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Community knowledge, attitudes, and practices about toxoplasmosis in Unguja Island, Tanzania

Cynthia Mshindi Paul[1*], Ernatus Martin Mkupasi[1], Martin John Martin[2], Abdul Selemani Katakweba[2]

Abstract

Background: Toxoplasmosis is among the globally neglected zoonotic diseases caused by *Toxoplasma gondii*. Humans get infected after ingesting or coming into contact with oocysts from the feces of infected cats. Illiteracy about the infection is one of the significant risk factors for its transmission. The study aimed to determine the community knowledge, attitudes, and practices that influence toxoplasmosis transmission in Unguja Island, Zanzibar, Tanzania.

Methods: The study used a cross-sectional design, which was done from February to April 2023. Semi-structured questionnaires collected data on 139 respondents' demographics, practices, knowledge, and attitudes regarding toxoplasmosis. The chi-square test was used to assess the statistical association between variables at a p-value of < 0.05.

Results: Out of 139 recruited respondents, only 18.0% of respondents were aware of Toxoplasmosis. The study revealed several risk factors for Toxoplasmosis transmission, whereby 63.1% of the cat owners didn't deworm their cats regularly, 70.8% didn't clean the cat kennels, and 53.1% didn't wash their hands after cleaning kennels and touching a cat. Furthermore, out of all respondents, about two-thirds didn't drink treated water and 87.8% ate raw vegetables as salads. The study revealed both negative and positive attitudes concerning Toxoplasmosis, where 64.7% of respondents thought that cats cannot transmit pathogens to humans and 66.2% did not agree with people interacting with stray cats, respectively. There was an association of awareness of the disease's existence with high education levels (P value = 0.001) and sex (females) (P = 0.002).

Conclusion: The study revealed a low awareness of the existence of the infection despite the higher interaction of cats with humans in the study area. We recommend the provision of public health education focusing on how the disease is transmitted, the relationship of the disease with cats, the management of cat feces, clinical signs of the disease, its treatment, and control.

Keywords: Attitude, Practices, Knowledge, Toxoplasmosis, Unguja Island, Zanzibar, Tanzania

Correspondence: Cynthia Mshindi Paul (cindysmiles757@gmail.com)

[1]Department of Veterinary Medicine and Public Health, Sokoine University of Agriculture, P. O. Box 3021, Morogoro, Tanzania

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Background

Toxoplasmosis is an infection caused by an intracellular protozoan parasite *T. gondii*. Since its discovery in 1908 by scientists in North Africa and Brazil [1], *T. gondii* has been shown to affect most warm-blooded animals, including humans, hence causing a zoonotic disease [2]. Warm-blooded animals such as cattle, pigs, rodents, and animals serve as the parasite's intermediate hosts, whereas felids are its definitive hosts [3]. Humans get infected after ingesting contaminated food, water, or vegetables containing oocysts from the feces of infected cats or consuming undercooked meat that contains viable tissue cysts of the parasite. Many countries have demonstrated a prevalence rate between 10% and 30% due to consumption of undercooked pork [4]. Eating undercooked, infected meat is thought to be the cause of between 30% and 60% of the infection in pregnant women [5]. Congenital infection of *T. gondii* can also occur vertically from the mother to the fetus through the placenta [6]. Other means of infection include blood transfusion and organ transplant [7, 8]. Rodents and shrews serve as reservoir hosts of various pathogens, including *T. gondii* [9], and they are crucial in their transfer to humans, other animals, and even their predators, like cats [10]. Direct transmission of toxoplasmosis from rodents to humans can occur when rodents are used as a source of food [11]. Several studies indicate the presence of Toxoplasmosis in rodents, including a study conducted in Mbeya, Tanzania which revealed a seroprevalence of 8.7% in rodents [12].

