

Assessment of Maternity Nurses Knowledge Regarding Toxoplasmosis

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Abstract: Toxoplasmosis is a zoonotic disease caused by the protozoal parasite *Toxoplasma gondii*. Transmission of the parasite to the fetus usually follows acquisition of primary infection by an immunologically normal pregnant woman during gestation. Congenital transmission from mothers infected before pregnancy is extremely rare except for immunocompromised women who are chronically infected.

Purpose of the study was to assess the maternity nurses' knowledge regarding toxoplasmosis. **Design:** descriptive cross-sectional was used. **Sample:** A simple random sample technique was used, the final nurses was 100 nurses. **Setting:** The study was conducted at maternal and child health care centers and health care units are affiliated to the ministry of health and population. **Instruments:** I: Structured interviewing questionnaire included: Socio-demographic characteristics of the nursing staff and Toxoplasmosis knowledge questionnaire. **Results:** of this study revealed that less than half of the sample (40.90%) had poor knowledge about toxoplasmosis and less than half of the nurses (48.90%) had fair knowledge, while less than one fourth of the nurses (10.20%) had good knowledge about toxoplasmosis. **Conclusion:** maternity nurses' knowledge about toxoplasmosis has been found less than one fourth of the study sample had good knowledge about toxoplasmosis. **Recommendations:** all nurses who work in prenatal care must admitted in training program regarding toxoplasmosis for early detecting and referral to safe mother and embryo.

Key Words: Assess, Knowledge, Toxoplasmosis, Maternity nurses

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I. Introduction

Toxoplasma gondii is a ubiquitous protozoan parasite that is extremely widespread and of great medical importance, infecting all mammalian cells and responsible for human and veterinary diseases (Carlo, 2018). Humans can become infected by any of several routes: eating undercooked meat of animals harboring tissue cysts, consuming food or water contaminated with cat feces or by contaminated environmental samples (such as contaminated soil or changing the litter box), blood transfusion or organ transplantation and transplacentally from mother to fetus. It is assumed that approximately half of the cases of toxoplasmosis are Food borne (WHO, 2015).

The prevalence of *T. gondii* infection varies significantly according to geographic local and the socioeconomic status of the population. Sero-prevalence increases with age because of increasing length of exposure with age. It is inversely associated with socioeconomic status because of the strong influence of hygienic and alimentary habits in the transmission of the parasite (Jones, Parise & Fiore, 2014).

Several studies in Egypt have been performed to detect *T. gondii* infection in human and animals. There is a high seropositivity for *Toxoplasma gondii* was reported (18.4%) indicating potential for abortion and congenital transmission. Women living in rural areas are at higher risks for *T. gondii* infection. (Abdelaziz et al, 2013). Also in Menoufia governorate, a previous study reported that the Seroprevalence of *T. gondii* among pregnant women was 52.2%, which is considered high. Only genotype I was detected (Nashaat et al, 2014).

The clinical diagnosis of maternal *Toxoplasma* infection is complex because most pregnant women who acquire infection during pregnancy show no or only benign symptoms that are often unrecognized or not reported and not specific. In immunocompetent pregnant women, lymphadenopathy and fatigue are the most common manifestations and appear, on average, 1 week after infection is acquired, although the incubation period can be longer (François, Martine, François and Justus, 2016). Early maternal infection (first trimester) can cause severe congenital toxoplasmosis and can result in death of the fetus in utero and spontaneous abortion. late maternal infection by contrast (acquired during the third trimester) usually results in a normal-appearing newborn who may be at high risk for seizures, mental retardation, and chorioretinitis (Rick & Edward, 2018).

Nurses play a role in home assessment and prenatal teaching to prevent this infection (Gibbs & Engebretson, 2012). Correct diagnosis by nurses and other health care workers allows the provision of early and appropriate treatment. Health care providers provide a client with education for preventing and controlling parasite infection (Stanhope & Lancaster, 2014). Toxoplasmosis is a serious infection which may be led to fatal events for the fetus. Therefore, this study was conducted to assess the maternity nurses' knowledge regarding toxoplasmosis.

