collected using a researcher-administered questionnaire that entailed the bio data and information related to factors for seroprevalence of *Toxoplasmosis* from the 368 HIV/AIDS participants suspected to have *T.gondii* at FRRH ART clinic. The participants were briefed about the objectives of the study to allow them to volunteer. Consenting and assenting were done before participation in data collection. A researcher administered a questionnaire was then used to collect data from those who had consented or assented. This procedure lasted for approximately 10 minutes. The questionnaires were then kept under lock and key by the

researcher. After collection, the data was entered into Microsoft (MS) Excel 2021.

Specimen collection and laboratory analysis: venous blood specimens were collected aseptically from participants into a plain vacutainer tube and transported to the laboratory for processing. This was done immediately after the initial data collection with the researcher-administered questionnaire. Each sample was left to clot and later centrifuged at 2000 revolutions per minute for 5 minutes to harvest serum. About 10 μ l of serum was pipeted using a micropipette and drawn into the sample well of a rapid *T. gondii* immunoglobulin (IgG/IgM) cassette, and 2 drops of the running buffer (80 μ l) were added. The results were read and interpreted after 15 minutes. The results were attached to the respective participant data profile obtained during the initial researcher-administered questionnaire process.

Data and laboratory quality assurance: data was collected using researcher-administered and pretested questionnaires by qualified research assistants who are proficient in Runyoro/Rutooro, Runyankore/Rukiga, and English to allow expression of non-predicted factors. The questionnaire was pilot tested on 20 HIV/AIDS victims on therapy from FRRH for understanding of the questions, estimate the duration of the interviews, test the reliability and validity of the tool. Ambiguous, complex, and irrelevant questions were modified, and the final version was used for data collection. Training of research assistants was done to ensure uniformity during data collection and to minimize errors. During laboratory analysis, sample collection and transportation protocols were followed, and contamination was avoided by using sterile equipment and a clean environment to prevent cross-contamination between samples. Inclusion of positive and negative controls in the runs was done, and lot testing was observed to ensure consistency. SOPs aligned with ISO15189: 2022 were adhered to. The data from the questionnaires and laboratory results were also

carefully double-entered by the principal researcher into Microsoft Excel. The obtained data were thoroughly examined for correctness and consistency with the data on the questionnaires and laboratory results before being exported to STATA software for statistical analysis by flagging and resolving the outliers, missing values, and implausible entries.

Data management and analysis: data was entered into Microsoft Excel 2021, cleaned and exported into STATA version 17 for analysis. The descriptive statistics were conducted using measures of central tendency (mean, mode, and median). Categorical data was presented in the form of frequency distribution tables. The prevalence of *Toxoplasmosis* was obtained using the proportion of participants whose samples tested positive for *T. gondii* antibody. Bivariate and multivariate logistic regression were conducted for the factors associated with *Toxoplasmosis*. Those determinants that were statistically significant ($p < 0.2$) at the bivariate analysis were included in the multivariate analysis to get rid of any confounding factors. The results were reported using crude and adjusted odds ratios at 95% confidence interval. A p-value below ($p < 0.05$) was considered statistically significant in multivariate analysis. The final model was tested for the absence of severe multicollinearity, using the variance inflation factor, and it was below the expected value of 5.

Ethical considerations: clearance was sought from the Department of Medical Laboratory Science, Faculty Research Committee (FRC), Research Ethics Committee (REC), all from Mbarara University of Science and Technology (MUST) under Reference number: MUST-2025-262, and the Hospital Director, FRRH. Consent was obtained from all study participants, and participation was voluntary in this research. Unique identifiers were used instead of patients' names for confidentiality purposes.

Results

Socio-demographic characteristics of HIV/AIDS patients attending the ART clinic at Fort Portal Regional Referral Hospital, Western Uganda, May-June 2025 (N=368): the total number of participants involved in the study was 368 people, and the response rate was 97%. The majority of the participants, 121 (32.9%), were aged between 35 and 44 years, and most were females, 231 (62.8%). More than half, 242 (65.8%) of the participants were self-employed, 331 (89.9%) of the participants lived in rural areas, and half of them, 184 (50.0%) were married. The majority of the participants, 194 (52.7%) studied up primary level (Table 1).