In humans, only 10%-30% of toxoplasma infections are symptomatic, and swollen lymph nodes, which can occasionally be linked to lung complications, headaches, fever, muscle aches, and anemia, are the most common symptoms. Toxoplasmosis is however a serious infection in patients who are immunocompromised including people with cancer, HIV/AIDS, and organ transplant recipients [13]. Toxoplasma encephalitis, which manifests as obstructive hydrocephalus and ventriculitis in AIDS patients, can be caused by *T. gondii* [14]. *T. gondii* can result in abortion, stillbirth, miscarriage, or problems related to the central nervous system in pregnant women after the initial infection [15]. Cattle, sheep, and goats are among the animals that are most susceptible to infection due to oocyst ingestion or inhalation from food or water sources [16]. Toxoplasmosis infection in livestock can result in economic losses due to reproductive failure including abortion, barrenness, and fetal resorption [17]. Among domestic animals in Malaysia, dogs had a seroprevalence of *T. gondii* of 9.6%, cats of 14.5%, goats of 35.5%, and cattle of 6.3% [18]. The global seroprevalence of *T. gondii* in humans varies from 1% to 100% based on environmental and socioeconomic factors, including eating habits, host susceptibility, general hygiene, soil humidity, and geographic location [19]. Due to a lack of knowledge about the prevalence in many African regions, toxoplasmosis is one of the neglected tropical diseases associated with poverty [20]. In Africa, the prevalence of toxoplasmosis is highest in Central Africa, followed by East Africa [21]. Only 17.0% of respondents to research done in Tanzania's Mbeya district were aware of Toxoplasmosis. This indicates a low level of awareness of the infection [22]. Studies conducted in the Tanzania mainland indicate a low level of awareness concerning toxoplasmosis while 0.08% of the total deaths that occurred in hospitals from 2006–2015 in the Tanzania mainland were attributed to Toxoplasmosis [23]. The aim of this study was to determine the community knowledge, attitudes, and practices that contribute to the spread of toxoplasmosis in humans living in Unguja Island for the purpose of raising awareness. The information is useful in setting appropriate control measures to control this zoonotic infection in the community.

Methods

Study area

Unguja is an Island with 1,666 Km^2 located on the eastern coast of Tanzania's mainland (6° 08′ 26.00" S, 39° 20′ 11.57" E) with a population of 1,346,332 people [24]. It is characterized by an equatorial and humid climate with relatively stable temperatures year-round, averaging between 25°C and 30°C, with high humidity levels often exceeding 80%. People living in Unguja depend on several sources of income including activities based on agriculture, animal husbandry, seaweed farming, and fishing. Unguja Island comprises three regions: Mjini Magharibi, Kaskazini Unguja, and Kusini Unguja and all seven districts were included in this study; which are Magharibi A, Magharibi B, Kati, Mjini, Kaskazini A, Kaskazini B and Kusini. (Fig. 1).

Study design and sampling strategies

This cross-sectional study was conducted in Unguja Island, Zanzibar from February 2023 to April 2023. A random sampling of different households within selected shehia was done for a questionnaire survey in order to determine community knowledge, attitude, and practices with regard to toxoplasmosis. The questionnaire was based on determining the demographic characteristics (age, sex, educational level, and occupation), knowledge about toxoplasmosis (signs and symptoms, mode of transmission), and attitude and practices toward toxoplasmosis transmission. A total of 28 Shehia were selected as follows: Magharibi A (Dole, Masingini, Kianga, and Mtoni), Magharibi B (Mombasa, Mwanakwerekwe, Kiembe Tamaki, and Nyamanzi) Kati (Binguni, Tunduni, Chwaka, and Mchangani), Mjini (Jang'ombe, Kikwajuni, Malindi, and Kiponda), Kaskazini A (Bandamaji, Kinyasini, Potoa and Kikobweni), Kaskazini B (Fujoni, Mangapwani, Mkataleni, and Mahonda), Kusini (Bwejuu, Paje, Kajengwa, and Nganani).

