



ASSESSMENT OF KNOWLEDGE AND PERCEPTION OF HEALTH PROFESSIONALS TOWARDS TOXOPLASMOSIS IN SELECTED TOWNS OF ETHIOPIA

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Abstract. *Background:* *Toxoplasma gondii* infections during pregnancy can result in abortion or congenital defects. The knowledge and perception of health professionals towards the disease is not well studied in the country/ the current study was conducted with the objectives to assess of knowledge and perception of health professionals including physician, nurses and gynecologist, working in antenatal care in selected health institution of different parts of Ethiopia. *Method:* A cross-sectional study was conducted at selected health facilities in different parts of Ethiopia from October 2011 to March 2012. A questionnaire survey was administered for all health professionals to gather information on their knowledge, attitude and perception towards toxoplasmosis. *Result:* From health professionals, 63 % know health risk of domestic animals like cat with regards to toxoplasmosis. Consumption of raw or undercooked meat and vegetables (71.2 %) were recognized as the common source of *T. gondii* infection by health professional's consumption of raw milk (18.4 %), contact with cat faces (14.3 %), and drinking unboiled water (6.1 %) were also mentioned as important modes of transmission. In this study, 52.7 % of health professionals thought toxoplasmosis as important pathogen in HIV infected patients and pregnant women. *Conclusion and recommendation:* The authors concluded that there is urgent need of incorporating zoonotic diseases concept in the medical education and training. Furthermore, these findings area helpful for optimal design of strategies in contribution of health professionals in relation to toxoplasmosis, pregnant women and immunocompromised individuals.

Keyword: Cats, HIV/AIDS, Pregnancy, Toxoplasmosis, *T. gondii*, Zoonosis.

Introduction

Because of the asymptomatic nature of primary toxoplasmosis infection, counseling of pregnant women is of paramount importance to reduce the risk of fetal infection.

Knowledge of the most likely sources of infection in a given population is a prerequisite for the development of effective strategies to decrease, and perhaps eliminate, infection risks.

Effective counseling for prevention requires knowledge of the risk factors associated with the transmission of the parasite. Knowledge of the life cycle of *T. gondii* is necessary to understand how to advice women to decrease their risk of primary toxoplasmosis [KRAVETZ and DANIEL, 2005; JONES *et al.*, 2003]

The knowledge and perception of health professionals towards

toxoplasmosis is the best tool to reduce the risk of infection in human. In the few surveys carried out elsewhere among obstetricians, a deficit in the knowledge about the diagnostic, clinical, and epidemiological aspects of toxoplasmosis was demonstrated, with the inherent risk of inadequate management [BERRIEL da SILVA *et al.*, 2011].

According to [ALVARADO-ESQUIVEL, 2011] the physicians surveyed showed an incomplete knowledge about diagnosis and treatment of toxoplasmosis.

A survey showed that the vast majority of obstetricians counselled pregnant women on avoiding cat litter and undercooked or raw foods, but fewer provided counselling on safe gardening and over 50 % responded that keeping a cat outdoors would lower the risk of toxoplasmosis [JONES *et al.*, 2001].



Education of obstetricians, nurses and physician on risk factors for toxoplasmosis transmission is needed and may lower the rate of congenital toxoplasmosis as well as decrease the frequency of cat abandonment during pregnancy.

There are few studies addressing the degree of knowledge on toxoplasmosis of the health professionals.

In these regards, assessing the knowledge and perception of health professionals towards toxoplasmosis in Ethiopia is very crucial but no similar study conducted in the country before.

Lack of adequate studies on sero-epidemiological pictures, potential risk factors and knowledge and perception of health professionals towards toxoplasmosis in the country justified the importance of this study.

Therefore, the objective of this study is to assess of knowledge and perception of health professionals working in antenatal care in selected health institution of different parts of Ethiopia.

Material and methods

Study areas and population

The study was done at selected health facilities of Addis Ababa, Jinka, Mojo and Awash towns of Ethiopia from October 2011 to March 2012 and the study subjects are all health professionals, physician, nurses and gynecologist. According to CSA the inhabitants of Addis Ababa city, Jinka, Mojo and Awash were 2,738,248; 90,756; 111,243 and 72,445, respectively. Addis Ababa, the capital city of Ethiopia, is described by a biannual rainfall.

