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Associated Risk Factors in Nangarhar**

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Abstract

Introduction: *Toxoplasma gondii* is an obligate intracellular protozoan parasite that represents an actual public health problem. Nangarhar is a tropical region in southern of Afghanistan, due to importance of abortions by Toxoplasmosis and absence of study evidences in this field in Nangarhar province, this cross sectional hospital based research was accomplished.

Purpose: The aim of this study was to estimate the prevalence of *T. gondii* and possible risk factors associated with the infection among the women who have abortion in Nangarhar province.

Methodology: Designed questionnaire for obtaining history of abortion and interviewing with aborted patients were use, the convenient sampling method as well using Latex agglutination Lab Test (LAT) a total of 100 serum samples of miscarriage women from Nangarhar different districts were collected and tested for *Toxoplasma gondii* antibodies. All collected data were analysed using ANOVA. SPSS Program.

Findings: The overall prevalence of toxoplasmosis in mentioned women was 47% (47/100 cases). From 47 positive cases 17 (34%) was in women resident in Urban areas and 30 (60%) was those resident in Rustic areas. The prevalence rate showed there was significant differences between women resident in Rustic and those in urban areas. The people who are living in rustic area (30%) were more exposed to infection than those who were living in urban area (17%) ($P < 0.015$). Higher prevalence was observed in 25-30 years old group than the others ($P < 0.05$). The result showed that Contact with raw or uncooked meet, water and soil, contaminated food and animals were significant ($P < 0.05$).

Keywords: *Toxoplasmosis, Prevalence, Women, Abortion, Undercooked or raw meat, contaminate food, water, and soil.*

Hypothesis: Undercooked or Raw meat, Contaminate Food, Water, and Soil are the most significant and vital sources of *T. gondii*.

Parameter: Estimation of *T. gondii* Prevalence in Nangarhar

Introduction

Toxoplasmosis is major parasitic zoonosis of worldwide distribution caused by the intracellular protozoa *Toxoplasma gondii*. Felines, in particular domestic cats, have a crucial and chief role in the epidemiology of the disease because the sexual (or asexual) reproduction takes place in them and they excrete and expel a large number of infective and environmentally resistant oocysts (**Kravetz and Federman, 2002**).

Miscarriage is defined as the spontaneous loss of pregnancy before the fetus reaches viability, the term therefore includes all pregnancy losses from the time of conception until 24 weeks of gestation. It should be noted that advances in neonatal care have resulted in a small number of babies surviving birth before 24 weeks of gestation (**Johns, 2012**). *Toxoplasma gondii* is an obligate and coeerce intracellular protozoan parasite responsible of animal and human toxoplasmosis and one of the most common chronic diseases, that affecting one/ third of the world's human population (**Jones et al., 2001**).

Although toxoplasmosis is largely asymptomatic in the majority of women, primary infection during pregnancy can result in disease transmission through the placenta and lead to hazardous consequences such as abortion, stillbirth, and different degrees of mental or physical retardation, hydrocephalus, and blindness (**Montoya and Liesenfeld, 2004**).

Toxoplasma gondii is an obligate intracellular protozoan parasite occurring with a global distribution in human and animals. The infection is caused by consuming contaminated meat or coming into contact with cat feces containing oocysts. *T. gondii* infects a large proportion of the world's population from temperate to tropical areas (**Kijlstra and Jongert, 2008**). Individuals at risk include fetuses, newborns, and immunologically compromised individuals. *Toxoplasma gondii* can cause congenital disease and abortion in humans and livestock. In most cases the laboratory diagnosis of acute and chronic toxoplasmosis depends on the detection of *T. gondii* specific IgG and IgM antibodies several studies have suggested the role of *T. gondii* in the causation of abortions. Quite a lot of serological assays have detected the immunoglobulin (IgG and IgM) antibodies against *T. gondii* in the blood serum (**Elsheikha, 2008**).