Seroprevalence of *Toxoplasma gondii* antibodies (IgG/IgM) among HIV/AIDS patients at Fort Portal Regional Referral Hospital, Western Uganda (N=368): the prevalence of was 6.8% (95% CI: 4.6 - 9.9) as indicated in Table 2.

Distribution of *Toxoplasmosis* seroprevalence by socio-demographic and behavioral characteristics among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368): the majority of the *Toxoplasmosis* cases were among participants aged 35-44 years, 7 (10.7%). Males 10 (7.3%) had higher positive cases of *T. gondii* compared to females. According to marital status, the participants who are single had the highest prevalence, 14 (7.5%). Participants with tertiary education had higher positivity 4 (8.7%) compared to other levels of education. Urban residents, 3 (8.1%), had a higher prevalence than the rural residents, and *T. gondii* positivity was more in the unemployed participants, 5 (8.3%), than their counterparts, the employed, as summarized in Table 3.

Bivariate and multivariate logistic regression analysis of factors associated with *Toxoplasmosis* seropositivity among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368): participants who had cats at home were more likely to have *Toxoplasmosis* than their

counterparts who didn't have cats at home (aOR=4.25, 95% CI=1.35-13.33, p=0.013). This was less likely statistically if the participants had other animals in the household like dogs (aOR=1.85, 95% CI=0.6-5.77, p=0.288) and poultry (aOR=2.1, 95% CI = 0.65-6.73, p=0.214) respectively. All the other factors were statistically insignificant at multivariate analysis (Table 4).

Discussion

Prevalence of *Toxoplasmosis* among HIV/AIDS patients at Fort Portal region Referral hospital ART Clinic was found to be 6.8%. These findings are slightly higher than results reported in West Africa (4%) [18,19]. Conversely, a higher seroprevalence of 16.4% among HIV/AIDS expectant mothers visiting health centres in Uganda has been reported [9]. Some parts of Africa, specifically Nigeria and Tunisia, have had higher prevalence of *Toxoplasmosis*, estimated at 75.4% and 28.5% respectively [20]. The high prevalence reported in other areas could have been due to reduced adherence to ART regimen in some patients, which may cause elevated viral load, resulting in immunocompromise and increased susceptibility to opportunistic parasites like *T. gondii*. Additionally, the increase of viral load further leads to the depletion of Cluster of Differentiation 4 positive (CD4+) cells, which weakens the patient's immune responses to opportunistic infections like *T. gondii*. The immune system is further depressed in patients with some comorbidities like high blood pressure and diabetes [21]. However, this low prevalence (6.8%) in our study could be attributed to the study site, which was one hospital (FRRH), yet the other studies were conducted over larger regions involving multiple hospitals. The low prevalence of *Toxoplasmosis* observed in this study may also suggest good ART coverage, leading to viral suppression and immune reconstitution (higher CD4 counts), which reduces the risk of opportunistic infections like *T. gondii*. It could also reflect limited sensitive diagnostic methods, and

the use of serology that misses latent infection, or failure to detect reactivation.

In this study, the factor associated with the prevalence of *Toxoplasmosis* was having pet cats at home (aOR=4.25, 95% CI=1.35-13.33, p = 0.013). This finding concurs with a study which showed that people with cats had a higher prevalence (26.7%), in comparison to individuals who did not have cats (8.9%) [15]. Having domesticated animals like cats and dogs has been indicated as one of the causes for *Toxoplasmosis* increase according to a study conducted in Cameroon [14]. Cats serve as the definitive host for *T. gondii* where it undergoes sexual reproduction, leading to the shedding of oocysts in their faeces that contaminate the environment, including soil and water sources [15]. These findings contradicted a report from Mettu Karl hospital in Ethiopia, which showed no statistical significance (p = 0.1306) between people with cats at home and acquiring *T. gondii* [22,23].