Significance of the study

The incidence of congenital infection in the United States is between 400 to 4000 cases/year. The incidence and severity vary with the trimester of gestation during which the mother acquired infection which is estimated by 10% to 25% at the first trimester, 30% to 54% at the second trimester, and 60% to 65% at the third trimester. The congenital infection which occurs at the first trimester is the most severe, while 89% to 100% of infections in the third trimester are asymptomatic (Philip & Chan, 2017). A previous study in Egypt conducted in Menoufia reported that the seroprevalence of *T. gondii* among pregnant women in Menoufia governorate was 52.2%, which is considered high. Only genotype I was detected (Nashaat et al., 2014). There are few studies conducted on knowledge of nurses regarding toxoplasmosis. So it is important to assess knowledge of nurses who provide prenatal care to identify if they need for more health education because nurses play an important role in the antenatal period.

Purpose of the Study to assess the maternity nurses' knowledge regarding toxoplasmosis.

Research questions:

1. What are the maternity nurses' knowledge regarding toxoplasmosis?
2. Is there a relationship between level of knowledge and the socio-demographic characteristics of maternity nurses about toxoplasmosis?

Research design: Descriptive design was used in carrying out this study.

Setting of the study: It was conducted in four districts out of nine districts at Menoufia governorate were chosen using simple random sampling technique these were (Shebin El-Kom, Menoufe, Tala and El-shohadaa). Using multi stage random sampling technique, eight villages were chosen. This study was conducted in maternal and child health care centers and health care units are affiliated to the ministry of health and population.

Sample: simple random sample technique. The total nurses who provide antenatal care in Menoufia is 500 nurses and the sample consists of 88 nurses.

Instruments of data collection: Structured interview questionnaire were developed by researcher after extensive literature review. These questionnaires consisted of two parts:

Part 1: Socio-demographic characteristics of nursing staff and included 6 questions such as age in years, sex, work experience and level of education,

the second part assessment of nurses' knowledge related to toxoplasmosis. Nurses' knowledge was evaluated through different questions about aspects of causes, diagnosis, clinical manifestation, and modes of transmission, treatment complication as well as prevention of toxoplasmosis in pregnant women.

Scoring system of participants' knowledge was done as followed: each question had a group of answer points, one point was awarded for each (correct answer) and (incorrect answer or don't know) took zero. (Linsell, Forbes, Burgess, Kapari, et al., 2012).

- Good level of knowledge (48-63) > 75%.

- Moderate level of knowledge (38-47) 60% - 75%.

- Poor level of knowledge (0-37) less than 60%.

Validity and reliability:

For validity of the instruments was ascertained by a group of subject area experts in two maternity nursing, two obstetricians and one professor in community health nursing were review the instruments for content accuracy. Test-retest reliability was applied by the researcher for testing the internal consistency of the tool. It was administered by the same tools to the same subjects under similar conditions on two or more occasions. Scores from repeated testing were compared.

Ethical considerations

Oral consent was obtained from each participant of the study after detailed explanation of data collection procedure and purpose of the study by the researchers. All of the subjects who agreed to participate in

the study were assured about confidentiality and anonymity of the information. They were informed about their right to withdrawn from the study at any time without giving a reason. The researcher was always available for clarifications.

Approval letter

A primary written approved was taken from the ethical and Research Committee at the Menoufia University before conducting the study . As well as permission from the faculty of nursing to the director of each health unit to get their agreement and their permission to conduct the study.

Pilot Study

Pilot study was conducted using the developed questionnaire on 10% of the study sample. The pilot study was carried out to test the applicability and clarity of the constructed questionnaire and detect any obstacles or problems that might arise during the actual collection of data. So the sample of the pilot study for that reason excluded for the sample.

Study Maneuver

The researcher constructed the tool of the study after reviewing the literature that cover the various aspects of the problem by using books, periodical articles and network.

