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Identification of Toxoplasma Gondii in The Feces of Domestic Cats in Watukumpul Village, Watukumpul District, Pemalang Regency

Abdul Ghofur[1], Ivan Wahyu Juniawan[1]
[1]*Akademi Analis Kesehatan Pekalongan, Indonesia*

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Corresponding Author :
Ivan Wahyu Juniawan
E-mail :
ivanwahyu260@gmail.com
Phone Number : 087845963502

ABSTRACT

Background & Objective: Cats can transmit toxoplasmosis, which is caused by the parasite *Toxoplasma gondii*. Toxoplasmosis can be transmitted from animals to humans and has serious consequences, especially for pregnant women and individuals with weakened immune systems. The sedimentation method is one way to detect the presence of *Toxoplasma gondii* oocysts in feces by using a solution with a lower specific gravity than the oocysts and utilizing centrifugal force, causing the parasites to settle at the bottom. This study aims to determine whether *Toxoplasma gondii* is present in the feces of domestic cats in Watukumpul Village, thereby providing useful information for the prevention and control of toxoplasmosis. **Method:** This study is a descriptive study, where the researcher identifies the presence of *Toxoplasma gondii* in domestic cat feces that can cause toxoplasmosis. **Result:** The results of *Toxoplasma gondii* identification using the sedimentation method on 12 samples of domestic cat feces in Watukumpul Village were all negative (100%). **Conclusion:** Therefore, based on the results of the identification of *Toxoplasma gondii* in 12 samples of domestic cat feces in Watukumpul Village, it can be concluded that all (100%) were not infected with *Toxoplasma gondii*.

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Introduction

Cats (*Felis catus / Felis domesticus*) are wild animals, but around 3,600 BC, ancient Egyptians began using cats to protect their farmlands from rodent pests. Due to this success, the ancient Egyptians eventually domesticated cats by taming them, feeding

them, and providing them with shelter. Eventually, cats became popular among the people. (Balwin, 1995)

As time progressed, the popularity of cats led to a continuous increase in the number of cat enthusiasts in Indonesia. Each year, the number of cat owners continues to grow, primarily because cats have an adorable physical appearance and charming behavior, making them beloved by people and chosen as pets. (Siagian et al., 2023) However, behind all this beauty lies a disease that can be transmitted, one of which is toxoplasmosis. Toxoplasmosis is a disease caused by a protozoan parasite known as *Toxoplasma gondii*. (Triana, 2015)

Toxoplasmosis is a zoonotic disease that can be transmitted from animals to humans and vice versa. This disease is caused by the protozoan *Toxoplasma gondii*. (Kravetz JD, 2005) *Toxoplasma gondii* is a parasite that can live in the host's body tissues and can infect all warm-blooded animals, mammals, birds, and humans. (J.P.Dubey, 2009) The three main routes of transmission of toxoplasmosis infection in humans are through food consumption (eating meat infected with *Toxoplasma gondii* cysts), transmission from animals to humans (ingesting oocysts from the feces of infected cats), and transmission from mother to child (congenital infection through the placenta during pregnancy). (Robert-Gangneux & Dardé, 2012) Toxoplasmosis, an infection caused by a parasite, is generally not life-threatening and rarely receives public attention, so people tend to ignore it until the disease enters a chronic phase. (Suparman, 2013) *Toxoplasma gondii* is a protozoan that typically causes asymptomatic infections, mononucleosis-like syndrome, retinochoroiditis, or congenital infections in individuals with strong immune systems. However, it most commonly presents as toxoplasmic encephalitis in HIV patients with severely weakened immune systems (Luft BJ, Conley F, Remington JS, 1983; Luft BJ, Hafner R, Korzun AH, 1993; Suparman, 2013; Wong B, Gold JW, Brown AE, 1984). Pregnant women are a group that is more susceptible to toxoplasmosis infection. (Larasati, P., & Sudarmaja, 2017) The risks that can occur if a pregnant woman is infected with *Toxoplasma gondii* include miscarriage, hydrocephalus, microcephaly, and deafness. On the other hand, the effects on the baby may include psychomotor retardation, intellectual disabilities, epilepsy, and autism spectrum disorders. (Fallahi, S., Rostami, A., Nourollahpour Shiadeh, M., Behniafar, H., & Paktinat, 2018).

