

Seroprevalence and Risk Factors of Toxoplasmosis among Pregnant Women in the Region of Setif, Algeria

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Abstract: The aim of this study was to evaluate the seroprevalence of toxoplasmosis infection in pregnant women in Setif region and to identify the main risk factors involved. The different parameters were collected by direct interviews and using standardized ELIFA technique for detecting the anti-toxoplasmic antibodies IgG / IgM and determining the immunological status of this sample. Our results showed a general lack of Toxoplasmosis awareness, a prevalence of 58% of seronegative pregnant women and 42% of seropositive women they may have risks of seroconversion as the case observed in our study. The statistical analysis confirmed that the consumption of undercooked meat is the main factor of contamination. This study has the advantage of setting up a serological monitoring of toxoplasmosis according to a legal framework with the aim of detecting and servile seronegative women, hence the importance of education and information in terms of prevention.

Keywords: Toxoplasmosis, pregnant women, seroprevalence, epidemiology, Setif.

INTRODUCTION

Toxoplasmosis is a cosmopolitan parasitosis caused by an opportunistic protozoan parasite *Toxoplasma gondii*, capable of infecting different warm-blooded animals [1]. It is a pathology generally benign in its classical form of the immunocompetent subject, but which can be doubtful in immune compromised patient in case of fetal damage during seroconversion in a pregnant woman [2] toxoplasmic infection occurs most often by ingestion of infected meat containing tachyzoite or bradyzoites, or by oocysts in food soiled by soil or by direct contact with the cat resulting in acquiring toxoplasmosis most often unapparent and benign, and congenital toxoplasmosis by transplacental transmission [3]; the risk of transmission increases with gestational age, while the severity of fetal impairment decreases, the majority of cases have been shown to be asymptomatic Toxoplasmosis affects about 7 to 80% of the world's population.

Seroprevalence varies from country to another <30% in North America, Scandinavia and Southeast Asia, and > 60% in Africa and Latin America [4]. In France seroprevalence was long raised 82% in 1961 and then decreased (44% in 2003) and (36% in 2010) [5]

The information is available on the epidemiological situation of this infection in Algeria, where knowledge of the incidence rate in women is poorly documented. In order to be able to understand the epidemiology of this Toxoplasmosis infection in the region of Setif, prevalence study in a population of pregnant women was undertaken. The work that we propose is to evaluate the state of knowledge of pregnant women in the form of a questionnaire in order

to identify by statistical analysis the factors favoring and on the other hand to carry out a serological follow-up on the search for IgG and IgM.

MATERIALS AND METHODS

Study population

The study was carried out on a representative sample of the population of 200 pregnant women at different gestational stages of the region of Setif, 100 pregnant women were 18-45 years old, these women were interviewed, using a questionnaire that included questions on clinical status and behavioral characteristics, and the other 100 women perform a serological test to determine IgG and IgM.

Serological technique

The serological examination was performed by the method of ELIFA (Enzyme linked fluorescent assay), the test protocol was adopted according to the manufacturer's recommendations. Whose IgG positivity threshold is greater than or equal to 8 IU / ml, and that of IgM is greater than or equal to 0.65 IU / ml.

Statistical methods

The data were collected in form of tables and entered into Microsoft Excel, then analyzed by the kid2 test using the SPSS version 24 software. The $p < 0.05$ value was accepted as significant.

RESULTS

Among the 200 pregnant women studied, 42% were found to be seropositive for *T. gondii* and 58% were seronegative. The statistical analysis showed that three variables were identified as possible risk factors associated with *T. gondii* infection for the questionnaire (Table 1): eating uncooked meat ($P = 0.006$); the stage of pregnancy ($p = 0.05$); Clean up cooking tools ($p = 0.023$).

The other clinical and behavioral characteristics of the women studied did not show any likely association with *T. gondii* infection for both questionnaire and serological test (Table 2).