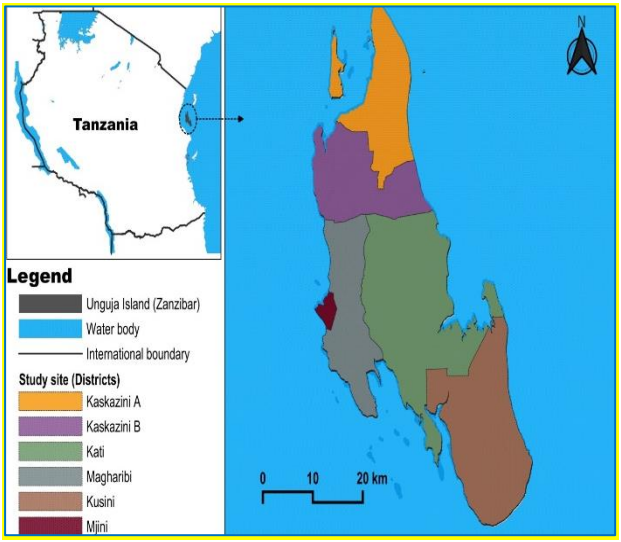

Figure 1: Map of Unguja Island showing surveyed districts
Source: Qgis 3.34.1 – Prizren; EPSG: 4326 – WGS 84

Sample size

The sample size was estimated using Slovin's equation with a 95% confidence level (n=N/ (1 + Ne2)).
Whereby n = estimated sample size, N=Population size, which is 1,346,332 people [24], and e= acceptable error set at 5%/.
An estimate of 200 participants was obtained, however, 139 participants were selected due to inclusion and exclusion criteria. From each district, four shehia were randomly selected. Within each selected shehia, five households were chosen through random sampling. Finally, from each of these households, one respondent was selected to participate in the study. The inclusion criteria were: for a person to qualify for the survey, they must be 18 years old and above, be a member of the selected shehia for the research, and willingness to participate.

Study tool

The survey involved a semi-structured questionnaire that was administered by interview, and the responses were recorded. The questionnaire was based on determining the demographic characteristics (age, sex, educational level, and occupation), knowledge about toxoplasmosis (signs and symptoms, mode of transmission), and attitude and practices toward toxoplasmosis transmission [25]. The interview was done using a written questionnaire, in which 139 (100%) respondents agreed to answer the questions provided. In every district, about 20 (14.4%) respondents were sampled randomly to be interviewed.

Dependent and independent variables

The dependent variables were knowledge, practices, and attitudes impacting infection transmission, while the independent variables were age, education level, sex, marital status, and occupation. The role of the intermediate and definitive hosts in transmission was considered. When interpreting the mean percentage of scores for community knowledge of toxoplasmosis, respondents' knowledge was classified as either high or low depending on whether the mean score was less than or greater than 50% [22, 26, 27].

Statistical analysis

The survey data were coded and entered in Statistical Product and Service Solutions (SPSS) software, formerly known as Statistical Package for Social Sciences version 25, developed by IBM Corporation in 2017, and descriptive statistics were computed. The association between demographic characteristics, knowledge, and practices of the respondents towards toxoplasmosis was measured using a chi-square test; whereas variables with a p-value ≤ 0.05 were considered statistically significant [28].

Results

Socio-demographic characteristics of study participants

Out of 139 respondents, 83 (59.7%) were males and 56 (40.3%) were females. The majority 52 (37.4%) of respondents aged between 26 and 35 years and only 1.4% were above 66 years old. About 69 (49.6%) respondents attended secondary education, while 23 (16.5%) attended college/university level. About half of the respondents were self-employed, 70 (50.4%) (Table 1).

Knowledge of Toxoplasmosis

To assess knowledge of Toxoplasmosis, respondents were asked if they had heard about the infection before. Those who heard about it were further asked about their source of information and if they knew how the infection is transmitted, its clinical signs, and treatment. The results obtained are summarized in Table 2.

