**Toxoplasma gondii Seroprevalence in Domestic Animals and Humans in Mymensingh District, Bangladesh**

Md. SHAHIDUZZAMAN1), Md. Rafiqul ISLAM1), Most. Monjila KHATUN1), Tatiana A. BATANOVA2),
Katsuya KITOH1) and Yasuhiro TAKASHIMA1)*

1)Department of Parasitology, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh and 2)Department of Veterinary Parasitological Diseases, Faculty of Applied Biological Science, 1–1 Yanagido, Gifu 501–1193, Japan

(Received 22 February 2011/Accepted 2 June 2011/Published online in J-STAGE 16 June 2011)

ABSTRACT. The seroprevalence of Toxoplasma gondii was examined in adult women and domestic animals used for meat products from the Mymensingh District, Bangladesh. Cattle, goats and sheep showed a high seroprevalence (12, 32 and 40%, respectively), while the sera from all fifteen women examined in the same area were seronegative. Considering that primary infection in women during pregnancy can cause abortion and congenital defects, accidental ingestion of T. gondii infected meat products from domestic animals represents a risk factor for adult women living in the same area.

Key words: bangladesh, seroprevalence, toxoplasma.

**Toxoplasma gondii** is a zoonotic protozoan parasite that causes widespread infection in humans and domestic animals. Chronic T. gondii infections in ruminant dams may cause abortion by reactivation of the parasite during pregnancy [5]. Although most infections in humans are asymptomatic, abortion may also occur after congenital T. gondii infection [3]. Previously, it was reported that 30 to 63% of human infections could be attributed to the consumption of undercooked meat in Europe [2]. Control of T. gondii infection in cattle, sheep and other domestic animals used for meat production is therefore important, not only for effective reproduction in domestic animals, but also for public hygiene. Currently, the T. gondii infection status of domestic animals in Bangladesh is poorly understood. We therefore determined T. gondii seroprevalence of cattle, goats and sheep in Mymensingh District, Bangladesh in this study. In addition, sera obtained from adult women from this same region were also examined.

Mymensingh is a typical provincial city located approximately 120 km north of the capital city, Dhaka. This area was chosen for our study because almost all meat products consumed in this area are locally produced, allowing for direct comparisons of T. gondii seroprevalence to be made between humans and domestic animals used for meat production. Detection of anti-T. gondii antibodies was conducted using a commercially provided diagnosis kit, Toxotest-MT (Eiken Kagaku, Tokyo, Japan) according to manufacturer’s instructions. In this system, anti-Toxoplasma antibodies were detected via agglutination of latex particles. Animal sera samples were collected from 25 individuals for each species (cattle, goats and sheep). Human sera were collected from 15 volunteer adult women living in the same region, following Bangladesh medical ethics guidelines.

As shown in Table 1, 3, 8 and 10 seropositive individuals were detected from cattle, goats and sheep, respectively. Goats and sheep showed relatively high seroprevalence (32 and 40%, respectively). It was reported more than 10 years ago that 12.8% of goat in this district was seropositive [4]. The goat seroprevalence was not decreased in this 10 years (Table 1). The results strongly suggest that control of T. gondii infection among domestic animals in this area has not been going well. When differences in seroprevalence between cattle vs goat and cattle vs sheep were examined by Chi-square test with Bonferroni correction, a statistical difference was found between cattle vs sheep (P<0.05). Mix grazing of cattle, goats and sheep at bank of river is common rearing style in this area. However goat and sheep are more frequently ranged on the streets. It might result in an increasing opportunity to access domestic cat feces. The relatively high seroprevalence of these small ruminants might be due to the rearing system. Considering goats and sheep are commonly used for meat production in this area and pork meat is religiously forbidden food for majority of Bangladesh people, these small ruminants are potentially an important source of T. gondii for human infection.

In contrast to the high prevalence among domestic animals, all serum samples collected from the 15 adult women who lived in the same area were seronegative for T. gondii infection. The 95% confidence interval of seroprevalence for women in this area calculated using F-distribution was 0–14.2%. In 1997, it was reported that seroprevalence of pregnant women in this area was 11.18% [4]. It suggests that seroprevalence of women in this area is maintained or slightly decreased in this 13 years. In Dhaka, the capital of Bangladesh, 38.5% of pregnant women showed seropositive [1]. Seroprevalence among women in Mymensingh district might be lower than Dhaka. Further study to clarify the
regional characteristics of *T. gondii* distribution in Bangladesh is necessary. In Europe, seroprevalence of adult humans is estimated to be 20–60% [3]. Even allowing for the smaller number of human samples examined in our study, the seroprevalence is still clearly lower than in Europe, despite the high seroprevalence in domestic animals for meat production.

Although *T. gondii* seroprevalence among several animal species including humans has already been reported throughout the world, as far as we know, only a few studies have reported the relationship between seroprevalence of domestic animals for meat production and its consumers. Our study revealed a relatively high seroprevalence among domestic animals for meat production and a low seroprevalence among meat consumers living in this area. The tendency was not changed from 1997 [4]. It indicates that women seroprevalence has been maintained low for long time despite of the domestic animals for meat production with high seroprevalence. This might be due to cultural eating habits because the consumption of raw and rare meat is not normally practiced in Bangladesh. Further epidemiological surveillance within this area is of interest to better understand the transmission dynamics of human *T. gondii* infection. Traditional butchering, meat distribution and unique cuisine cultural practices in this area may offer effective strategies for the prevention of human *T. gondii* infection from infected meat products.

Initial exposure to *T. gondii* during pregnancy can cause spontaneous abortion and congenital defects [3]. However, for pregnant women previously infected with *T. gondii*, subsequent infection rarely causes such birth defects. Therefore, accidental *T. gondii* infection resulting from the consumption of meat products during pregnancy represents a risk factor for abortion and congenital defects in adult women with a low seroprevalence of this protozoan. Control of *T. gondii* infection in domestic animals in this area is potentially more important from a public health perspective in Bangladesh than in areas where women show higher seroprevalence, such as in Europe and South America.

### REFERENCES