It is estimated that approximately 25 to 30% of the global population is infected with *Toxoplasma gondii*. (Montoya, 2004) In fact, prevalence varies significantly by country, ranging from 10 to 80%, and even between different communities within the same region. Low seroprevalence of 10 to 30% has been observed in North America, Southeast Asia, Northern Europe, and Sahelian countries in Africa. Moderate prevalence of 30 to 50% has been found in Central and Southern European countries, and high prevalence has been found in Latin America and tropical African countries. (Robert-Gangneux & Dardé, 2012) According to a journal on environmental health written by Rachmawati, the positive detection rate of *Toxoplasma gondii* in humans in Indonesia is approximately 53%. (Rachmawati, 2019).

Based on previous research on toxoplasmosis by Nurnaningsih conducted in Jombang using cat feces samples, out of 21 samples, 9 tested positive for *Toxoplasma gondii*. (Nurnaningsih, 2017) These findings are supported by Fadhlullah et al., who detected *Toxoplasma gondii* in domestic cats, with 1 out of 20 samples testing positive for *Toxoplasma gondii*. (Fadhlullah Mursalim et al., 2018) However, in another study

conducted by Rahman and Nur, all 17 samples of domestic cat feces tested negative (Rahman & Nur, 2022).

Objective

The purpose of this study was to determine whether *Toxoplasma gondii* was present in the feces of domestic cats in Watukumpul Village.

Method

This study used a descriptive research design. The population in this study consisted of all domestic cats in Watukumpul Village, totaling 12 domestic cats. Samples were taken using total sampling (census) with purposive sampling based on the following criteria:

1. Inclusion criteria
   a. Domestic cats in the Rt 02/04 Watukumpul area, Watukumpul subdistrict, Pemalang district.
   b. Cats aged at least 2 months.
   c. Domestic cats that like to hunt small animals.
   d. Domestic cats that have not received the *Toxoplasma gondii* vaccine.
2. Exclusion criteria
   The exclusion criteria for this study are: domestic cats that have been vaccinated against *Toxoplasma gondii* prior to sample collection.

The study was conducted from September 2024 to February 2025 in the RT 02/04 Watukumpul area of Watukumpul Subdistrict, Pemalang Regency. Samples were examined using the sedimentation method and then observed microscopically. The data in this study were obtained from primary and secondary sources. Primary data were collected through observation techniques, questionnaires, and laboratory examination results for *Toxoplasma gondii*. Secondary data were obtained from literature reviews, research journals, official websites of the Ministry of Health and WHO, and books. The collected data were then entered into a results table, calculated as percentages, and described to determine the presence of *Toxoplasma gondii* in cat feces in Watukumpul Village. The percentage calculation used the following formula:

Percentage of *Toxoplasma gondii* positivity = $\frac{\text{Positive Samples}}{\text{Total Samples}} \times 100\ \%$

Results

Results of fecal sample examinations from domestic cats in the Rt 02/04 Watukumpul area, conducted at the Parasitology Laboratory of the Pekalongan Health Analysts Academy from February 3–14, 2025, with the following results:

TABLE 1. Number and Percentage of Toxoplasma gondii Identifications in Fecal Samples from Domestic Cats in Watukumpul Village

Hasil	Jumlah	%	Bentuk ookista
Positif (+)	0	0	0
Negatif (-)	12	100	0
Total	12	100	0

Based on Table 1. Number and percentage of Toxoplasma gondii identification results in domestic cat feces in Watukumpul Village using the sedimentation method on 12 samples of domestic cat feces in Watukumpul Village, all results were negative (100%).