- Data collection for this study was carried out at the first of April 2018 and completed by the middle of May 2018.
- The data of the present study was conducted using self-administered questionnaire tool. The data was collected during the morning shifts of the working days of the week. After administrative approval and informed consent, the questionnaire tool were administered to each participant by the researcher and explain the study purpose as well as the method of filling the questionnaire were provided. The researcher was assured the participants for the confidentiality of their information, then the participants were asked to fill in the questionnaire and any clarifications were done by the researcher.

Data Analysis

Data were collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 22 (SPSS, Inc, Chicago, Illinois, USA).

II. Result

Table (1): Socio-Demographic Characteristics of the Studied Participants (N =88):

Variables	The Study Nurses	
	No.	%
Age (years)		
-Mean ±SD	39.5±9.86	
-Range	22- 59	
Gender :		
-Female	88	100
Educational level:		
- Secondary nursing school	56	63.6
-Technical nursing institution	21	23.9
-Faculty of nursing	11	12.5
Training courses		
-Yes	66	75
-No	22	25
Years of experience (years)		
-1 – 6 years	19	21.5
-7 – 13 years	6	6.8
-14 – 20 years	27	30.7
-> 21 years	36	40.9

Table (2): shows the socio- demographic characteristics of the study nurses. It shows that the mean age of the maternity nurses was **39.5±9.86** years. All the participants were females (100%). Regarding the educational level, about two thirds (63.6%) of the study participants had secondary nursing school. Concerning the training courses about three fourths (75%) of the study nurses stated that they had training courses. Regarding the years of experience, less than half (40.9%) of the study participants had more than 21 year experience, whereas less than one quarter of them (21.5%) had experience ranging from 1 – 6 years and more than one quarter(30.7%) had experience from 14-20 years of experience.

Table (2): Knowledge of Studied Nurses about (Causative agent, Mode of Transmission and High Risk Groups of Toxoplasmosis) (N=88):

Variables	Studied nurses (N=88)					
	Yes		No		Not sure	
	No.	%	No.	%	No.	%
Name of causative agent						
Toxoplasma gonad parasite	47	53.4	34	36.6	7	8.00
Toxoplasma gonad virus	28	31.8	53	60.2	7	8.00
Toxoplasma gonad bacteria	12	13.6	68	77.3	8	9.10
The main provider of toxoplasmosis						
Cat	68	77.3	16	18.2	4	4.50
Human	19	21.6	63	71.6	6	6.80
Mode of transmission						
Direct contact with infected cat	81	92.0	6	6.80	1	1.10
Eating or drinking contaminated with parasite	68	77.3	15	17.0	5	5.70
From infected mother to fetus	70	79.5	13	14.8	5	5.70
From mother to baby during breast feeding	40	45.5	31	35.2	17	19.3
Eating raw not well cooked meat	65	73.9	11	12.5	12	13.6
Touching the nose or mouth after washing infected vegetables or fruits/and meat	60	68.2	15	17.0	13	14.8
High risk groups						
Women during pregnancy	86	97.7	2	2.30	0	0.00
People with low immunity	65	73.9	7	8.00	16	18.2
Pre-infection and antibody formation	33	37.5	28	31.8	27	30.7
Transplant recipients infected by receiving positive toxoplasma donor	34	38.6	11	12.5	43	48.9

Table (2) shows nurse knowledge about toxoplasmosis. Regarding studied nurses' knowledge about causative agent 53.4% answered yes for toxoplasma gonad parasite ,while 8% were not sure . On the other hand 60.2% answered no for toxoplasma gonad virus ,while 8% were not sure . For toxoplasma gonad bacteria the results showed that 77.3% answered no, while 9.1% were not sure. Concerning knowledge of nurse about the main provider of toxoplasma , the result revealed that 77.3% answered yes about cat, while 4.50% were not sure. On the other hand 71.6% answered no for human as the main provider , while 6% were not sure. As regards to knowledge of nurses about mode of transmission, it has been found that the majority (92%) answered yes for the transmission with the direct contact with infected cat, while 1.10 % were not sure. On the other hand more than three fourth answered yes on eating or drinking contaminated with parasite and from infected mother to fetus, while less than one fourth (5.70%) not sure. Regarding knowledge of nurse about high risk group, it has been found 97.7% answered yes for women during pregnancy, 73.9% answered yes for people with low immunity, while 2.30 answered no. For pre-infection and antibody formation has been found that 37.5% answered yes , while 30.7% were not sure. On the other hand ,it is noticed that 48.9% were not sure about Transplant recipients infected by receiving positive toxoplasma donor ,while12.5% answered no .