A total of 1146 serum samples were collected and researched for *Toxoplasma gondii* antibodies using Latex Agglutination Test (LAT). Five hundred (out of 1146 cases) resulted positive with a prevalence of 43.6%. High prevalence was found among HIV patients (75%), aborters (58.3%), and suspected cases (55.5%). Higher prevalence was observed in 26-30 years old group than the others ($P = 0.0001$). Prevalence rate by sex was found to be higher in females than males ($P < 0.05$). Residence was found to be significant in rural areas ($P = 0.001$). The relationship between LAT results and women who aborted was significant ($P < 0.05$). Study reviled that Contact with cats, eating raw meat, and eating soil were significant (LAT) ($P = 0.0001$, $P = 0.0001$, and $P = 0.006$), respectively. Thus, high prevalence of *Toxoplasma gondii* was recorded in Khartoum State. A total of 1146 sera samples, from various target groups of human, were collected and screened serologically using latex agglutination test (LAT), 500 (43.6%) of these samples were positive. From 245 sera samples of pregnant women, 88 (35.9%) of them were found positive by using (LAT). In 209 sera samples of aborters, 122 (58.3%) of the samples were found positive using LAT (**Khalil et al., 2013**).

A study revealed that Anti-Toxoplasma IgM and IgG were positive in 1% and 29% respectively. Seropositive subjects were more frequently seen in women with age >30 years compared to younger women. No significant relationship was found among the seroprevalence of *T. gondii* infection and level of education, residence area, history of abortion and gestational age. (**Lame et al., 2014**).

Out of 32 positive cases, 19 and 13 patients were urban and rural, respectively. However no statistically significant association between these risk factors and Toxoplasma seropositivity was observed in the current study. In regard to location, the prevalence rate of IgG anti-Toxoplasma gondii antibodies in women with abortion was 19/90 (21.1%) and 13/40 (32.5%) for urban and rural cases, respectively, which indicated significant differences. The possible reason for this difference is the more contact with soil in rural individuals in comparison with urban ones (**Saki et al., 2015**).

Transmission of *T. gondii* is usually by ingestion of cysts infected and undercooked or raw meat or by accidental ingestion of oocysts that may contaminate soil, water, and food. Meat is one of the most important sources of the infection in individuals (**Dubey et al., 2005**). The seroprevalence of *T. gondii* antibodies in pregnant women can vary from 6.1 to 75.2 % based on the geographical region (**Elsheikha, 2008**). In women with acute toxoplasmosis, Toxoplasma transmission rate through placenta in the first, second, and third trimesters is 25, 54, and 65%, respectively, and early diagnosis and specific treatment of mothers can reduce the risk of fetal infection up to 50%. (**Freij and Ver, 1991**). In many studies, contaminated drinking water and close contact with cats have been implicated as sources of Toxoplasma infection in human's worldwide (**ACOG, 2001; Jordon, 1983**). Clinical miscarriages (those occurring after the sixth week of gestation) occur in 8% of pregnancies (**Wang et al., 2003**).

A study showed Antibody IgM for women infected by Toxoplasmosis has recorded (14) positive cases out of 400 examined cases which equal 3.5% and The highest infection rate in age group (21 -25) years % 5.15 . while antibody IgG has recorded (70%) positive cases out of 400 examined cases in rate 17.5% and the highest rate of infection rate for age group (36 -40) (**Saja, 2012**). Specific antibodies against the parasite appear soon after primary infection. It has been estimated that up to one third of the world's population has been infected with endemicity from around 10% to 70% (**Alvarado, 2009**). The biggest age group to be included in this study was 25-29 years age group (46.6%) and the least one was 35-39 years age group (1.8%). 39 individuals (17.6%) were uneducated, 105 individuals (47.5%) were educated to the diploma level and 77 individuals (34.8%) were educated academically but there was no significant association between educational status and seroprevalence of toxoplasma antibody. The results shows that among IgG positive individuals the prevalence rate of risky habits were 91.2% for consuming raw vegetables, 61.8% for consuming half-cooked meat, 77.9% for not using disinfectants in washing vegetables, 51.5% for contacting cats and 26.5% consuming water from wells (**Adel, 2013**).

