

Short Communication



First and Preliminary Report on Seroprevalence of *Toxoplasma gondii* in Sheep and Goats at Al-Baha Province, Southwest Saudi Arabia

KHALED SULTAN^{1,2*}, MOHAMMED ELFEHID³, ABDELATIFF ALWAZAN³, FAWAZ ALGHAMDI⁴, HANEEN ABUGASMEEN¹, IBRAHIM ELDESOUKY^{1,5}

¹Veterinary Diagnostic Lab, Al-Baha, Ministry of Environment, Water and Agriculture (MEWA), Al-Aqiq Road, Al-Baha, Saudi Arabia; ²Department of Parasitology, Faculty of Veterinary Medicine, Kafrelsheikh University, 33516 Kafr El-Sheikh, Egypt; ³MEWA, 65 King Abdulaziz Road, Riyadh, 11195, Saudi Arabia; ⁴MEWA, Al-Baha branch, King Abdulaziz Road, Al-Baha, 65528, Saudi Arabia; ⁵Department of Bacteriology, Mycology and Immunology, Faculty of Veterinary Medicine, Kafrelsheikh University, 33516 Kafr El-Sheikh, Egypt.

Abstract | Toxoplasmosis is a serious protozoan disease of both medical and veterinary significance. Scanty data exists about its incidence in small ruminants in Saudi Arabia. The main aim of this study was to evaluate the *Toxoplasma gondii* infection in sheep and goats in Al-Baha Province, KSA. One-hundred sixty serum samples (109 sheep and 51 goats) were tested for detecting the antibodies to *T. gondii* infection using ELISA. The frequency of *T. gondii* infection in all tested animals was 20.625%. Among tested sheep 20.183%, while 21.56% of tested goats were seropositive respectively. Al-Mandaq region recorded the highest prevalence. Although this work is a preliminary, nevertheless a significant existence of toxoplasmosis in small ruminants in the study area is detected. This prevalence reflects a problem of both economic and public health concern and requires implantation of effective control programs as well as further studies and continuous monitoring of toxoplasmosis status in small ruminants in the region.

Keywords | Toxoplasmosis, Sheep, Goat, iELISA, Saudi Arabia

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***Correspondence** | Khaled Sultan. Veterinary Diagnostic Lab, Al-Baha, Ministry of Environment, Water and Agriculture (MEWA), Al-Aqiq Road, Al-Baha, Saudi Arabia; **Email:** Khaled.sultan1@vet.kfs.edu.eg

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INTRODUCTION

Toxoplasmosis is a major protozoan disease of small ruminants worldwide. Moreover, it is a serious public health problem. The life cycle of *Toxoplasma gondii* is complicated. Cats are the known definitive hosts, while other warm-blooded animals as well as humans are considered as intermediate hosts. The infection of intermediate hosts takes place mainly by ingestion of sporulated oocysts with contaminated feed, water and even milk. Abortions, delivery problems, and weak births are the main consequences of *T. gondii* infection in small ruminants. Those results in significant economic losses. Nev-

ertheless, humans can acquire *T. gondii* infection from raw or inadequately cooked infected animals (i.e. sheep or goat) meat and milk (Dubey, 2009; Ismail et al., 2016). Cats are the main definitive host for toxoplasmosis. Mohammed et al. (2009) examined 200 serum samples of stray and household cats in Riyadh, Saudi Arabia, for *T. gondii* antibodies, the overall seroprevalence was 26%. Also, examination of 100 fecal samples from cats revealed an overall prevalence of 12% of *T. gondii* oocysts. This indicates persistence of infection and completing the parasite transmission cycle in-between cats and intermediate hosts including food animals. Also, humans in Saudi Arabia can acquire infection (Bin Dajem et al., 2012).

Diagnosis of toxoplasmosis in animals depends mainly on serological tests to detect specific antibodies against *T. gondii* (Nagaty et al., 2009). Many serological tests have been adapted to diagnose such infection. Latex agglutination, indirect fluorescent antibody technique and indirect enzyme linked immunosorbent assay (iELISA) are the most popular serological tests. With advantage to the later test "iELISA", as it is a highly specific and sensitive diagnostic and has minimal or no false positive results (Dubey, 2009; Nagaty et al., 2009; OIE, 2009).

