

Colaboration Reseach of Seroprevalensi Toxoplamosis in Goat and Animal

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Abstract: Collaboration research is interdisciplinary effort that seek optimal health for people and animal. Toxoplasmosis is zoonotic disease that caused by *Toxoplasma gondii*. It's intracellular protozoan infection that could be found in meat or milk from infected animal. The epidemiology, prevention and control strategies are reviewed, with the objective of integrative research. To reduce the disease in human, intervention are needed in the animal reservoir, necessitating close collaboration between both the human and veterinary medical sectors. This study showed that toxoplasmosis in human are positive that infected 3 farmers (from 14 farmer). Prevalence toxoplasmosis in goat are between 22% - 100%. A high prevalence on one farm allows for human infected with toxoplasmosis.

1 INTRODUCTION

Toxoplasma gondii an obligate intracellular protozoa is causing infection rate that affect approximately one third of human population worldwide. Toxoplasmosis is opportunistic disease that infected a human with immunocompromised disease. Toxoplasmosis infection can be transmitted via several routes in different host species. Toxoplasmosis is common in sheep, goats, pigs and chicken as intermediate host. However, cattle and horses are notably resistant to the disease. In sheep, congenital infection is a leading cause of stillbirth and survive usually exhibit normal growth, but they still represent a public health risk if their infected meat is consumed. Toxoplasmosis can also occur in adult goats, and the disease is more severe than in sheep (Aguirre *et al.*, 2019).

Domestic cats and other feline species may become infected with *T. gondii* either by ingesting infectious oocysts from the environment or by ingesting tissue cysts from intermediate hosts. Cat become infected *T. gondii* by feeding on carcasses of small mammals or birds infected with *T. gondii*. Until 2001, up to 73% of small rodents and up to 71% of wild bird may be infected with *T. gondii* (Tenter *et al.*, 2001).

Toxoplasmosis in human is potentially become a agent of foodborne illnesses. The disease may be

either acute or chronic and can be cause active infection of any age. Initial infection acquired by pregnant women may cross the placenta and reach the fetus. Latent or primary toxoplasmosis can be particularly dangerous in individuals with compromised immune system including those treated with corticosteroid, cytotoxic medicine and antibody to tumour necrosis factor alpha. Approximately one third of HIV-infected individuals with *T. gondii* infection develop encephalitis.

As a global strategy, transdisciplinary approach across Toxo are compounded by changing practices and attitude toward the control of owned and unowned domestic cat which are the obligate reservoir of parasite (Aguirre *et al.*, 2019).

Current patterns of human driven environmental change and globalization of travel and trade can enhance the spillover and spillback of *Toxoplasma* and parasites of animal origin into human populations. Furthermore given that most emerging infectious disease in human are of animal origin there is pressing need to integrate human-animal ecosystem health within a common framework. The purpose of this study is to initiate collaborative research in order to integrate data in toxoplasmosis cases.

2 MATERIALS AND METHODS

This prospective cross sectional study was conducted in Batu Municipality. The inclusion criteria of this study were farmer, veterinary technicians, veterinary student and veterinary with age of more than 20 years. All eligible participants gave informed consent before the commencement of this study. Other data that support this study using questionnaire.

2.1 Animal and Human Samples

Between June – July 2019, blood samples were obtained from 152 sheep and goat, 22 farmers, 23 veterinary and paramedic. Sera were obtained from 3 subdistricts in Batu Municipality.

Sampling is carried out simultaneously between farmer and animal (goat and sheep). The location of this study are farmer who are assisted by Department of Agriculture of Batu Municipality. Samples

2.2 Serologic testing

Detection is made by serological methods. Clinical signs of toxoplasmosis are nonspecific and are not sufficiently characteristic for a definite diagnosis (Lindsay & Weiss, 2014). Serum samples from animal were tested for immunoglobulin G and immunoglobulin M antibodies to *T. gondii* by the Toxoplasmosis Modified Agglutination Test (ToMAT) in Veterinary Laboratory in Lampung. Serum samples from human were tested by the enzyme-linked immunosorbent assay (ELISA) using a commercial kit in Syaiful Anwar Hospital.

Serum sample for animal will testing for IgG and IgM. The IgM antibodies appear sooner after infection than the IgG antibodies and the IgM antibodies disappear faster than IgG antibodies after recovery.

2.3 Data analysis

Data analysis from serological test are then tested descriptively. This data will describe the distribution of cases in 3 subdistrict. Seroprevalance result in animals are paired with human seroprevalance result.

3 RESULTS

In this study, the prevalence of toxoplasmosis of animal are between 20% until 100%. And

seroprevalance positive in human, found in a farm which is have a great prevalence of animal (66,7 %, 75%, and 100%). One possible explanation could be the *T gondii* are around of this farm. It could be the contamination of water source. The high prevalence may be the indication of frequent exposure to the parasite on farms (Lopes *et al.*, 2013).

Infection with *T gondii* can cause a wide range of clinical consequences in people and animal. People who become infected with *T gondii* have very minor symptom and would often be unaware they had come into contact with the parasite. Immuno-compromised individuals are also an important risk group for infection with *T. gondii* as they are unable to effectively control parasite multiplication. Patients with acquired immune deficiency syndrome (AIDS) that have persistent *T. gondii* infection may present with severe brain lesions where the *T. gondii* parasites within tissue cysts become active again and start multiplying due to the dysfunction of their cell-mediated immune system which would otherwise keep the parasite in check (Innes *et al.*, 2019).