Jinka is the capital of South Omo Zone of the South nation, nationality people. Mojo and Awash are located in East Shoa Zone 74 and 202 km from Addis Ababa respectively. In the study, we considered health professionals who are gynecologist, physician and nurses working in prenatal and Anti-Retroviral Treatment services of the selected health institution of different parts of Ethiopia. Therefore, in the current study 100 health professionals were included for

knowledge and perception study towards toxoplasmosis.

Those health professionals who are physician, nurses and gynecologist and had more than or equal to two years work experience were included in the study but others health professionals except the aforementioned health professionals who had less than two years work experience were excluded.

Questioner survey

A structure and pretested questionnaire used to collect data from the health professionals to collect information on their age, sex, academic qualification, area of work, awareness of toxoplasmosis, exposure of toxoplasmosis case on the patient, clinical sign and symptoms, prevalence of case and provision of health education to pregnant women.

The other important part of the study was questionnaire survey based investigations to assess various risk factors to acquire *T. gondii* infection in study participants and knowledge and perception of health professionals.

For this purpose, pretested questionnaire in one selected site using 15–20 respondents was analyzed and usefulness of the data for the survey was assessed before it's finally usage for the actual research purpose.

Data management and analysis

The data was recorded and coded in Microsoft Excel spreadsheets (Microsoft Corporation) before transferred to statistical software for analysis (STATA Version 20, Stata cooperation, TX, USA). Results were considered significant at $P \leq 0.05$. For knowledge and perception section frequency table were computed and Chi square (χ^2) was applied.

Results and discussion

Socio demographic characteristics of health professionals

A total of one hundred physicians, nurses and gynecologist attending pregnant women in the selected health institution of the different parts of Ethiopia were surveyed. Male to female ratio is 0.53. The health professionals consisted mostly of women (65 %).



The mean age of respondents was 27.2 years ranging from 21 to 47 years old and half of respondents were belongs to 25–40 years age group.

Among health professionals, 40 % of them had diploma, 30 % of them had

bachelor degree, 20 % of them had medical degree and 6 % of them specialize in their profession. Most of the health professionals (60 %) had 4–6 years of work experiences in their professions (Table 1).

Table 1.

Socio–demographic characteristics of health professionals in selected health institution of different parts of Ethiopia.

Professions	Nurses (N=74)	Physicians (N=20)	Gynaecologists (N=6)	Total
Sex				
M	20(27)	13(65)	2(33.3)	35(35)
F	54(73)	7(35)	4(66.7)	65(65)
Age group (Years)				
<25	20 (27)	2(10)	0(0)	22(22)
25–40	54 (73)	14(70)	4(66.7)	72(72)
>40	0(0)	4(20)	2(33.3)	6(6)
Educational status				
Diploma	40(54)	0(0)	0(0)	40(40)
BSc	34(46)	0(0)	0(0)	34(34)
MD	0(0)	20(100)	0(0)	20(20)
MSc	0(0)	0(0)	6(100)	6(6)
Service years (Years)				
2–4 years	19(25.7)	4(20)	2(33.3)	25(25)
4–6 years	34(46)	8(40)	3(50)	45(45)
>6 years	21(28.3)	8(40)	1(17.7)	30(30)

Number in parentheses is percentage of respondents *– Shows that significance difference occur

Of them, 74 were Nurses, 20 general practitioners, and 6 gynecologists.

They were asked about [i] general aspects about toxoplasmosis including clinical manifestations, diagnosis and, treatment, [ii] their practices and experiences on toxoplasmosis.

General knowledge and perception of health professionals about Toxoplasmosis

From health professionals, 65 % and 63 % of them had knowledge of health risk of cat and toxoplasmosis respectively.

Consumption of raw or undercooked meat and vegetables were recognized as the common source of *T. gondii* infection by 71.2 % health professionals, but consumption of raw milk (18.4 %), contact with cat faces (14.3 %), and drinking unboiled water (6.1 %) were also mentioned as important modes of transmission (Table 2).

Of health professionals, 42.5 % respondents considered as avoid contact with cat faces is the most commonly used

method for preventing the spread and transmission of toxoplasmosis.