Practices that influence the risks of Toxoplasmosis transmission

To determine the risks of toxoplasmosis infection transmission from the intermediate hosts, respondents were asked if they eat or if they control rodents and the methods used to control rodents (Table 3). Respondents were also asked if they boil water, eat raw vegetables, or drink raw milk, in order to assess the risks of contracting *T. gondii* infection from the environment (Table 4). Also to determine the risks of *T. gondii* transmission from the definitive hosts, respondents were asked if they owned a cat. Those who owned cats were asked if they deworm their cats regularly, how they feed their cats, how they dispose of cat litter, and if they clean cat kennels. Interaction between intermediate and definitive hosts was assessed, whereas cat owners were asked if they keep their cats outdoors, indoor, or both indoors and outdoors. They were also asked if their cats hunt, capture, or eat rodents. Moreover, hygienic practices such as washing hands after touching a cat and wearing gloves during the cleaning of gardens were asked of the cat owners and all respondents respectively (Table 5).

Table 1. Sociodemographic characteristics of respondents (n=139).

Variables	Categories	Respondents	Percent (%)
Age groups	18 - 25 Years	21	15.1
	26 - 35 Years	52	37.4
	36 - 45 Years	33	23.7
	46 - 55 Years	24	17.3
	56 - 65 Years	7	5.0
	Above 66 Years	2	1.4
Sex	Female	56	40.3
	Male	83	59.7
Marital status	Single	31	22.3
	Married	102	73.4
	Separated/Divorced	4	2.9
	Widow	2	1.4
Education level	Informal education	2	1.4
	Primary education	34	24.5
	Secondary education	69	49.6
	Advanced education	11	7.9
	College/University	23	16.5
Occupation	Peasant	19	13.7
	Formally employed	33	23.7
	Self-employed	70	50.4
	Business	13	9.4
	Housewife	3	2.2
	Retired	1	0.7

Table 2: Knowledge of Toxoplasmosis among respondents (n=139).

Variables	Categories	Respondents	Percent (%)
Have you ever heard of a disease called Toxoplasmosis?	No	114	82.0
	Yes	25	18.0
If Yes: Where did you get the information?	Newspaper	5	20.0
	Television	1	4.0
	Radio	2	8.0
	Health facility/worker	14	56.0
	Social network	3	12.0
If you heard about Toxoplasmosis: Do you know how the disease is transmitted?	Yes	20	80.0
	No	5	20.0
If Yes: How is the disease transmitted?	Contact with cat feces	14	56.0
	Ingestion of contaminated food	5	20.0
	Using rodents as a source of food	1	4.0
	I don't know	5	20.0
If you heard about Toxoplasmosis: Do you know the clinical signs associated with Toxoplasmosis?	Yes	13	52.0
	No	12	48.0
If Yes: mention?	Fever	6	24.0
	Loss of appetite	2	8.0
	Abortion	5	20.0
	I don't know	12	48.0
If you heard about Toxoplasmosis: Do you know any treatment for Toxoplasmosis?	Yes	7	28.0
	No	18	72.0
If Yes: explain	Use of antibiotics	7	28.0
	I don't know	18	72.0

Table 3: Rodent control practices (n=139).

Variables	Categories	Respondents	Percent (%)
Do you use rodents as a food source?	No	139	100
Do you control rodents around the house?	Yes	109	78.4
	No	30	21.6
If yes, specify the methods of controlling rodents	Cats	26	23.9
	Poison	27	24.8
	Traps	21	19.3
	Cats and poison	9	8.3
	Poison and traps	16	14.7
	Cats and traps	9	8.3
	Cats, poison, and traps	1	0.9

Table 4: Food and water consumption practices among respondents (n=139)

Variables	Categories	Respondents	Percent (%)
Do all members of the house drink boiled/bottled water?	Yes	34	24.5
	No	105	75.5
Do you eat the undercooked meat from other animals? (beef, goat, sheep, poultry)	Yes	20	14.4
	No	119	85.6
Do you eat raw vegetables as salad?	Yes	122	87.8
	No	17	12.2
Do you drink raw milk?	Yes	55	39.6
	No	84	60.4

Attitude towards Toxoplasmosis transmission

In order to know the attitudes of respondents towards Toxoplasmosis transmission, they were asked about their thoughts on the ability of cats to transmit disease pathogens to humans and if people should interact with stray cats. They were also asked about their thoughts on the ability of other animals such as cows, goats, and sheep to transmit diseases to humans. Those who agreed were asked about the methods of transmission. Lastly, respondents' opinions concerning the severity of Toxoplasmosis in their respective areas were asked. The results obtained are summarized in Table 6.