Domestic cats are likely the major source of ecosystem contamination in many areas due to their abundance on the landscape relative to native felids. *T gondii* is known to be influenced by environmental condition, survival of oocysts in the soil may be influenced by geological and environmental characteristics such as soil temperature, texture and chemistry. *T gondii* oocyst in the environment increases the likelihood of infection for all at risk species in the ecosystem.

Reports documenting the presence of *T. gondii* in diverse environmental matrices, including water, soil, vegetables and seafood have been increasing. New methods that can discriminate the route of *T. gondii* acquisition have demonstrated that, in some populations, a significant proportion of infections are caused by oocyst ingestion (Shapiro *et al.*, 2019)

Table 1. Prevalence of Toxoplamosis in Human and Animal

Num	Sub District	Human Code	Prevalence In Goat	Result of Human
1	Batu	A1	33,3%	Negative
2	Batu	A2	70,0%	Negative
3	Batu	A3	20,0%	Negative
4	Batu	A4	62,5%	Negative
5	Batu	A5	100,0%	Negative
6	Batu	A6	100,0%	Negative
7	Junrejo	B1	10,0%	Negative
8	Junrejo	B2	66,7%	Positive
9	Junrejo	B4	63,6%	Negative
10	Junrejo	B5	22,2%	Negative
11	Junrejo	B6	75,0%	Positive
12	Bumiaji	C1	100,0%	Positive
13	Bumiaji	C3	40,0%	Negative
14	Bumiaji	C6	50,0%	Negative

The environmental infection of *T gondii* starts with oocysts shed in cat feces that contaminate soil and or water and are subsequently transmitted to hosts (intermediate, paratenick and definitive). Infection caused by ingestion of oocysts, bradyzoites (tissue cycts) or vertical transmission (congenital), transfusional or organ transplatation infection. Infection or contamination of *T gondii* transmitted directly from water and soil.

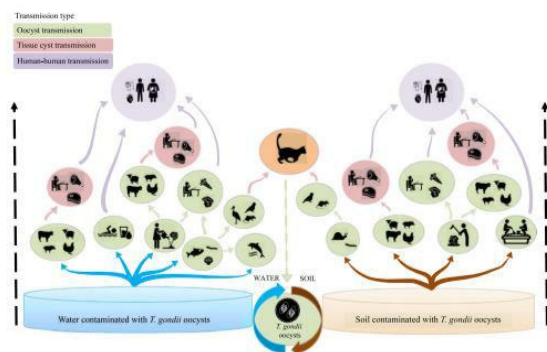


Figure 1: Toxoplasma gondii oocyst transmission tree (Shapiro et al., 2019)

The importance of oocysts as the primary infective stage responsible for transmission of *Toxoplasma gondii* to intermediate host such as rodents or birds, as well as herbivorous meat-producing animals. In wildlife, oocyst-borne *T. gondii* infections have been proposed to occur in numerous species including freshwater-dwelling mammals. Humans and susceptible animal hosts can be exposed to *Toxoplasma gondii* oocysts in the environment through drinking water contaminated with felid feces. Foodborne transmission of *Toxoplasma gondii* has traditionally referred to the ingestion of tissue cysts in raw or poorly cooked meats. However, it has become increasingly evident that ingestion of oocysts on fresh produce and other foods is under recognized, and the significance of this route of transmission to humans is not entirely clear. Unlike other foodborne protozoan parasites, which have been implicated in numerous illness outbreaks worldwide, there have been only two reported outbreaks of toxoplasmosis associated with the consumption of fresh produce or juice (Shapiro *et al.*, 2019).

Sheep can become infected with *T. gondii* through the consumption of sporulated oocysts contaminating pasture, feed and water and if a primary primary infection occurs when the ewe is pregnant the tachyzoite stage of the parasite can invade and multiply within the placenta and infect the developing foetus resulting in abortion or birth of a still born lamb. Epidemiology studies have emphasised the importance of consumption of raw or undercooked meat from *T. gondii* infected food animals as a major transmission route for human infection.

Prevention program start from cutting the transmission of this disease from other species. Such as in cat, in all cases, faeces of pet cats should be removed daily from household. Whereas for the cage of goat. The cage and all item that may have come in contact with cat faeces should be cleaned thoroughly with hot water and detergents wearing gloves (Tenter *et al.*, 2001).

Reducing the risk of oocyst-borne *Toxoplasma gondii* infections in animals and people should target three distinct but not mutually exclusive factors: 1) reducing felid contributions of oocysts into the environment; 2) preventing oocyst contamination of water, soil, and foods; and 3) physically removing or inactivating oocysts in water and foods such as shellfish and produce.

However, with the appropriate preventive measures the risk of acquiring an infection with *T gondii* from a pet cat can be highly controlled by its

owner. The most important ecosystem management tool is control contaminated runoff to mitigate the health impacts of coastal habitat pathogen pollution (Aguirre *et al.*, 2019).

The strategic application of vaccination of food animals was suggested as a means of preventing/reducing viable tissue cysts in meat making it safer for human and animal consumption. Research is needed to integrate data across scales to assess risk and devise methods of control, as links are made between toxoplasmosis and significant adverse health outcomes beyond acute infection in humans, i.e., congenital infection, increased death rates in traffic accidents and environmental transmission rather than meat consumption as a significant pathway for infection

4 CONCLUSION

Collaboration research needed as a bridge disciplines linking human health, animal health, and ecosystem health. Toxoplasmosis demands integrative approaches breaching disciplinary boundaries. This integration is needed to generate new approaches to manage and control the disease. The complexity of toxoplasmosis requires the development of a dashboard system of measures that are a combination of health and ecological indicators, that is, an easy set of indicators for quick reference to identify prevention and management needs. Transdisciplinary, integrative research, and capacity building are core elements in establishing One Health interventions that address toxoplasmosis.

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