Limitations: the rapid *Toxoplasmosis* IgG/IgM antibody test used was unable to determine either the rate of antibody increase or the quantity of antibodies present in the sample. Furthermore, serological assays may cross-react with antibodies from related pathogens, resulting in false-positive results. IgM and IgG responses also vary depending on the pathogen and the individual, and seronegative window periods can lead to false-negative results during early infection. In addition, antibodies may persist long after the infection has resolved, making it difficult to distinguish past exposure from active disease. In contrast, quantitative molecular methods such as Polymerase Chain Reaction (PCR) can directly measure pathogen burden or gene expression, providing a more accurate snapshot of active infection due to their high sensitivity. Our study was conducted in a single regional referral hospital in a resource-limited setting, which may limit generalizability to some settings.

Conclusion

The study confirmed the presence of undiagnosed *Toxoplasmosis* among people living with HIV/AIDS and are on therapy in our study area, as indicated by the prevalence of 6.8%. The positivity of *Toxoplasmosis* was associated with the presence of reservoir hosts for this parasite, such as cats. Therefore, routine screening for *Toxoplasmosis* among people living with HIV/AIDS, deworming all the pets, and improved hygienic and sanitation practices in households with pets could help in the management and control.

What is known about this topic

- *Toxoplasmosis is a significant opportunistic infection in immunocompromised individuals, particularly those with HIV/AIDS, leading to severe complications like encephalitis;*
- *The burden of Toxoplasma gondii is high in sub-Saharan Africa, with varying seroprevalence rates reported across different regions;*
- *Risk factors include ingestion of undercooked meat, contact with contaminated soil or water, and exposure to infected host feces.*

What this study adds

- *This study establishes a seroprevalence of 6.8% for Toxoplasmosis among HIV/AIDS patients attending the ART clinic at Fort Portal Regional Referral Hospital in Western Uganda;*
- *It identifies the presence of cats in the household as a statistically significant risk factor (aOR = 4.25) for T. gondii infection in this specific setting;*
- *The findings highlight a need for targeted screening and health education regarding pet hygiene for HIV patients in the Rwenzori region of Uganda.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Adolf Busobozi: conceptualization, design of work, proposal writing, data collection, laboratory analysis, data analysis, interpretation of the data, manuscript drafting. Pascal Sekyanzi: data collection, interpretation of data, dissertation writing, and revision of the manuscript. Charles Nkubi Bagenda: data analysis, interpretation of the data, manuscript writing, and revision of the manuscript. Ronnie Ndizeye: research idea refining, design of work, literature review writing, and manuscript revision. Ayub Toko: design of work, laboratory method validation and verification, laboratory analysis oversight. Pauline Irumba: proposal and dissertation work design, literature review writing, and manuscript revision. Vicent Mwesigye: conceptualization, design of the dissertation work, interpretation of the data, and revision of the manuscript. Angella Tumwine: Design of work, laboratory method validation and verification, laboratory analysis co-overseer. Rogers Kalyetsi: conceptualization, design of the dissertation work, data analysis, interpretation of the data, and revision of the manuscript. All authors have read and approved the final version of this manuscript.

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Tables and figure

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Table 3: distribution of *Toxoplasmosis* seroprevalence by socio-demographic and behavioral characteristics among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368)

Table 3.1: distribution of *Toxoplasmosis* seroprevalence by socio-demographic and behavioral characteristics among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368)

Table 4: bivariate and multivariate logistic regression analysis of factors associated with *Toxoplasmosis* seropositivity among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368)

Figure 1: map of the catchment area for Fort Portal Regional Referral Hospital in Western Uganda, showing the counties served

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Table 1: socio-demographic characteristics of HIV/AIDS patients attending the ART clinic at Fort Portal Regional Referral Hospital, Western Uganda, May-June 2025 (N=368)

Variable	Frequency	Percentage (%)
Age (years): median (IQR)	42 (35-52)	
Age groups (years)		
1-16	18	4.9%
17-24	20	5.4%
25-34	51	13.9%
35-44	121	32.9%
45-54	88	23.9%
≥55	70	19.0%
Sex		
Female	231	62.8%
Male	137	37.2%
Marital status		
Married	184	50.0%
Single	184	50.0%
Education level		
Pre-primary	70	19.0%
Primary	194	52.7%
Secondary	58	15.8%
Tertiary	46	12.5%
Area of residence		
Rural	331	89.9%
Urban	37	10.1%
Employment status		
Employed	66	17.9%
Self employed	242	65.8%
Unemployed	60	16.3%