Statistical inference of variations in awareness of the infection within categorical demographic variables

The findings revealed that awareness of the infection varied statistically significantly across two of the sociodemographic variables examined (p-value ≤ 0.05). Education level and sex were the variables that displayed a statistically significant variation in the awareness of this infection's existence (Table 7).

Table 5: Cat ownership and hygiene practices (n=130)

Variables	Categories	Respondents	Percent (%)
Do you own a cat? (n=139)	Yes	130	93.5
	No	9	6.5
If you own a cat: Do you normally deworm your cat? (n=130)	Yes	48	36.9
	No	82	63.1
If you own a cat: How do you feed your cat? (n=130)	Do nothing	13	10.0
	Leftovers from slaughter slab	3	2.3
	Milk	26	20.0
	Home-made foodstuffs	41	31.5
	Leftovers from slaughter slabs and milk	37	28.5
	Milk and home-made foodstuffs	5	3.8
	Leftovers from slaughter slabs and home-made foodstuffs	5	3.8
If you own a cat: Is your cat an indoor cat or an outdoor cat? n=130)	Outdoor	64	49.2
	Indoor	47	36.2
	Indoor and outdoor	19	14.6
If you own a cat: Does your cat normally hunt, capture, and eat rodents? n=130)	Yes	71	54.6
	No	59	45.4
If you own a cat: How do you dispose of cat litter materials? n=130)	Do nothing	74	56.9
	Boxes	30	23.1
	Garden	17	13.1
	Throw outside	9	6.9
If you own a cat: Do you normally clean the cat kennels with protective gear? n=130)	Yes	38	29.2
	No	92	70.8
If you own a cat: Do you wash your hands after touching a cat? n=130)	Yes	61	46.9
	No	69	53.1
Do you always wear protective gear during the	Yes	19	13.7
cleaning of gardens? n=139)	No	120	86.3

Table 6: Attitude towards Toxoplasmosis transmission

Variables	Categories	Respondents	Percent (%)
Do you think that cats can transmit disease pathogens to humans? (n=139)	Yes	49	35.3
	No	90	64.7
If yes, mention disease pathogens (n=49)	I don't know	9	18.4
	Toxoplasmosis	5	10.2
	Rabies	17	34.7
	Toxoplasmosis and rabies	7	14.3
	Asthma	5	10.2
	Worms	3	6.1
	Toxoplasmosis and worms	3	6.1
Should people interact with stray cats? (n=139)	Yes	47	33.8
	No	92	66.2
Do you think that other animals (e.g., cows, goats, and sheep) can transmit disease pathogens to humans? (n=139)	Yes	64	46.0
	No	75	54.0
If yes, how? (n=64)	Contact	13	20.3
	Drinking raw milk	1	1.6
	Eating undercooked meat	13	20.3
	Contact and eating undercooked meat	11	17.2
	Contact and drinking raw milk	5	7.8
	Drinking raw milk and eating undercooked meat	13	20.3
	Inhalation and contact	2	3.1
	Inhalation, contact, drinking and eating	2	3.1
	I don't know	4	6.3
In your opinion, based on your area how severe do you think Toxoplasmosis is? (n=139)	I don't know	104	74.8
	Low	35	25.2

Table 7: Association between social demographic characteristics and knowledge of Toxoplasmosis (n=139)