Table-1: Bivariate analysis of risk factors associated with *Toxoplasma gondii* infection in pregnant women (the interview)

Variable	Response	Immunological status			p value
		Positive	Negative	No information	
Education	Illiterate	60,0%	20,0%	20,0%	0,175
	Primary	28,6%	28,6%	42,9%	
	Middle school	53,6%	28,6%	17,9%	
	High school	44,4%	33,3%	22,2%	
	University	26,2%	57,1%	16,7%	
Consumption of undercooked meat	Yes	28,6%	39,3%	32,1%	0,006
	Sometimes	33,3%	57,1%	9,5%	
	No, I stopped	31,0%	37,9%	31,0%	
	No, I don't like it	68,2%	31,8%	00,0%	
The trimester of pregnancy	First	14,3%	42,9%	42,9%	0,009
	Second	36,0%	44,0%	20,0%	
	Third	45,9%	39,3%	14,8%	
Clean up cooking tools	Yes	41,1%	37,9%	21,1%	0,023
	No	0,0%	100%	0,0%	
Knowledge of toxoplasmosis	Yes	43,8%	40,0%	16,3%	0,071
	No	20,0%	45,0%	35,0%	
Gravidity	Primigravida	27,8%	52,8%	19,4%	0,152
	Multigravida	45,3%	34,4%	20,3%	
Contact with cat	Yes	43,8%	31,3%	25,0%	0,368
	No	36,8%	45,6%	17,6%	

Table-2: Bivariate analysis of risk factors associated with *Toxoplasma gondii* infection in pregnant women (the serological test)

Variable	Reponce	Imunological statut				p value
		IgG ⁺ IgM ⁻	IgG ⁻ IgM ⁻	IgG ⁻ IgM ⁺	IgG ⁺ IgM ⁺	
Age	<20	2,40%	1,80%	0,00%	0,00%	0,879
	20-35	63,40%	66,70%	0,00%	100,00%	
	35-50	34,10%	31,60%	0,00%	0,00%	
Localisation region of Pregnant women	North	19,50%	14,00%	0,00%	50,00%	0,659
	Central	65,90%	73,70%	0,00%	50,00%	
	South	14,60%	12,30%	0,00%	0,00%	

DISCUSSION

The situation of toxoplasmosis in Setif remains unknown. We noticed a lack of register-level information, which has led to make it difficult to discuss the results; We also noticed that pregnant women who shows up at the service level are directed to private laboratories due to the lack of specific reagents and their high price, hence the lack of serological information (Prevalence). Until the hour currently very little work has been done in the region of Setif on this theme, except some final dissertations and doctoral thesis. According to the data of the literature, the results of the epidemiological studies diverge from one study to another. Indeed, the prevalence varies not only from one region geographically but also within the same population. The methods samples used, the diagnostic techniques and their specificity thresholds are great of variability.

The main purpose of our work is to determine the immune status of toxoplasmosis in pregnant women and the risk factors associated with toxoplasmic infection in the region of Setif, despite the short duration of the study, we have been able to obtain results making it possible to draw conclusions concerning. Our study showed a prevalence of 58% of seronegative pregnant women and 42% of seropositive women.

Our study highlights potential risk factors for *T. gondii* infection in pregnant women in Setif. Consumption of undercooked meat ($p=0.006$); the trimester of pregnancy ($p=0.009$) and clean up cooking tools ($p=0.023$). These parameters have also been found as significant contributing factors in previous studies in various regions of the world [6, 7, 8]. Although Algerians' dietary habits revolve around cooking meat, we find that meat is the main cause of toxoplasmosis and this may be due to the fact that most women eat out of the house (chawarma, sandwich), Manipulation of utensils used in the preparation of meals presents a factor of contamination. The other factors explored in this study shown no influence in toxoplasma infection such as education ($p=0.174$), Knowledge of toxoplasmosis ($p=0.071$); gravidity ($p=0.152$) and

contact with cat ($p=0.368$) which is in agreement with several studies conducted elsewhere [4, 9, 10]

Which concerns the serological results they showed that age and immune status, residence and immune status are insignificant ($p = 0.879$); ($p = 0.656$) respectively. The results obtained in our present study seem to be in agreement with those reported by Nacir *et al.* [11]. A good knowledge of toxoplasmosis and appropriate preventive measures contribute to the health of pregnant women and reduce the risk of developing this disease.

CONCLUSION

Toxoplasmosis is a major parasitosis by its frequency, the diversity of the attacks clinics and affected populations. It represents a cosmopolitan zoonosis, with a seroprevalence varies from one country to another and sometimes within the same country The data obtained from this work allowed us to have a better knowledge about the status of toxoplasmosis in Setif in terms of seroprevalence and to see the level of knowledge among pregnant women in Setif region, as well as to identify the main factors related to the contamination. This study allowed us to highlight the important lack of information at the register level. This work highlights the inescapable importance of serological surveillance of pregnant women, which will make it possible to detect and follow as early as possible non-immune pregnant women and to take care of them.

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