Table 2: seroprevalence of *Toxoplasma gondii* antibodies (IgG/IgM) among HIV/AIDS patients at Fort Portal Regional Referral Hospital, Western Uganda (N=368)

Result	Frequency	Percentage (%)
Positive	25	6.8%
Negative	343	93.2%

Table 3: distribution of toxoplasmosis seroprevalence by socio-demographic and behavioral characteristics among HIV/AIDS patients at Fort Portal Regional Referral Hospital (n=368)

Variable	N=368	Toxoplasmosis		p-value
		Negative (n=343)	Positive (n=25)	
Age (years): median (IQR)		42 (34-52)	43 (39-58)	0.16
Age groups (years)				0.098
1-16	18 (4.9%)	18 (100.0%)	0 (0.0%)	
17-24	20 (5.4%)	20 (100.0%)	0 (0.0%)	
25-34	51 (13.9%)	48 (94.1%)	3 (5.9%)	
35-44	121 (32.9%)	108 (89.3%)	13 (10.7%)	
45-54	88 (23.9%)	86 (97.7%)	2 (2.3%)	
≥55	70 (19.0%)	63 (90.0%)	7 (10.0%)	
Sex				0.77
Female	231 (62.8%)	216 (93.5%)	15 (6.5%)	
Male	137 (37.2%)	127 (92.7%)	10 (7.3%)	
Marital status				0.53
Married	184 (50.0%)	173 (94.0%)	11 (6.0%)	
Single	184 (50.0%)	170 (92.4%)	14 (7.6%)	
Education level				0.80
Pre-primary	70 (19.0%)	67 (95.7%)	3 (4.3%)	
Primary	194 (52.7%)	180 (92.8%)	14 (7.2%)	
Secondary	58 (15.8%)	54 (93.1%)	4 (6.9%)	
Tertiary	46 (12.5%)	42 (91.3%)	4 (8.7%)	
Area of residence				0.73
Rural	331 (89.9%)	309 (93.4%)	22 (6.6%)	
Urban	37 (10.1%)	34 (91.9%)	3 (8.1%)	
Employment status				0.81
Employed	66 (17.9%)	61 (92.4%)	5 (7.6%)	
Self employed	242 (65.8%)	227 (93.8%)	15 (6.2%)	
Unemployed	60 (16.3%)	55 (91.7%)	5 (8.3%)	
Work in soil-related activities				0.92
No	100 (27.2%)	93 (93.0%)	7 (7.0%)	
Yes	268 (72.8%)	250 (93.3%)	18 (6.7%)	
Viral load test done				0.90
1. No	143 (38.9%)	133 (93.0%)	10 (7.0%)	
2. Yes	225 (61.1%)	210 (93.3%)	15 (6.7%)	
If yes, viral load results				0.29
Detected	220 (97.8%)	206 (93.6%)	14 (6.4%)	
Not detected	5 (2.2%)	4 (80.0%)	1 (20.0%)	
Boil drinking water				0.26
No	138 (37.5%)	126 (91.3%)	12 (8.7%)	
Yes	230 (62.5%)	217 (94.3%)	13 (5.7%)	
If yes, how often				0.48
Every day	219 (95.2%)	207 (94.5%)	12 (5.5%)	
Once a week	11 (4.8%)	10 (90.9%)	1 (9.1%)	

Table 3.1: distribution of toxoplasmosis seroprevalence by socio-demographic and behavioral characteristics among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368)