Have you ever heard of a disease called Toxoplasmosis?				
Variables	**Categories**	**No**	**Yes**	**Chi-square (P value)**
Age groups	18-25 Years	15 (10.79%)	6 (4.32%)	**0.323**
	26-35 Years	42 (30.21%)	10 (7.19%)	
	36-45 Years	30 (21.58%)	3 (2.16%)	
	46-55 Years	21 (15.12%)	3 (2.16%)	
	56-65 Years	5(3.60%)	2 (1.44%)	
	Above 66 Years	1 (0.72%)	1 (0.72%)	
Sex	Female	39 (28.06%)	17 (12.23%)	**0.002**
	Male	75 (53.96%)	8 (5.75%)	
Marital status	Single	25 (17.98%)	6 (4.32%)	**0.510**
	Married	84 (60.43%)	18 (12.95%)	
	Separated/divorced	4 (2.88%)	0 (0.00%)	
	Widow	1 (0.72%)	1 (0.72%)	
Education level	Informal education	2 (1.44%)	0 (0.00%)	**0.001**
	Primary education	31 (22.30%)	3 (2.16%)	
	Secondary education	61 (43.88%)	8 (5.75%)	
	Advanced education	5 (3.60%)	6 (4.32%)	
	College/university	15 (10.79%)	8 (5.75%)	
Occupation	Peasant	16 11.51%)	3 (2.16%)	**0.068**
	Formally employed	23 (16.55%)	10 (7.19%)	
	Self-employed	60 (43.16%)	10 (7.19%)	
	Business	12 (8.63%)	1 (0.72%)	
	Housewife	3 (2.16%)	0 (0.00) %	
	Retired	0 (0.00%)	1 (0.72%)	

Discussion

This study aimed to determine the level of community awareness, attitudes and practices concerning Toxoplasmosis that pose a risk towards toxoplasmosis transmission in Unguja Island, Tanzania. About 25 (18.0%) of the respondents in the study had heard of Toxoplasmosis, indicating a low level of knowledge of the infection. This suggests that there is a higher chance of toxoplasmosis transmission because many respondents were unaware of the infection's transmission mechanism and had never heard of it. In the Mbeya district, a similar finding was observed, with only 17% of respondents knowing about the infection [29]. Low levels of community awareness concerning Toxoplasmosis have also been demonstrated in Saudi Arabia [30] and Bangladesh [31], with the percentage of people who had sufficient knowledge being 20.9% and 22.18%, respectively. The low level of information in Tanzania is probably associated with fewer educational and public health programs that aim to increase awareness concerning neglected tropical diseases including Toxoplasmosis. The low level of information concerning toxoplasmosis in this study is furthermore related to low educational levels whereby the majority studied up to the secondary level, followed by the primary level. These results are in line with other studies that reported that insufficient knowledge of toxoplasmosis is due to low education levels in Casablanca and Morocco, Iraq and Dar es Salaam, Tanzania [32–34]. This study also revealed higher risks of humans contracting toxoplasmosis because of their interaction with cats and rodents. A total of 130 (93.5%) respondents owned cats and out of those, 71 (54.6%) respondents used their cats to control rodents. It has been shown that people who own cats are at greater risk of contacting Toxoplasmosis infection compared to those who don't [35]. The present study also revealed several practices that increase the risk of contracting the infection, whereby 82 (63.1%) respondents who owned cats didn't deworm their cats regularly, 92 (70.8%) didn't clean the cat kennels, 69 (53.1%) didn't wash their hands after touching a cat, and many of them didn't have cat litter materials. This indicates that there is a high probability for the cat owners to come into contact with cat feces which increases the chances of getting infected with toxoplasmosis [36]. Also, the majority of the cat owners, 64 (49.2%), practiced outdoor keeping of cats, which is one of the risk factors for transmission of Toxoplasmosis to humans. These indoor-outdoor cats can acquire Toxoplasmosis from the environment or through ingestion of infected prey and later on transmit the disease to their owners [37]. Other factors that increase the risks of contracting Toxoplasmosis from the surroundings include drinking untreated water, eating raw vegetables, drinking unboiled milk, and eating raw or undercooked meat from animals that have been infected with Toxoplasmosis such as goats, sheep, and poultry [38]. In the present study, many respondents didn't drink boiled or bottled water, and 122 (87.8%) ate raw vegetables as salads. However, many respondents practiced good practices such as eating well-cooked meat 119 (85.6%) and drinking boiled milk 84 (60.4%). Such practices are useful in decreasing the risks of contracting Toxoplasmosis and should be encouraged in the communities. The present study revealed both negative and positive attitudes concerning Toxoplasmosis prevention/control. Most of the respondents, 90 (64.7%) thought that cats cannot transmit pathogens to humans. This increases the risks of disease transmission because people would come into contact with cats thinking that they could not obtain any infection from them. However, many respondents, 92 (66.2%) did not agree with people interacting with stray cats because stray cats can easily transmit diseases since they don't get veterinary care. A study conducted in Pakistan revealed a higher prevalence of *T. gondii* in stray cats compared to pet cats [39]. The study further showed a statistically significant variation in awareness regarding the infection with education level and sex (p-value ≤ 0.05). Similar observations were made in Morocco, whereby participants in higher educational levels were more likely to be aware of