More over 35 % respondents mentioned that transmission of toxoplasmosis could be prevented by keeping personnel hygiene, avoid undercooked food substances (meat, vegetables and milk) (15 %) and avoid unboiled water for drinking purpose (7.5 %).

In the current study, 56.7 % and 47.3 % of health professionals not knew the importance of testing toxoplasmosis during pregnancy and symptoms of toxoplasmosis respectively.

The four commonly recognized symptoms of toxoplasmosis mentioned by health professionals were hydrocephalus [33.3 %], mental/brain retardation (26.9 %), microcephaly (25.4 %) and hearing loss (14.3 %).

Majority of health professionals (93%) do not screen pregnant women but 78% of them had the case or exposure of toxoplasmosis in HIV patient and pregnant women.



All health professionals didn't give health education for the pregnant women regarding modes of transmission and prevention of toxoplasmosis.

The most commonly used method of diagnosis known by health professionals for toxoplasmosis were clinical examination (66.7 %) but serology (17.5 %), ultra sound (11.1 %) and CT scan (4.7 %) were also mentioned by respondents as method of diagnosis for toxoplasmosis. 70 % (11/63) of health professionals only requested laboratory tests for detecting toxoplasmosis.

The greatest number of health professionals concentrated on clinical issues. In studying the altitudes and practices of respondents, 52.7 % and 47.6 % of health professionals thought toxoplasmosis as important pathogen in HIV infected patients and pregnant women respectively but Less than half of professionals, 44.4 %, knew the medication of toxoplasmosis in pregnant and neonates but 22.3 of respondents they don't knew what they do if pregnant women and neonats became toxoplasmosis positive.

Table 2.

Health professional's knowledge about general aspects of Toxoplasmosis in different parts of Ethiopia.

Case of toxoplasmosis					
No	15(20.3)	5(25)	2(33.3)	22(22)	0.711
Yes	59(79.7)	15(75)	4(66.7)	78(78)	
Providing health education for pregnant for toxoplasmosis					
No	74(74)	20(20)	6(6)	100(0)	
Yes	0(0)	0(0)	0(0)	0(0)	
Screen pregnant women for toxoplasmosis					
No	73(90)	18(90)	2(33.3)	93(93)	0.000*
Yes	1(10)	2(10)	4(66.7)	7(7)	
Diagnosis of toxoplasmosis					
Clinical	24(61.5)	14(77.7)	4(66.7)	2(66.7)	0.000*
CT scan	0(0)	3(16.7)	0(0)	3(4.7)	
Serology	9(23)	1(15.6)	1(16.7)	11(17.5)	
Ultrasound	6(15.5)	0(0)	1(16.6)	7(11.1)	
Importance of Toxoplasma in pregnant women					
Important	10(25.6)	14(77.7)	6(100)	30(47.6)	0.000*
Not Important	5(12.8)	3(16.7)	0(0)	8(12.6)	
Don't know	24(61.6)	1(15.6)	0(0)	25(39.8)	
Importance in HIV infected patient					
Important	13(33.3)	14(77.7)	6(100)	33(52.4)	0.000*
Not Important	6(15.3)	4(32.3)	0(0)	10(15.9)	
Don't know	20(51.4)	0(0)	0(0)	20(31.7)	
Response for					
Medication	10(25.6)	12(66.6)	6(100)	28(44.4)	0.094
Refer to	15(38.4)	6(33.4)	0(0)	21(33.3)	
specialist	14(36)	0(0)	0(0)	14(22.3)	
Don't know					

Number in parentheses is percentage of respondents*– Shows that significance

Comparing the number of answers according to type of profession, the professionals who are gynecologist and physician showed the total number of correct answers on the issues of clinical manifestation, prevention and diagnosis, higher than those who are nurses however nurses had a better experience

(23 %) of using laboratory test relative to other professionals.

In the comparison according to the professions, the gynecologist had the highest number of correct answers in the diagnostic and clinical issues.

Regarding prevention, no significant differences were found between the two professional categories.



Mostly nurses had better knowledge than Physician but in medication physician had more awareness relative to nurses.

A questionnaire based survey was conducted among health professionals for the assessment of knowledge and perception towards toxoplasmosis on selected health facilities of different parts of Ethiopia.