The highest IgG seropositivity of anti-Toxoplasma antibodies was recorded in an age group of 37 – 44 years in all studied groups with an increasing trend of seroprevalence. This may be due to the fact that humans are repeatedly exposed to the parasite and thus seroprevalence in the

population increases with age. A high seroprevalence of IgG antibodies in a group of women aged 19 – 24 with repeated abortions may be due to a small number of examined sera (**Studeníčová et al., 2006; Strhářsky et al., 2009**). Samples from 8 of the 21 data sets in that evaluation exceeded 25 percent prevalence. Worldwide, *T. gondii* is reported to infect up to one-third of the world's population (**Montoya and Liesenfeld, 2004**).

Toxoplasmosis seroprevalence among pregnant women 26 years mean age was 41%, most of them being chronic infections. In the group of apparently healthy women 1.85% were strongly suspected of acute acquired toxoplasmosis during pregnancy. In the group of pregnant women suffering spontaneous abortion in the first period of their pregnancy 4.23% had acute acquired infection. The cord blood screening among newborns noticed 44.5% toxoplasma antibodies prevalence with one case of asymptomatic congenital toxoplasmosis detected. Toxoplasmosis seroprevalence among chorioretinitis patients was 68%. Also, 12.8% of studied lymphadenopathies could be attributed to toxoplasmosis. The results confirmed *Toxoplasma gondii* wide spread in Eastern Romania, and the risk represented by this protozoan for the unborn child and HIV infected patients (**Elena, 2001**).

In Baghdad, Juma and Salman found that the infection of *T. gondii* in women was 19.17%. (**Juma and Salman, 2011**). A total of 95 participants were tested for *T. gondii* antibodies. Mean age was (29.93 ± 6.30) years old. *T. gondii* IgM was found reactive in 5 participants (5.3%), while 27 participants (28.4%) were found reactive for *T. gondii* IgG. It was found that the age group of 20-29 and 30-39 had a significant correlation with antibody sero-positive (**Bahaeldin et al., 2015**).

The overall anti- *T. gondii* (Immunoglobulin M (IgM) and Immunoglobulin G (IgG)) in both couples were 38.4%, the seroprevalence in wives was only 30.7%, while that in husbands was 13.1% only. This study showed that abortive women and abnormal pregnancy had the highest percentage rates (35.7 versus 57.14%) of toxoplasmosis among those of 26 to 30 years old and the lowest was among those who have the average of age (36 to 40) years old. One group miscarriage was (50%) higher than the other groups. The group of 26 to 30 years old showed high rate of IgM antibodies of about (66.66%). The number of abortion in the first trimester was high in both patterns of antibodies IgM only and (IgM and IgG) (62.5 and 29.16%), respectively. Analysis of variance revealed that, there were no significant interactions between IgM and IgG seropositivity and the gestational age of the fetus. The overall percentage of positive reaction to *T. gondii* in both couples was 38.4 (35/91), while for wife infected it was only 30.7% (28/91) and husband infected was only 13.1% (12/91). The most frequent age group for abortive women and abnormal women was among those of 26 to 30 years old and it represents 35.7 and 57.14% of the total number of each group, respectively (**Mohanad et al., 2013**).

The rate of *Toxoplasma* seropositivity, was higher using LAT 54.46%, followed by ELISA IgG 37.5%, 2ME 14.29% and ELISA IgM 9.13%, and higher rates were recorded among rural inhabitants in comparison with those living in urban areas. The rate of *Toxoplasma* seropositivity was highest among married women, and the age group 47-57 years revealed highest infection rate. The higher rates were indicated among the housewives than the employers, Using LAT, the highest seroprevalence rate was among married patients 54.95% followed by single and others (widow, divorced and separated women) 50% and 33.33% respectively (**Narmin and Mohammed, 2013**).