Discussion

Cats are definitive hosts of *Toxoplasma gondii* because they can excrete oocysts in their feces. This study used fecal samples from domestic cats in Watukumpul Village, with 12 cat fecal samples all testing negative. The results of this study align with those of Rahman & Nur's research on the identification of *Toxoplasma gondii* in fecal samples from domestic cats in Ternate City, where all 17 fecal samples from domestic cats tested negative. (Rahman & Nur, 2022) However, studies using stray cats have found a high prevalence of *Toxoplasma gondii* in cat feces, as demonstrated by the research conducted by Zakaria & Ardiansyah on the analysis of the potential distribution of toxoplasmosis in stray cats at several markets in Sidoarjo District, where 24 stray cat samples were analyzed, resulting in 7 (29.16%) samples were positive for *Toxoplasma gondii* oocysts (Zakaria & Ardiansyah, 2020). Another study by Ahn et al. on the excretion of *Toxoplasma gondii* oocysts from stray cats in Korea was conducted over three years from 2009 to 2011, using 563 stray cat feces samples. *Toxoplasma gondii* oocysts were found in 4 out of 128 cats in 2009 (3.12%), none were found in 207 cats in 2010, and 1 out of 228 cats in 2011 (0.43%) tested positive for *Toxoplasma gondii* (Ahn et al., 2019). All results of this study were negative. This aligns with the questionnaire results from cat owners, which indicated preventive factors against *Toxoplasma gondii* transmission. The questionnaire results can be explained as follows.

Based on the questionnaire results regarding cats' freedom to go outside, 66.66% of cats were not allowed to go outside, meaning that 66.66% of cats did not interact with other cats or stray cats. According to Dubey & Miller, cats that are allowed to roam freely outside the home and interact with stray cats, as well as environments such as yards, soil, or grass, have a higher risk of contracting toxoplasmosis. (Dubey JP, Miller NL, 1970) This is due to the possibility of them ingesting oocysts present in the environment or consuming other animals infected with *Toxoplasma gondii* cysts (CDC, 2024). This is further supported by Nurnaningsih's research on the identification of *Toxoplasma gondii* oocysts in the feces of domestic cats (a case study in Badang Village, Ngoro District, Jombang Regency). Out of 21 domestic cats, it was found that they had the freedom to go outside and interact with stray cats, and 9 of them tested positive for *Toxoplasma gondii* oocysts. (Nurnaningsih, 2017)

Based on a questionnaire about cats hunting and eating small animals, it was found that 100% never hunted or ate small animals such as mice or birds. Hunting and eating mice or birds also poses a high risk of *Toxoplasma gondii* infection, as if the mice or birds contain oocysts in their body tissues, the cats that consume them can become infected with toxoplasmosis. (CDC, 2024)

Based on the questionnaire about cats eating raw food, 91.66% of cats do not eat raw food that can cause *Toxoplasma gondii* infection. Transmission of toxoplasmosis is obtained, among other things, from cats that have the habit of hunting mice and eating raw food, which is a significant risk factor. (CDC, 2024) This is supported by research conducted by Agus Manik on the Bioassay of *Toxoplasma gondii* in Cats, where fecal samples from five cats were examined after being fed 25 chicken organs, including liver, heart, lungs, and brain, from the regencies of Badung, Tabanan, Buleleng, Gianyar, and Karangasem. Two positive oocysts were found in the fecal samples of cats fed chicken organs from Badung and Gianyar districts. (Manik. Agus, 2013)

Based on a questionnaire about bathing cats, it was found that 58.33% bathe their cats 2-3 times a week. Maintaining a cat's body cleanliness is important to avoid *Toxoplasma gondii* infection, but if other body parts are not cleaned properly, especially

those exposed to feces, the risk of infection remains. (Ramadhani et al., 2024) This is supported by research findings from Hanafiah et al., showing that cats bathed more than once a week have a 5 times higher risk of contracting toxoplasmosis, while cats bathed more than once a month have a 3 times lower risk. This may be due to improper bathing methods. (Hanafiah et al., 2015)