Table (3): knowledge of Studied Nurses about Symptoms of Toxoplasmosis (N=88):

Variables	Studied nurses (N=88)					
	Yes		No		Not sure	
	No.	%	No.	%	No.	%
Symptoms of toxoplasmosis in human						
Flu like symptoms	20	22.7	34	38.6	34	38.6
Neurological symptoms	13	14.8	34	38.6	41	46.6
Vision problem	14	15.9	35	39.8	39	44.3
Symptoms of toxoplasmosis in pregnant women						
Fever and swollen lymph nodes	19	21.6	32	36.4	37	42.0
Inflammation of joints and redness	18	20.5	32	36.4	38	43.2
Asymptomatic	45	51.1	11	12.5	32	36.4
In which quarter of pregnancy risk of congenital infection is greater						
First trimester	69	78.4	11	12.5	8	9.10
Second trimester	14	15.9	63	71.6	11	12.5
Third trimester	8	9.10	60	68.2	13	14.8
Throughout pregnancy	15	17.0	60	68.2	13	14.8
In which quarter of pregnancy the severity of disease is greater						
First trimester	53	60.2	24	27.3	11	12.5
Second trimester	13	14.8	61	69.3	14	15.9

Third trimester	13	14.8	57	64.8	18	20.5
Throughout pregnancy	12	13.6	56	63.6	20	22.7

Table (3) shows knowledge of studied nurses about symptom of toxoplasmosis. Regarding symptom of toxoplasmosis in human ,it has been found that less than half(46.6) were not sure about symptom ,while less than one fourth(14.8%) answered yes. Concerning knowledge of nurses about symptom in pregnant woman, the result showed that, less than half (43.2%)were not sure ,while less than one fourth(21.6%) answered yes. On the other hand, about half(51.1%) answered yes for symptoms of toxoplasmosis are a symptomatic , while 12.5% answered no. Regarding to the quarter of pregnancy with risk of congenital infection is greater, it has been found more than three forth (78.4%) answered yes for the first trimester ,while 8% were not sure. On the other hand more than two third(71.6%) answered no for second ,third trimester and throughout pregnancy, while less than one fourth(12.5%) were not sure. Regarding to which quarter of pregnancy in which the severity of the disease is greater, it was found that 60.2% answered yes to the first trimester, while 12.5% were not sure. for the third trimester and throughout pregnancy ,it is noticed that less than two third answered no, while less than one fourth answered yes on the question.

Table(4): Knowledge of Studied Nurses about Prevention of Toxoplasmosis (N=88):

Variables	Studied nurses (N=88)					
	Yes		No		Not sure	
	No.	%	No.	%	No.	%
Preventive measures for non infected pregnant women						
Wear gloves while handling cats or cleaning their own vessels	83	94.3	2	2.30	3	3.40
Cooking meat well	80	90.9	4	4.50	4	4.50
Don't eat unpasteurized milk which may be infected	77	87.5	5	5.70	6	6.80
Care when washing raw meat and clean the hands after completion	74	84.1	9	10.2	5	5.70
Washing vegetables and fruits properly	81	92.0	4	4.50	3	3.40
Preventive methods to prevent transmission from infected mother to fetus						
Advice the mother to take the initial preventive measures	85	96.6	2	2.30	1	1.10
Tell the mother to do Serological test	83	94.3	0	0.00	5	5.70
Tell her to make sonar on the uterus	80	90.9	5	5.70	3	3.40
Tel her doctor to give her proper treatment	87	98.9	0	0.00	1	1.10
Preventive measures for infant born with the disease						
Tell her about the test necessary for the child to assess the condition of the child and give him appropriate treatment	84	95.5	2	2.30	2	2.30
Repeat analysis after 6 months	79	89.8	3	3.40	6	6.80
Regular follow up of the infant with the pediatrician	84	95.5	2	2.30	2	2.30

