

Occurrence of antibody to *Toxoplasma* infection among pregnant women with obstetric histories and at different trimesters in Sokoto, Northwest Nigeria

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Abstract

During an investigation of toxoplasmosis among women of childbearing age in one of the tertiary hospitals in Sokoto, 173 volunteered pregnant women attending antenatal clinic were encountered, all these women were in various trimesters of pregnancy and some have had one or two forms of obstetric history previously. The sera collected from these volunteered pregnant women and analysed using Toxo-Latex kit by LINEAR chemicals (Cromatest, Jeanquim Costa, Barcelona, Spain) which is a rapid slide agglutination procedure showed that of the 59 women in the first trimester, 18 (30.5%) were sero-positive, while 14/62 and 16/52 representing 22.5% and 30.7% sero-positivity were recorded for women in second and third trimesters respectively. There was significant statistical association between the *Toxoplasma* infection and trimester ($p < 0.01$). Based on data analysis of the questionnaire administered on women with previous obstetric history, sero-prevalence for toxoplasmosis among women with neonatal death was 62.5% while for those with abortion was 41.6%. Pregnant women without obstetric history had 21.6% sero-prevalence; however, there was no significant statistical association between the *Toxoplasma* infection and reproductive history ($p > 0.01$).

The significance of this finding is that more needs to be done on health education during antenatal clinic on the prevention of *Toxoplasma gondii* and other zoonotic infections.

Key words: Obstetric history, Occurrence of Antibody, *Toxoplasma* infection, trimesters, pregnant women, Sokoto

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Introduction

Infection due to *Toxoplasma gondii* is a worldwide zoonosis. The organism infects herbivorous, omnivorous and carnivorous animals, including birds (Bisson *et al.*, 2000; Arko-Mensah *et al.*, 2000). Two main routes of transmission have been described in humans; by oral- ingestion of the parasite and through placental transmission to the fetus if occur in recent pregnant women. The oral routes may involve the ingestion of raw or undercooked meat that contains cysts, the ingestion of water or food contaminated with oocysts (Pelloux *et al.*, 1997; Dubey, 2004; Dawson; 2005). Detection of recently acquired infection with *T. gondii* is important in pregnant women for prevention of transmission of the infection to their fetuses (Pelloux *et al.*, 1997). Infection of some women with habits of tasting raw meat such as paste from chopped pork for meat balls during cooking (Flegr *et al.*, 1998) has been reported. Transmission through contaminated soil is also possible in humans by accidental ingestion of soil contaminated with *T. gondii* oocysts. The vertical transmission of *T. gondii* from pregnant woman to the fetus during pregnancy may cause a wide range of clinical manifestations in the offspring depending on the gestational age at which the primary maternal infection was acquired, the virulence of the parasite and the immunologic development of the fetus.

Pelloux *et al.*, (1997) stated that, congenital toxoplasmosis of newborn resulting from infection of the mother while she is pregnant is probably the most common form in man.

Materials and Methods

Study location

The study was carried out at Specialist Hospital Sokoto. The hospital is one of the tertiary hospitals in Sokoto town, northwest Nigeria. Sokoto is within the Sudan savannah vegetation belt. Ethical approval was obtained from the management of the hospital.

Study population

The participants for this study were the volunteered pregnant women who had registered for antenatal clinic at the hospital. Individual consent was sought after explaining the purpose and the benefit of the study to them. One hundred and seventy-three pregnant women in different trimesters participated in this study. Of these 59 of them were in the first trimester, while 62 and 52 were in second trimester and third trimester respectively.

Collection and analysis of blood samples

About 5ml venepuncture blood samples were collected from each participant and quickly transferred to sample bottles without anticoagulant. The blood in the sample bottles was left for 3 - 4hrs at room temperature of about 23-29⁰C to allow for clotting. The sera formed were now separated into labeled vials and stored at 4⁰C until used, which was not later than 36 hours. Sero- diagnostic tests were performed on the collected sera. Toxo-Latex kit (Sensitivity; 92% and Specificity; 96%) by LINEAR Chemicals (Cromatest, Jeanquim Costa. Barcelona.Spain.REF2740005; 2740010), which is a rapid slide agglutination procedure developed for the direct detection of antibodies anti –

Toxoplasma in human serum was used. Structured questionnaire in which information on the reproductive history was included was administered. The prevalence of infection was given as the percentage parasitological positive in the total population examined. The association between infection and trimester was determined using Chi-square test.

Results

A total of 48 women were positive serologically with Toxo-Latex kit LINEAR Chemicals (Cromatest, Jeanquim Costa. Barcelona.Spain.REF2740005; 2740010). Of this, 18/59 (30.5%) were in the first semester, while 14/62 and 16/52 representing 22.5% and 30.7% sero-positivity were recorded for women in second and third trimesters respectively, (Fig.1).