Toxoplasmosis compared to lower educational levels [32]. The significant association of knowledge of the existence of the disease with sex in this study indicated that females are more likely to be aware than males. This is, however, in contrast with observations made in the Mbeya district, where male respondents were more knowledgeable than females [22]. The variations in these results may be due to the differences in cultures, occupations, and educational backgrounds of study participants. The present study faced limitations regarding differences in religious beliefs, cultural beliefs, socioeconomic status, and access to healthcare services which influenced respondents' understanding and perceptions of toxoplasmosis, as well as their health-related practices.

Conclusion

The study revealed low community awareness of the existence of Toxoplasmosis despite the higher interaction of cats and rodents with humans in the study area. Other risk factors observed include irregular deworming of cats, poor handling of cat feces, eating raw vegetables, and drinking untreated water. People should be educated about how the infection is transmitted, its clinical signs, treatment, and control of the disease. We also recommend similar studies be conducted in Pemba and Unguja Islands, targeting pregnant women and health providers.

Abbreviation

SUA: Sokoine University of Agriculture; HIV: Human immunodeficiency virus; AIDS: Acquired immunodeficiency syndrome; OCGS: Office of the Chief Government Statistician; ZALIRI: Zanzibar Livestock Research Institute; NBS: National Bureau of Statistics; ACE: African Centre of Excellence; BTD: Biosensor Technology Development; IRPM: Innovative Rodent Pest Management; CDC: Centre for Disease Control and Prevention

Declaration

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Availability of data and materials

Data will be available by emailing cindysmiles757@gmail.com

Authors' contributions

Cynthia M Paul (CMP) is a principal investigator involved in data collection, analysis, interpretation, and article writing. Ernatus Martin Mkupasi (EMM), Martin John Martin (MJM), and Abdul S. Katakweba (ASK) were responsible for drafting and reviewing the article.

Ethics approval and consent to participate

The Sokoine University of Agriculture Research Ethics Committee granted ethical clearance for this study, with reference number DPRTC/R/186/24. The Zanzibar Livestock Research Institute (ZALIRI) revised and approved the research protocols, and on February 24, 2023, the Office of the Chief Government Statistician (OCGS) and the Research Committee of the Office of the Second Vice President granted permission to conduct research in Zanzibar. The reference number for this permission was 63F74AA424AF2. Furthermore, verbal consent was obtained from heads of households selected in the study.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

Author Details

[1]Department of Veterinary Medicine and Public Health, Sokoine University of Agriculture, P. O. Box 3021, Morogoro, Tanzania.
[2]African Centre of Excellence for Innovative Rodent Pest Management and Biosensor Technology Development (ACE IRPM and BTD). Institute of Pest Management, Sokoine University of Agriculture, Morogoro, Tanzania.
[3] Institute of Pest Management, Sokoine University of Agriculture, P. O. Box 3110, Morogoro, Tanzania.

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