Based on a questionnaire about cage cleanliness, it was found that 83.33% of domestic cats in Watukumpul Village have clean cages. The environment around the cat's cage, if cleaned frequently, can reduce the time oocysts remain in the environment. (Rachmawati, 2019) Cats with poor or dirty environmental sanitation are more likely to be infected compared to those with good environmental sanitation. (Taraporevala S, Sahin M, 2017) The risk factors for toxoplasmosis infection in cats or humans can occur if the cage is not cleaned frequently, as *Toxoplasma gondii* oocysts attached to the cage may also attach to the cat's body and inadvertently enter the human body after contact with the cat or the cage. Oocysts can attach to the cage and the cat's body even if the cat has been bathed. (Hanafiah et al., 2015) This is supported by research from Marthalia & Sulistyorini, which found that among cat breeders with poor cage sanitation, 62% experienced chronic toxoplasmosis infection, while among cat breeders who maintained good cage sanitation, none experienced chronic toxoplasmosis infection. (Marthalia & Sulistyorini, 2020)

Based on a questionnaire about litter box usage, 91.66% of cat owners use litter boxes as containers for their pet cats' feces, thereby maintaining the cleanliness of their homes. Maintaining litter box cleanliness is also important to note, as it is a crucial step in maintaining the health of pet cats while preventing the spread of toxoplasmosis. (Quimby J, Gowland S, Carney HC, DePorter T, Plummer P, 2021).

Based on a questionnaire about maintaining litter box cleanliness, 75% of cat owners clean their pet's litter box daily. This is an appropriate step because the spread of *Toxoplasma gondii* can occur not only through the ingestion of oocysts but also through accidental ingestion, making it important to maintain cat hygiene and litter box sanitation to prevent cats from contracting toxoplasmosis (Dubey JP, Ferreira LR, Martins J, 2011).

Based on a questionnaire about cleaning cat feces, 75% of cat owners clean cat feces by transferring them into biodegradable plastic bags and disposing of them in closed trash bins. This prevents the spread of oocysts, especially in soil, which is an ideal medium for oocysts to develop into infectious forms. The time required for oocysts to become infectious is 1–5 days after being excreted through cat feces (CDC, 2024).

Based on a questionnaire about routine veterinary check-ups and vaccination or deworming, it was found that 100% of cats did not undergo routine veterinary check-ups and were not vaccinated. One effort to prevent and break the chain of *Toxoplasma gondii* infection is through toxoplasmosis vaccination in cats. Vaccination is administered regularly, and vaccinating cats can enhance their immunity, preventing infection by *Toxoplasma gondii*. (Dwi Agustin & Mukono, 2019) Cats that are not routinely vaccinated are indeed at higher risk of toxoplasmosis infection, as this can be a risk factor for infection. (Agustin PD, 2015) However, in this study, despite not being vaccinated, none of the cats in the sample were infected with *Toxoplasma gondii*. This is supported by other preventive factors such as cats not hunting small animals like birds and mice, not eating raw food, maintaining cat hygiene, and keeping the cat's environment clean, with 66.66% of cats not interacting with other cats that may

be infected with *Toxoplasma gondii*, (Dubey JP, Miller NL, 1970) so that these factors can prevent domestic cats in Watukumpul Village from being infected with *Toxoplasma gondii*.

Conclusion

Based on the research conducted, it can be concluded that no *Toxoplasma gondii* oocysts were found in 12 fecal samples from domestic cats in the RT 02/04 Watukumpul neighborhood, Watukumpul subdistrict, Pemalang regency.

Recommendations for future researchers include conducting research using more modern methods, such as PCR, to obtain more accurate results.

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