Variable	N=368	Toxoplasmosis		p-value
		Negative (n=343)	Positive (n=25)	
Eat meat at home				0.49
No	38 (10.3%)	37 (97.4%)	1 (2.6%)	
Yes	330 (89.7%)	306 (92.7%)	24 (7.3%)	
If yes, how often				0.15
No	215 (58.4%)	197 (91.6%)	18 (8.4%)	
Yes	153 (41.6%)	146 (95.4%)	7 (4.6%)	
Work in a slaughterhouse				1.00
No	360 (97.8%)	335 (93.1%)	25 (6.9%)	
Yes	8 (2.2%)	8 (100.0%)	0 (0.0%)	
Having dogs at home				0.001
No	276 (75.0%)	264 (95.7%)	12 (4.3%)	
Yes	92 (25.0%)	79 (85.9%)	13 (14.1%)	
Having cats at home				<0.001
No	320 (87.0%)	305 (95.3%)	15 (4.7%)	
Yes	48 (13.0%)	38 (79.2%)	10 (20.8%)	
Having cattle at home				0.21
No	287 (78.0%)	270 (94.1%)	17 (5.9%)	
Yes	81 (22.0%)	73 (90.1%)	8 (9.9%)	
Having sheep at home				0.54
No	336 (91.3%)	314 (93.5%)	22 (6.5%)	
Yes	32 (8.7%)	29 (90.6%)	3 (9.4%)	
Having poultry at home				0.037
No	162 (44.0%)	156 (96.3%)	6 (3.7%)	
Yes	206 (56.0%)	187 (90.8%)	19 (9.2%)	
Frequency of rain				0.12
1-2 times in a week	124 (33.7%)	112 (90.3%)	12 (9.7%)	
Once a week	244 (66.3%)	231 (94.7%)	13 (5.3%)	

Table 4: bivariate and multivariate logistic regression analysis of factors associated with Toxoplasmosis seropositivity among HIV/AIDS patients at Fort Portal Regional Referral Hospital (N=368)

Variable	Bivariate	Multivariate		
	cOR (95%CI)	p-value	aOR (95%CI)	p-value
Age	1.03 (1.00 - 1.06)	0.054	1.04 (0.10 - 1.08)	0.062
Sex				
Female	1.00		1.00	
Male	1.33 (0.49 - 2.60)	0.767	0.71 (0.27 - 1.85)	0.482
Marital status				
Single	1.00			
Married	0.77 (0.34 - 1.75)	0.535		
Education level				
Pre-primary	1.00		1.00	
Primary	0.74 (0.50 - 6.24)	0.397	2.84 (0.70 - 11.45)	0.143
Secondary	1.65 (0.40 - 7.71)	0.522	3.71 (0.65 - 21.16)	0.140
Tertiary	2.3 (0.45-9.98)	0.339	3.46 (0.64 - 18.80)	0.151
Area of residence				
Urban	1.00		1.00	
Rural	0.81 (0.23 - 2.83)	0.738	0.41 (0.10 - 1.68)	0.217
Employment status				
Unemployed	1.00			
Employed	0.90 (0.25 - 3.30)	0.875		
Self employed	0.73 (0.30-0.553)			
Work in soil related activities				
No	1.00		1.00	
Yes	0.96 (0.40 - 2.36)	0.923	0.78 (0.29 - 2.10)	0.617
Viral load test done				
Yes	1.00			
No	1.05 (0.46 - 2.41)	0.903		
Boil drinking water				
Yes	1.00		1.00	
No	1.59 (0.70 - 3.59)	0.265	1.81 (0.74 - 4.46)	0.197
Eat meat at home				
No	1.00		1.00	
Yes	2.90 (0.38-22.07)	0.303	3.53 (0.40 - 31.18)	0.256
Having dogs at home				
No	1.00		1.00	
Yes	3.62 (1.59 - 8.25)	0.002	1.85 (0.60 - 5.77)	0.288
Having cats at home				
No	1.00		1.00	
Yes	5.35 (2.25 - 12.75)	<0.001	4.25 (1.35 - 13.33)	0.013
Having cattle at home				
No	1.00		1.00	
Yes	1.74 (0.72 - 4.19)	0.217	0.67 (0.21 - 2.17)	0.503
Having sheep at home				
No	1.00			
Yes	1.48 (0.42 - 5.23)	0.546		
Having poultry at home				
No	1.00		1.00	
Yes	2.64 (1.03 - 6.78)	0.043	2.10 (0.65 - 6.73)	0.214
Frequency of rain				
Once a week	1.00		1.00	
1-2 times a week	1.90 (0.84 - 4.31)	0.122	2.21 (0.90 - 5.47)	0.086