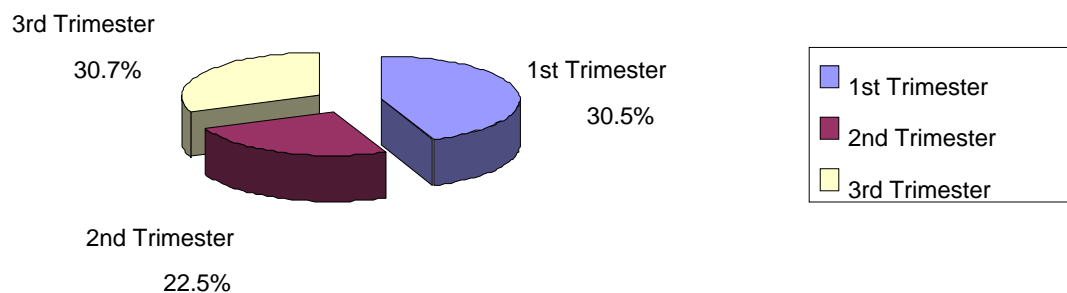


Fig. 1: Shows the distribution of antibody to *Toxoplasma* infection among pregnant women in relation to trimester.

Data analysis of the questionnaire administered on women with previous obstetric histories indicated that serological positive individuals with still birth 8 (61.5%) and neonatal death 5(62.5%) were observed (Table 1). There was significant statistical association between the *Toxoplasma* infection and trimesters ($p < 0.01$). Pregnant women without obstetric history had 21.6% sero-prevalence; however, there was no significant statistical association between the *Toxoplasma* infection and reproductive history ($p > 0.01$).

Table1: Shows the prevalence of *Toxoplasma* infection in respect to the reproductive history

Reproductive History	No. Examined	No.Positive (%)	p.value
Abortion	12	5 (41.6)	p>0.001
Still birth	13	8 (61.5)	
Neonatal death	8	5 (62.5)	
None	139	30 (21.6)	

Discussion

This study shows that about 27.7% of the pregnant women sampled using Latex Agglutination technique had been exposed to *Toxoplasma gondii* infection. This prevalence is similar to that obtained in Zaria (Ishiaku *et al.*, 2009) using IgG determination technique. This value (27.7%) was however, less than 40.8% obtained by Akinbami *et al.* (2010) and 32.8% Deji- Agboola *et al.* (2011) respectively both in Lagos.

This variation may probably due to the study area which was in the North-western zone of the country with extreme high temperature condition, which consequently hinders the survival and development of the *Toxoplasma gondii* oocyst (Alayande *et al.*, 2012). It has been reported that pregnancy itself is a risk and may add to unfavourable condition of life (Alvenino *et al.*, 2004) and this increases vulnerability of pregnant women to parasitic infection. Although, it is reported that detection of antibodies in pregnancy reduces the risk of infection (van der Veen and Polak, 1980), the presence of *T. gondii* antibody might have occurred earlier among pregnant women in the study area. Congenital toxoplasmosis is considered to be the most serious form of *T. gondii* infection, because it is accompanied by various foetal complications based on gestational age at the time of infection (Deji Agboola *et al.*, 2011). Significant association was found to exist between *T. gondii* oocyst infection and trimester in which a higher prevalence was recorded for pregnant women in the first (30.5%) and third (30.7%) trimester's retrospectively. There is possible foetal implication of the *T. gondii* oocyst infection in pregnant women in the first trimester based on the fact that this period corresponding to the formative stage of the foetus in which deformation and even death of the foetus may occur. The intrauterine transmission of toxoplasmic infection is greatly determined by factors such as date of onset of the maternal/infection, the virulence of the parasite strain, the quantity of inoculums as well as the maternal immunity. Most congenital toxoplasmic infection asymptomatic at birth and symptoms such as blindness mental retardation, chorioretinitis may appear later in life (Pelloux *et al.*, 1998). This study also indicated that a considerable proportion of the pregnant women (72.2%) sampled have not been exposed to *T. gondii* infection, hence no immunity. This group is at risk of becoming infected if

they come in contact with *T.gondii* infectious agent. They should therefore be advised against infection through comprehensive public health education. Human infection in the study area may be attributed to the consumption of contaminated food products usually eaten or drunk which might inadequately or improperly washed. Such items include *suya*/roasted meat, *nunu*, these are animal products. Others are vegetables, carrots, garden eggs which are commonly eaten in the country especially by pregnant women as advised by the clinicians (Aganga *et al.*, 1990).

In conclusion, it is suggested that antenatal examinations should include screening for *Toxoplasma* infection. Similarly pregnant women should be educated on the risk factors associated with toxoplasmosis.

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