The sample size of the population studied was 81, the study revealed that total Infection was 44.5% and there was significant effect of age on proportion rate Which increase directly with age, highest infection rates was in 35-39 age group. While lowest at 15-19 age groups. The infection in Unemployed women was 75% and higher than employed which was 25%. Ratio of the abortion was high and reached to 69.4% from total infected women. 54.3% of total abortions were due to Toxoplasmal infections (**Seadawy and Mohened, 2010**).

Cats are the most common pet in the United States according to the American Veterinary Medical Association (2007). Thirty-three percent of U.S. households own at least 1 cat, totaling 81 million owned cats (**Conrad et al., 2005; Robertson, 2008**). Humans become infected through ingestion of food or water contaminated with oocysts shed by cats, eating under cooked or raw meat containing tissue cysts and by transplantations or by blood transfusions (**Montoya and Liesenfeld, 2004**).

The cats are the final host to *T. gondii* and it is considered to be the major source of human infection (**Hartmann et al., 2013; Lilly and Wortham, 2013**). Possible routes of infection were contaminated soil, drinking rainwater and eating raw vegetables rather than eating uncooked meat or contact with cats. The prevalence of previous abortion was 37.3%, with a slight (but not statistically significant) association with toxoplasmosis (**Nijem and Amleh, 2009**).

Toxoplasma gondii is an obligate, intracellular parasite, which is widely spread in the world. The parasite is able to infect all warm-blooded hosts including human. The infection occurs via consumption of food or water containing oocytes, eating undercooked meats containing tissue cysts, and placenta. Undercooked meat consumption is one of the most important ways of *Toxoplasma* transmission especially in pregnancy period. Raw and undercooked meats have been reported responsible for 50 % of congenital toxoplasmosis. The detection of the parasite in slaughtered animals, indicated that the risk still exists for food-transmitted toxoplasmosis, and consumption of raw or undercooked meat can transmit the infection to human community. (**Mahmoud et al, 2012**).

The parasite is able to infect all warm-blooded hosts such as human. The infection has various clinical symptoms in immunocompetent or immunocompromised patients and pregnant women. *T. gondii* has three ways of transmission: 1) consuming food or water containing oocytes, 2) eating undercooked meats containing tissue cysts, and 3) transmission via placenta (1). Consumption of undercooked meat is one of the most important ways (28 %) of transmission among pregnant toxoplasmosis patients (**Kravetz and Federman, 2005**).

Objectives

1. To estimate the prevalence of toxoplasmosis in Nangarhar and know about the possible risk factors associated with the infection among the women who have abortion.
2. To know about the relationship between *Toxoplasma* infection and abortion.
3. To assess the knowledge, attitude, behavior and practice of women on abortion and its determinant factors.

Materials and Methods

Work place:

Nangarhar Public Health Hospital department of Obstetrics was used for patients interviewing and blood sampling. The tests was performed in the veterinary science faculty histopathology lab of the Nangarhar University.

Study Population:

The source population were the women who came to the public health hospital and had miscarriage/ abortion.

Study design

Using sampling method, a Hospital based cross-sectional study was done involving patients with diagnosis of abortion, in which the convenient sampling method were used. The study was conducted on 100 women who had miscarriages. 5 ml venial blood was carried in anticoagulant tubes in special ice- packet kits, samples were carried to histopathology lab of veterinary science faculty of Nangarhar University for testing. The entire study population then divided in to two groups, as well, both groups again were divided into two other treatments of urban and rustic women with having ages between 18- >39 years.

No 1: women who were contacted with risk factors.

No 2: women who were not contacted with risk factors.

Both populations were studied in the entire of all mentioned risk factors and the significance was statistically calculated by ANOVA, SPSS. Beside this, the structured questionnaire were designed to use the data collection from public health hospital, as well, interview with patient's history of exposure for the mentioned associated risk factors was also done.

Sample and Sample Size:

In this study 5 ml of venial, 100 Blood samples were prepared from the women who had abortion and were referred to hospital because of abortion and had come for treatment. The blood samples were collected from the women with abortion and blood serum samples were examined for detection of anti-Toxoplasma IgG and IgM antibodies anti-*Toxoplasma gondii* (*T. gondii*) using latex agglutination test.