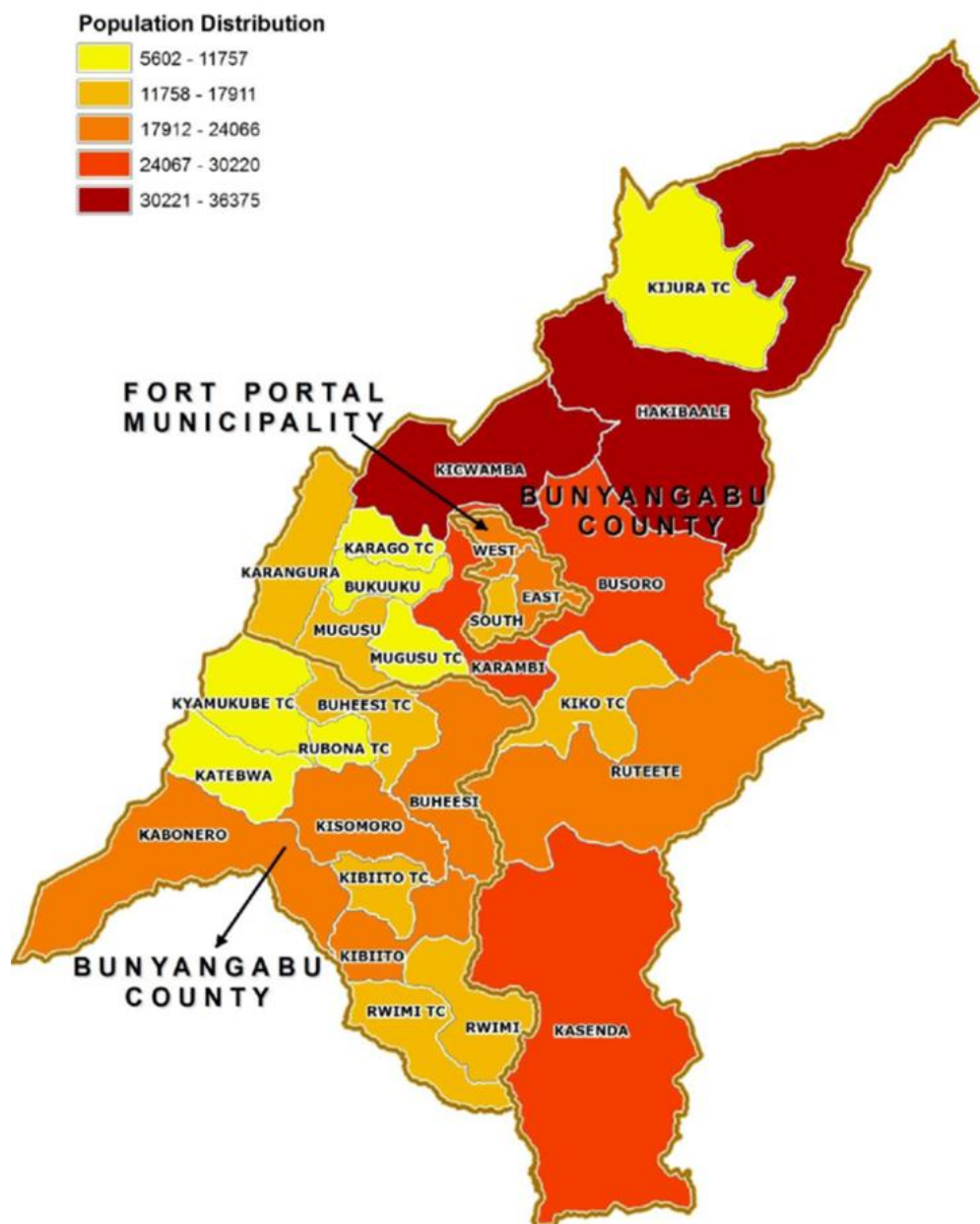


Figure 1: map of the catchment area for Fort Portal Regional Referral Hospital in Western Uganda, showing the counties served