Few publications are available in the literature that address the existence of toxoplasmosis in small ruminants in Saudi Arabia. Therefore, the objective of the current study was to detect the seroprevalence of *T. gondii* infection in sheep and goats in Al-Baha region.

MATERIALS AND METHODS

STUDY AREA

Al-Baha is the name of the province as well its main city, situated in the northwestern part of Saudi Arabia. This region is situated in the Hejaz, between longitudes 41/42 E and latitudes 19/20 N. The region covers an area about 36,000 km². Sheep and goat populations in Al-Baha province estimated in 2015 to be as 227,982 and 114,409 head respectively. Small ruminants have a significant contribution in the province economy (Saudi General Authority of Statics, 2015).

SAMPLES

Study samples were collected by veterinarians for the lab to diagnose of an existing problem in animal/herd. A total of 160 serum samples (109 sheep and 51 goat) collected from sheep and goats reared at Al-Baha province with history of abortion during the period between October 2019 and September 2020 from four regions including Al-Baha, Al-Aqiq, Al-Mandaq and Balgurashi.

SEROLOGICAL TEST

A Commercial kit was used in the current work. iELISA: *Toxoplasma gondii* Antibody Test Kit, IDEXX Toxotest, (Lot SN. P721, IDEXX Switzerland GmbH, Switzerland). Test procedures were done according to the manufacturer recommendations.

STATISTICAL ANALYSIS

Data were computed using EXCEL statistical analysis software on Microsoft 10 package.

RESULTS AND DISCUSSION

Results are summarized in Tables 1 and 2. In the current work, 20.625% of the tested animals sera were positive for

Table 1: Seroprevalence of toxoplasmosis in sheep and goats in Al-Baha Province, Saudi Arabia

| | Goat | Sheep | Total |
|-----------|------|-------|-------|
| No. | 51 | 109 | 160 |
| *Positive | 11 | 22 | 33 |
| *Negative | 40 | 85 | 125 |
| *Suspect | - | 2 | 2 |

Positive, negative and suspect was calculated as kit recommendation, with retesting of the suspect.

Table 2: Prevalence of toxoplasmosis in sheep and goats according to the region inside Al-Baha Province. Numbers in brackets indicate the positive samples

| | Al-Aqiq | Al-Baha | Al-Mandaq | Belgurashi |
|-------|---------|---------|-----------|------------|
| Sheep | 21 (3) | 32 (3) | 52 (15) | 4 (1) |
| Goat | 21 (1) | 11 (0) | 18 (10) | 1 (0) |
| Total | 42 (4) | 43 (3) | 70 (25) | 5 (1) |

toxoplasma-antibodies. This percent not so variant from those recorded previously in Saudi Arabia (15.4%) by Ismael et al. (2016). But lower than reported in goats (51%) in Tabouk, Saudi Arabia by Sanad and Al-Ghabban (2007). Also, lower than reporting in Iraq (32.8%) by Al-Dabagh et al. (2004) and in Tunisian sheep and goats (40.2, 34.5% respectively) as reported by Lahmar et al. (2015). Izadyar et al. (2019) stated that toxoplasmosis prevalence in sheep and goats in Iran was 33.62 and 36.41% respectively. In fact, the variation in-between our results and other studies might be contributed to many factors. Such as sample size, techniques used for examination, rearing/mangemental, risk factors, environmental and geographic factors. With absence of an effective commercial vaccine against *T. gondii* yet and no specific therapeutics against such infection in small ruminants, toxoplasmosis is a major thread of small ruminants (Innes et al., 2009).

Our report here is just a preliminary report attracting the attention to such a problem. Further and in-depth studies should be performed. This is the first report on small ruminants toxoplasmosis in this area. Further studies on the prevalence and risk factors of toxoplasmosis in animals and human should continue. Also, implantation of proper control program should be considered.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

ME, AA, FA, HA, IE, KS shared equally in the study concept and design. ME, FA approved the study. KS, IE performed laboratory procedures. KS wrote the manuscript draft. HE, IE revised the draft.

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