Toxo Latex Lab Test Procedure:

After obtaining information consent, 5 mL of venous blood was drew from each of the study participant using labeled test tubes by trained medical laboratory technician. Then serum was separated from the whole blood by centrifugation at 3000 rpm for 5 min and was transported with ice box from Hospital to the parasitology Laboratory of veterinary faculty of Nangarhar University.

After this Latex agglutination test was used for identification of Toxo-antibodies indirect agglutination test on the slide was used for the determination of toxoplasmosis. Latex agglutination test was performed as per the procedure described in the product information of Toxotest- kit.

Results

A total of 100 sera samples, from aborted women, were collected and screened serologically using latex agglutination test (LAT), In **Table 1**, The overall seroprevalence of toxoplasmosis in mentioned women was 47% (47/100cases). From 47 positive cases 17(34%) was in women resident in Urban areas and 30(60%) was those resident in Rustic areas. The prevalence rate showed there was significant differences between women resident in Rustic and those in urban areas. The people who are living in rustic area (30%) were more exposed to infection than those who were living in urban area (17%) ($P < 0.015$).

Table 1. Prevalence of toxoplasmosis in aborted women in urban and rustic areas in Nangarhar province.

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	17	5.666 \pm 0.881 ^b	34	0.015
Rustic	50	30	10 \pm 0.557 ^a	60	

In **table 2**, in total 100 aborted women consented to be included in this project were for the demographic characteristic and age groups resided in urban regions and rustic residents between the ages of 18 years to >39 years. In total 50 urban examined cases, 17 cases were positive with the prevalence of age group 18- 24 (8%), 25- 31(20%), 32-38(4%) and >39(2%).. While in rustic age groups the prevalence were found as 18- 24(8%), 25- 31(30%), 32-38(22%) and >39(0%). The biggest age group to be included in this for the highest abortion age were 25- 31(20%) in urban and 25- 31(30%) in rustic areas. the result showed, there was significant association between the age groups and residency and seropositivity of toxoplasmosis ($P < 0.05$).

Table2. Distribution of Latex agglutinin test with some demographic characters (age) for the subjects with abortion.

Residence	Age group	No. examined	positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	18-24	50	4	1.333 \pm 0.333 ^c	8	0.05
	25-31		10	3.333 \pm 0.333 ^b	20	
	32-38		2	0.666 \pm 0.333 ^d	4	
	>39		1	0.333 \pm 0.333 ^d	2	
Rustic	18-24	50	4	1.333 \pm 0.333 ^c	8	0.05
	25-31		15	5.000 \pm 1.000 ^a	30	
	32-38		11	3.666 \pm 0.333 ^b	22	
	>39		0	0.000 \pm 0.000	0	

While **in table 3** studied data shows that 14 cases in urban with the prevalence of (28%) and 26 cases in rustic areas with prevalence of (52%) were found contacted and consuming half-cooked meat with risk factors (raw or uncooked meat). There was significant difference between the women had abortion and contacted with risk factors in urban and rustic areas ($P < 0.05$).

Table3. Prevalence of toxoplasmosis in women had abortion and contacted with risk factor (raw or uncooked meat).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	14	4.666 \pm .333 ^b	28	0.05
Rustic	50	26	8.666 \pm 0.333 ^a	52	

In table 4, the prevalence of toxoplasmosis in women eating or contact with soil and water was 9 (18%) in Urban and 21(42%) in Rustic resident women. There was significant difference between women who eating contaminated soil and water or had contacted with the risk factors (contaminated soil and water) and residence in rustic area during pregnancy and those are living in Urban areas ($P < 0.05$).