Table (4) show nurse knowledge about prevention of toxoplasmosis. Regarding preventive measure for non infected pregnant women ,it has been found that the majority of studied nurses (94.3%)answered yes, while less than one fourth(2.30%) were not sure. On the other hand ,it is noticed that the majority of studied nurses(98.9%)answered yes on the preventive methods to prevent transmission from infected mother to fetus , while 1.10% were not sure. As regards preventive measures for infant born with the disease ,it has been found that the majority (95.5%)answered yes ,while less than one forth answered no and not sure.

Figure (1): Total knowledge of Nurses about Toxoplasmosis (N=88):

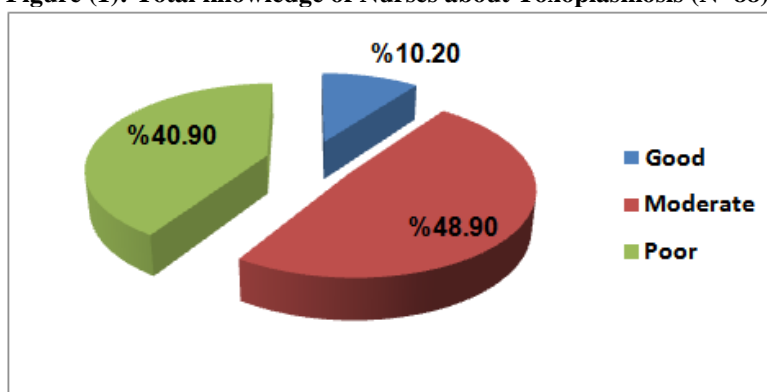


Figure (1) shows the overall knowledge of the maternity nurses about toxoplasmosis . It has been found that less than half (40.90%) of the sample had poor knowledge about toxoplasmosis and less than half (48.90%) of the nurses had fair knowledge ,while less than one forth (10.20%) had good knowledge about toxoplasmosis .

Table (5): Relationship between Nurse' Knowledge and their Socio-Demographic Characteristics

Variables	Studied nurses knowledge						Test of sig.	P value
	Good (N=9)		Moderate (N=43)		Poor (N=36)			
Age / years							F	
Mean ±SD	39.3±9.79		39.8±10.0		39.1±9.89		0.07	0.931
Range	22- 59		22- 59		22- 59			
Educational level:	No	%	No	%	No	%	χ ² 3.09	0.797
- secondary nursing school	5	55.6	26	60.5	25	69.4		
- technical nursing institution	2	22.2	12	27.9	7	19.4		
- faculty of nursing	2	22.2	5	11.6	4	11.1		
Training courses							χ ² 0.40	0.817
- Yes	6	66.7	33	76.7	27	75.0		
- No	3	33.3	10	23.3	9	25.0		
Years of experience							χ ² 32.2	0.001*
- 1 – 6	2	22.2	1	2.30	16	44.4		
- 7 – 13	0	0.00	1	2.30	5	13.9		
- 14 – 20	1	11.1	17	39.5	9	25.0		
- ≥ 21	6	66.7	24	55.9	6	16.7		

*significant F: ANOVA test

Table (5) shows relationship between nurse knowledge and their socio demographic characters. Regarding the nurses' age and level of knowledge ,there was no statistical significant difference (p>0.05) . As regards educational level and level of knowledge, there was no statistically significant difference (p>0.05).In relation to nurses' years of experience ,there was a statistically significant difference (p <0.05)between nurses 'knowledge and their years of experience with the majority of them (66.7%) are from and above 21 years of experience.

III. Discussion

The results of the present study revealed that the age of the nurses in the sample ranged between 22-59 years with a mean of 39 years. Because nurses working immediately from secondary school of nursing with low age 19 years so the study found that range of age is 39 years. This result is closer to those reported by (Berrieldasilva et al, 2011) who studied knowledge of toxoplasmosis among doctors and nurses who provide prenatal care in an endemic region in midsize Brazilian city, where the participants age ranged between 22-58 years, with the mean age of 39 years. On the contrary, a study was conducted by(Abdulameer, 2016) in Basra City, who studied knowledge of nurses who provide prenatal care concerning toxoplasmosis, where the age of the participants ranged between 26-31 years.