This study demonstrated that majority of health professionals [63 %] recognized human get disease from cat and knew toxoplasmosis respectively.

This finding was in agreement with others studies [BERRIEL da SILVA *et al.*, 2011, JONES *et al.*, 2001, BUTNARIU *et al.*, 2012].

Since the knowledge and awareness of health professionals is not adequate, there is a need for the improvement among health professionals in both patient education and self-education.

As numerous studies have shown, eating undercooked meat during pregnancy is the most important risk factor for toxoplasmosis sero-conversion [KRAVETZ and DANIEL, 2005, BERRIEL da SILVA *et al.*, 2011, ALVARADO-ESQUIVEL, 2011].

Similarly, in the current study majority of health professionals recognize consumption of raw or undercooked meat and vegetables as the common source of *T. gondii* infection.

With regard to direct advice given to pregnant women, all health professionals didn't give health education for the pregnant women regarding modes of transmission and prevention of toxoplasmosis however studies in USA [KRAVETZ and DANIEL, 2005, PUTNOKY *et al.*, 2013, BAGIU *et al.*, 2012] showed almost all health professionals (98 %) advised them to avoid raw meat and vegetables.

Since consumption of raw vegetables in the current study was the primary risk factor for toxoplasmosis transmission, all pregnant women should be counselled to thoroughly cook all vegetables during pregnancy.

About prevention, although 42.5 % of professionals recognize avoid contact with cat faces is the most commonly used method for preventing the spread and

transmission of toxoplasmosis, which is similar to other studies [DIAZ-SUAREZ, 2009, AKYAR, 2011].

Regarding to the diagnosis, more than 83 % of professionals never request lab test for diagnosis of toxoplasmosis which is very high (25 %) relative to studies in Mexico [BERRIEL da SILVA, 2011].

The fact that the overall median number of correct answers and diagnosis from professionals working in hospitals were higher than those of the health center may in part be explained by the fact that professionals working in hospitals have more training in high-risk prenatal care.

However, a higher number of correct questions of prevention among professional's health center were expected, since the health center has as one of its main mission's educational activities aimed at preventing health problems [KRAVETZ and FEDERMAN, 2009, BUTNARIU and CAUNII, 2013, RASHED and BUTNARIU, 2014].

Likewise, the median number of correct answers among physicians higher than that of nurses is expected in the diagnosis and clinical issues, as these issues are the object of focus in medical schools than in schools of nursing.

However, the basic knowledge of nurses in issues related to prevention is inconsistent with the role of nurses as health educators [BERRIEL da SILVA, 2011, BUTNARIU and GIUCHICI, 2011].

The greatest number of correct answers among the professionals with less training time is consistent with the literature that indicates an inverse correlation between knowledge and years of professional practice, justifying the need for recertification exams in some countries [KRAVETZ and DANIEL, 2005, BERRIEL da SILVA, 2011, CRISTINA *et al.*, 2014].

Continued education seems especially useful when targeted to specific groups and disciplines [BERRIEL da SILVA, 2011] like our target population.

However, in this study only 100 data of health professionals are analyzed to assess their knowledge and perception but it is preferable to analyze all the data of health professionals for better findings.



Conclusions

In conclusion, the knowledge of health professional's especially nurses is not adequate as their main role is providing health education for their pregnant women to maintain safe delivery. Only half of the respondents were aware of the treatment and more than 83 % never request laboratory test for detecting toxoplasmosis.

The health professionals surveyed showed an incomplete knowledge about diagnosis and treatment of toxoplasmosis.

All health professionals didn't give health education for the pregnant women regarding the disease. Such findings prove toxoplasmosis is considering as neglected disease even though it had various complication during pregnancy and on newborn health.

Therefore, urgent providing of medical education and self-learning is needed. Because such findings are useful for optimal design of strategies in the medical education about toxoplasmosis.

At last the authors would like to recommend, assessment of health professionals knowledge, attitude and practice in large scale towards toxoplasmosis is also recommended.

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Authors' details

AA developed the proposal, participated in the coordination and management of the study, collected and analyzed the data and drafted the article. MA participated in data collection, data analysis and interpretation and drafting of article with inputs from AHA and TS and

TS participated in the study design and edition of article.

All authors read and approved the final manuscript.

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