Table4. Prevalence of toxoplasmosis in women had abortion and contacted with risk factor (water and soil).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	9	3.000 \pm 0 .333 ^b	18	0.05
Rustic	50	21	7.000 \pm 0.577 ^a	42	

Regarding statistical analysis of this data, the prevalence of toxoplasmosis in aborted Women those had contact with contaminated food were 7(14%) in urban while in rustic were 23(46%). There was significant difference between the women residence in rustic areas and had contact with contaminated food and those are living in Urban areas and had contact with contaminated food ($P < 0.05$). The results shown in Table5.

Table5. Prevalence of toxoplasmosis in women had abortion and contact with risk factor (contaminated food).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence(%)	P-value
Urban	50	9	3.000 \pm 0.577 ^b	18	0.05
Rustic	50	23	7.666 \pm 0.666 ^a	46	

In table 6, the results showed the relationship between the people and contact with animals was found to be significant difference in urban residence women and rustic women ($P < 0.05$).

Table 6. Prevalence of toxoplasmosis in women had abortion and contacted with risk factor (animals).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	6	1.888 \pm 0.336 ^b	12	0.05
Rustic	50	20	6.666 \pm 0.666 ^a	40	

In **Table7**, the prevalence of toxoplasmosis in aborted Women those had no contact with raw or uncooked meat was 1(2%) in urban, while in rustic were 4(8%). There was no significant difference between the women residence in rustic areas and had no contact with raw or uncooked meat and those are living in Urban areas and had no contact with raw or uncooked meat (P=0.101).

Table7. Prevalence of toxoplasmosis in women had abortion and not contact with risk factor (raw or uncooked meat).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	3	1.000 \pm 0.000	6	0.101
Rustic	50	4	1.333 \pm 0.333	8	

In **Table 8**, Women which had no contact with the contaminated water and soil in aborted cases were 15 positives in total, that 6(12%) were from urban areas, while 9(18%) were from rustic areas in Nangarhar. There was not significant difference between these two groups (p=0.158).

Table8. Prevalence of toxoplasmosis in women had abortion and not contact with risk factor (water and soil)

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	8	2.666 \pm 0.333	16	0.643
Rustic	50	9	3.000 \pm 0.577	18	

In **table9**, shows the total non-contacted with the risk factor (contaminated food) of aborted women was 15 in total, that 8(16%) in urban and 7(14%) in rustic women. There was no significant difference between mentioned groups (p=0.519).

Table9. Prevalence of toxoplasmosis in women had abortion and not contacted with risk factor (contaminated food).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	8	2.6660 \pm .333	16	0.519
Rustic	50	7	2.333 \pm 0.333	14	

In table 10, Women with abortion and had no contact with the risk factor (animals) was found 24 in total which was 11(22%) in urban aborted women and 10(20%) in rustic aborted women with the ($p=0.678$).there was no significant difference between mentioned groups.

Table10. Prevalence of toxoplasmosis in women had abortion and not contacted with risk factor (animals).

Residence	No. Examined	No. positive	Mean \pm S.E	Prevalence (%)	P-value
Urban	50	11	3.666 \pm .666	22	0.678
Rustic	50	10	3.333 \pm 0.333	20	

Table 11: Risk factors of *Toxoplasma gondii* and compression of the prevalence in Urban and Rustic, contact and not-contact aborted women.

Groups		Risk factors			
		Raw or uncooked meat	Water and soil	Contaminated food	Animals contact
Urban	Contact	4.666 \pm 0.333 ^b	3.000 \pm 0.333 ^b	3.000 \pm 0.577 ^b	1.888 \pm 0.336 ^c
	Not contact	1.000 \pm 0.000 ^c	2.666 \pm 0.333 ^c	2.6660 \pm .333 ^c	3.666 \pm 0.666 ^b
Rustic	Contact	8.666 \pm 0.333 ^a	7.000 \pm 0.577 ^a	7.666 \pm 0.666 ^a	6.666 \pm 0.666 ^a
	Not contact	1.333 \pm 0.333 ^c	3.000 \pm 0.577 ^b	2.333 \pm 0.333 ^c	3.333 \pm 0.333 ^b

Note: abcd shows the significant difference between groups ($P<0.05$). The same article having groups are not significant.