Regarding to knowledge of the studied nurse about mode of transmission of toxoplasmosis, the results of the present study revealed that more than three fourth know about mode of transmission. In contrast to this studyAnteneh, Metasebia&Tsfaye, 2016 who studied assessment of knowledge and perception of health professionals towards toxoplasmosis in selected towns of Ethiopia, whichless three-fourth of health

professionals were recognized that consumption of raw or undercooked meat and vegetables as the common source of *T. gondii* infection, while less than one-third of these mentioned other methods.

Regarding to the knowledge of the studied nurses about clinical manifestation of toxoplasmosis, the present study revealed that less than half of the reported were neurological problem, visual problem and a symptomatic. In contrast to this study **Loureiro de Moura et al, 2017** who studied congenital toxoplasmosis: perception of knowledge and primary prevention measures among healthcare professionals and pregnant women treated in public healthcare facilities, which the most widely mentioned clinical manifestations in this study were visual alterations and problems with the fetus. Almost half of the surveyed healthcare professionals recognized that the infection can be a symptomatic, while in a study conducted in the Juiz de Fora, state of Minas Gerais (**Berrielda Silva et al, 2011**) who studied knowledge of toxoplasmosis among doctors and nurses who provide prenatal care in an endemic region, which more than three-fourth of the professionals knew that toxoplasmosis could occur without symptoms.

Regarding to knowledge of the studied nurses about preventive measure of toxoplasmosis, the findings of the present study revealed that the majority of the nurses in the sample know the preventive measure of toxoplasmosis. This result is close to those reported by (**Loureiro de Moura et al, 2017**) who studied congenital toxoplasmosis: perception of knowledge and primary prevention measures among healthcare professionals and pregnant women treated in public healthcare facilities, and reported that the knowledge of preventive measures and washing hands before handling the foods and after handling oil or litter boxes were mentioned by all the participants, while possible prevention measures were mentioned less often.

Concerning the total knowledge of the studied nurses about toxoplasmosis, the present study showed that less than half of the participants have moderate knowledge about toxoplasmosis. This finding is supported by (**Khudair, 2013**) who studied knowledge of prenatal care nurses toward management of toxoplasmosis in pregnant women, and reported that less than half of the participants had moderate knowledge about toxoplasmosis, while in the present study revealed that less than half of studied nurses had poor knowledge, this finding were congruent with those reported by (**Khudair, 2013**) who studied knowledge of prenatal care nurses toward management of toxoplasmosis in pregnant women, and reported that the participants (20%) had poor knowledge about toxoplasmosis.

Regarding relationship between the nurse's level of knowledge and their socio-demographic characteristics, in the present study, it was observed that there is statistically significant difference between the nurse's level of knowledge and years of experience. On the other hand, there is no significant relation between the nurses' knowledge and their level of education and age. This finding agree with (**Abdulameer, 2016**) in Basra City, who studied knowledge of nurses who provide prenatal care concerning toxoplasmosis and found that there is highly significant relation between the nurse's level of knowledge and years of experience.

IV. Conclusion

Maternity nurses' knowledge about toxoplasmosis has been found that less than one fourth of the study sample had good knowledge about toxoplasmosis while less than half of the nurses had poor knowledge and less than half had fair knowledge about toxoplasmosis. On the other hand there was no significant difference between the nurses' knowledge about toxoplasmosis and their level of education and age. There was a significant difference between the nurses' knowledge about toxoplasmosis and their years of experience. Also there is positive significant correlation between years of experience and nurse knowledge about toxoplasmosis.

V. Recommendations

1. All nurses who work in prenatal care must admitted in training program regarding toxoplasmosis for early detecting and referral to safe mother and embryo.
2. Educate nurses as health educator about toxoplasmosis to improve health awareness and knowledge for the mother.

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