Discussion

Toxoplasmosis is a zoonotic disease which caused by *Toxoplasma Gondii* and causes abortion in pregnant women. The prime invasion during pregnancy can lead to irreversible effects on fetus. Miscarriage, the most common complication of pregnancy, is the spontaneous loss of a pregnancy before the fetus has reached viability. Toxoplasmosis is an infectious disease which is generally asymptomatic in persons with fully functioning immune system. The infections occurred during pregnancy are generally asymptomatic but it may cause abortion, stillbirth, intrauterine growth retardation and various congenital malformations in fetus.

The target groups were selected because most of them were exposed to the infection due to their nutritional, social, and cultural habits or their natural susceptibility to infection. The results showed the overall prevalence of 47 % by latex agglutination test (LAT) in the study population. These results are in agreement with study done in Khartoum State, Sudan by the LAT (Khalil et

al., 2013) and in Al Muthana province / Iraq where reported 44.5% also, by LAT (**Seadawy and Mohenned, 2010**). Our study showed, prevalence is higher than in study done in Hebron district, Palestine where obtained 17.6% by using *Toxoplasma* IgM and IgG ELISA kit (**Nijem and Amleh, 2009**), and in Southwest of Iran recorded 24.6%, (**Saki et al., 2015**).

However, prevalence estimates for human populations vary and among different countries, among different geographical areas within one country, among different age group and contact or not contact with the risk factors. The risk factors that were found to be significantly contributing to the infection after the analysis were host susceptibility such as age, residence, or pattern of contact with risk factors such as contact with, animals, raw or uncooked meat, water and soil, contaminated food, and eating mud. In the present study, we found there was statistical difference between prevalence of *T. gondii* and the residence areas ($p < 0.05$). Our study showed the prevalence of toxoplasmosis is higher in women residence in rustic area (60%) than in women residence in urban area (34%). The prevalence is highest in rural areas because of the increased abundance of cats and other animals. The lower prevalence was in urban areas because the urban women are not contact with cats or other animals. These results are in full agreement with study done in Iran by (**Saki et al., 2015**) and in Palestine by (**Nijem and Amleh, 2009**). But our findings not in agreement with (**Lame et al., 2004**) who found there is no significant differences between women resident in rural and those in urban areas.

In many other studies the sero-prevalence for *Toxoplasma gondii* increases with age (**Lame et al., 2014; Khalil et al., 2013**) might be due to accumulated opportunities for exposure.

The finding in the present study (25-31) years, had a significantly higher prevalence [20%] in Urban residence women and (30%) in Rustic residence women, compared to those who were 24 or less or above 39 years ($p < 0.05$), which is predictable, because older individuals have more chances for exposure to infectious form of parasite. These results are in full agreement with study done in Khartoum, Sudan by (**Khalil et al., 2013**).

The prevalence of toxoplasmosis among the women had abortion and contact with risk factors (raw or uncooked meat, water and soil, contaminated food and animals) was significant than the women was not contact with the risk factors in this study. This finding is in synchrony to the result obtained by (Montoya and Liesenfeld, 2004), they found that the Humans become infected through ingestion of food or water contaminated with oocysts shed by cats, eating under cooked or raw meat containing tissue cysts.

Our results showed that among positive individuals the prevalence rate of risky habits were 28% and 52% in urban and rustic wome for consuming raw or uncooked meat, 18% and 42% for consuming contaminated water and soil, 18% and 46% consuming contaminated food and 12% and 40% for contacting animals, that our study was almost same with little difference with the (**Adel, 2013**).

Conclusion

Toxoplasma gondii is an obligate intracellular protozoan parasite that represents an actual public health problem. Nangarhar is a tropical region in southern of Afghanistan, due to importance of abortions by Toxoplasmosis and absence of study evidences in this field in Nangarhar province,

this research was accomplished. A total of 100 serum samples were collected and tested for *Toxoplasma gondii* antibodies using Latex Agglutination Test (LAT). The overall prevalence of toxoplasmosis in mentioned women was 47% (47/100cases). From 47 positive cases 17(34%) was in women resident in Urban areas and 30(60%) was those resident in Rustic areas. The prevalence rate showed there was significant differences between women resident in Rustic and those in urban areas. The people who are living in rustic area (30%) were more exposed to infection than those who were living in urban area (17%) ($p < 0.015$). Higher prevalence was observed in 25-30 years old group than the others ($P < 0.05$). the result showed that Contact with raw or uncooked meet, water and soil, contaminated food and animals were significant($p < 0.05$). In total 100 aborted women consented to be included in this project were for the demographic characteristic and age groups resided in urban regions and rustic residents between the ages of 18 years to >39 years. In total 50 urban examined cases, 17 cases were positive with the prevalence of age group 18- 24 (8%), 25- 31(20%), 32-38(4%) and >39 (2%).. While in rustic age groups the prevalence were found as 18- 24(8%), 25- 31(30%), 32-38(22%) and >39 (0%). The biggest age group to be included in this for the highest abortion age were 25- 31(20%) in urban and 25- 31(30%) in rustic areas. the result showed, there was significant difference between the age groups and residency and seropositivity of toxoplasmosis ($p=0.05$).

Studied data shows that 14 cases in urban with the prevalence of (28%) and 26 cases in rustic areas with prevalence of (52%) were found contacted and consuming half-cooked meat with risk factors (raw or uncooked meat). There was significant difference between the women had abortion and contacted with risk factors in urban and rustic areas ($p=0.05$). The prevalence of toxoplasmosis in women eating or contact with soil and water was 9 (18%) in Urban and 21(42%) in Rustic resident women. There was significant difference between women who eating contaminated soil and water or had contacted with the risk factors (contaminated soil and water) and residence in rustic area during pregnancy and those are living in Urban areas ($p < 0.05$). Regarding statistical analysis of this data, the prevalence of toxoplasmosis in aborted Women those had contact with contaminated food were 7(14%) in urban while in rustic were 23(46%). There was significant difference between the women residence in rustic areas and had contact with contaminated food and those are living in Urban areas and had contact with contaminated food ($p < 0.05$).The results showed the relationship between the people and contact with animals was found to be significant difference in urban residence women and rustic women ($p < 0.05$).

The results and statisticle analysis of the present study showed There was significant difference between the women residence in rustic areas and had contact with risk factors and those are living in Urban areas and had contact with risk factors ($p < 0.05$), and between the women residence in rustic areas and had no contact with risk factors and those are living in Urban areas and had no contact with risk factors ($p < 0.05$). Hence this study recommends implementing health program among pregnant women to prevent primary infection during pregnancy and regular surveillance of the disease among population all over the country.

Recommendations

This study recommends the followings:

Wide educational program is needed for the whole population in Nangarhar illustrating the hygienic conditions in dealing with animals and the preventive methods for diseases transmitted by animals.

1. Similar studies are recommended in different governorates Nangarhar as a national based study to clarify the exact prevalence of Toxoplasmosis during pregnancy in Nangarhar.
2. Studied of the causes of Abortions in pregnant women may correct the problem of toxoplasmosis in pregnant women.
3. Routine serological testing is to be advised to all pregnant women.
4. For women with negative results in both the tests, information and education relating to preventive measures are of paramount importance because they are at a high risk of acquiring a primary infection during pregnancy.
5. Women who are showing both IgM and IgG positive results, differentiation between recent infection and pre-existing infection may be done with the IgG avidity test and those showing low avidity be treated accordingly.
6. Preconceptional care should be encouraged when the patient decide to become pregnant again. Health education should be done for these women to avoid the risk factors. The study needs to find more risk factors and to be done in a larger scale and in all governorates of Egypt to reduce the risk of abortion as possible.
7. Serological detection for each of Toxoplasma gondii ,Cytomegalovirus, Herpes simplex virus II, Rubella virus, anti cardiolipin (ACL) andante phosphatidylserine (APS) by ELISA should be done for each women prepare to pregnancy.

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