



Assessment of Knowledge, Attitudes, and Practices Toward Toxoplasmosis Prevention Among Pregnant Women Attending Al-Bayda Medical Center, Libya

Faiza., A. Muhammad Taher^{1*}, Ebtesam S Abd- Elrazeq², Munira A Hamad³, Kasem
Abdinibi Farag⁴

^{1*}Department of Midwifery and Neonatology, Higher institute of Science and Technology, El-
Beyda, Libya

²Department of Medical Laboratories Faculty of Health Sciences, University of Omar
AlMukhtar, El-Beyda, Libya

³Department of Laboratory Medicine, Faculty of Health Sciences, University of
Tobruk, Tobruk, Libya.

⁴Department of Mathematics, faculty of science university of Omar AlMukhtar, Albayda,
Libya.

تقييم المعرفة والاتجاهات والممارسات المتعلقة بالوقاية من داء المقوسات (التوكسوبلازما) لدى النساء الحوامل المترددات على مركز البضاء الطبي، ليبيا

فائزة عطية محمد طاهر^{1*}، ابتسام صالح عبد الرازق²، منيرة عبد الحفيظ حمد³، قاسم عبد النبي فرج⁴

^{1*}قسم القبالة وحديثي الولادة المعهد العالي للعلوم والتقنيات الطبية، البيضاء، ليبيا.

²قسم المختبرات الطبية، كلية العلوم الصحية، جامعة عمر المختار، البيضاء، ليبيا.

³قسم طب المختبرات، كلية العلوم الصحية، جامعة طبرق، طبرق، ليبيا.

⁴قسم الرياضيات، كلية العلوم، جامعة عمر المختار، البيضاء، ليبيا.

*Corresponding author: faiza_alsharif071030@yahoo.com

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Abstract:

Toxoplasmosis is a common zoonotic disease, transmitted to humans by cats or through contaminated water and food. Adults may be asymptomatic. However, infection during pregnancy poses a significant risk to the fetus, potentially leading to complications such as miscarriage, birth defects, and developmental delays in the newborn. **Objective:** This study aimed to assess pregnant women's knowledge, attitudes, and preventive practices regarding toxoplasmosis, to analyze the relationship between these factors, and to identify the impact of certain demographic factors. **Results:** The results showed that the majority of participants were between 21 and 30 years old (52%) and in their third trimester of pregnancy (47%), and that approximately one-third of them had a history of miscarriage (33%). The results also indicated a high level of knowledge, attitudes, and practices regarding toxoplasmosis among most women: 70% reported having good knowledge, 73% had positive attitudes, and 68% practiced preventive measures. Correlation tables revealed statistically significant positive relationships between these three areas. A higher level of knowledge was associated with better attitudes and preventive behaviors. Analysis of differences also revealed significant differences favoring women who did not own a cat, with their scores for knowledge, attitudes, and preventive practices being

10–15% higher than those of women who did own one ($p < 0.05$). In conclusion, the study results show that most pregnant women have good knowledge and practice effective preventive measures regarding toxoplasmosis. However, awareness of mother-to-child transmission remains moderate and needs improvement. The positive correlation between knowledge, practices, and attitudes suggests that strengthening health education could help improve preventive behaviors and reduce the risk of infection.

Keywords: Toxoplasmosis; Pregnant women; Knowledge; Attitudes; Practices; Congenital infection; Risk factors; Preventive measures; Exposure to cats.

الملخص:

يُعد داء المقوسات (Toxoplasmosis) مرضاً حيوانياً شائعاً ينتقل إلى البشر عن طريق القطط أو عبر المياه والأغذية الملوثة. قد لا تظهر أي أعراض على البالغين المصابين، إلا أن العدوى أثناء الحمل تشكل خطراً كبيراً على الجنين، إذ قد تؤدي إلى مضاعفات مثل الإجهاض، والعيوب الخلقية، وتأخر النمو لدى المولود. **الهدف:** هدفت هذه الدراسة إلى تقييم مستوى المعرفة والاتجاهات والممارسات الوقائية لدى النساء الحوامل فيما يتعلق بداء المقوسات، وتحليل العلاقة بين هذه العوامل، وتحديد تأثير بعض العوامل الديموغرافية. النتائج: أظهرت النتائج أن غالبية المشاركات كن في الفئة العمرية ما بين 21 و 30 عاماً (52%) وفي الثلث الثالث من الحمل (47%)، وأن حوالي ثلثهن (33%) لديهن تاريخ سابق للإجهاض. كما أشارت النتائج إلى مستوى مرتفع من المعرفة والاتجاهات والممارسات المتعلقة بداء المقوسات لدى معظم النساء؛ حيث أفادت 70% منهن بامتلاك معرفة جيدة، وأظهرت 73% اتجاهات إيجابية، بينما التزمت 68% بتطبيق تدابير وقائية. وكشفت جداول الارتباط عن وجود علاقات إيجابية ذات دلالة إحصائية بين هذه الجوانب الثلاثة؛ إذ ارتبط المستوى الأعلى من المعرفة باتجاهات أفضل وسلوكيات وقائية أكثر فاعلية. كما أظهر تحليل الفروق وجود اختلافات جوهرية لصالح النساء اللواتي لا يربين قططاً، حيث كانت درجاتهن في مجالات المعرفة والاتجاهات والممارسات الوقائية أعلى بنسبة تتراوح بين 10% و 15% مقارنة بالنساء اللواتي يربين قططاً. ($p < 0.05$). **الخاتمة:** تخلص الدراسة إلى أن معظم النساء الحوامل يتمتعن بمعرفة جيدة ويمارسن تدابير وقائية فعالة ضد داء المقوسات. ومع ذلك، لا يزال مستوى الوعي بشأن انتقال العدوى من الأم إلى الجنين متوسطاً ويحتاج إلى تحسين. ويشير الارتباط الإيجابي بين المعرفة والممارسات والاتجاهات إلى أن تعزيز التنقيف الصحي قد يساهم في تحسين السلوكيات الوقائية والحد من خطر الإصابة بالعدوى.

الكلمات المفتاحية: داء المقوسات؛ النساء الحوامل؛ المعرفة؛ الاتجاهات؛ الممارسات؛ العدوى الخلقية؛ عوامل الخطر؛ التدابير الوقائية؛ التعرض للقطط.

Introduction:

Toxoplasmosis, also known as cat disease, is a zoonotic disease, meaning it is transmitted from animals to humans, and is endemic in most countries worldwide. Domestic and wild cats, and all species belonging to the Felidae family, are the definitive hosts of the parasite, while birds and mammals, including humans, are intermediate hosts (Ferguson, 2004). The absence of clinical signs in most cases and late diagnosis are among the most important factors that contribute to the spread of the disease (Fachado et al., 1997).

Toxoplasmosis affects approximately one-third of the world's population. While adults are often asymptomatic, infection during pregnancy can lead to serious complications for the fetus, as the parasite can cross the placenta. Transmission occurs through the consumption of fruits or vegetables contaminated with Toxoplasma cysts, the ingestion of contaminated water, or through blood transfusions or organ transplants. It can also be transmitted through contact with contaminated cat feces, particularly during litter box cleaning, gardening, or handling contaminated soil (Ross et al., 2006).

The disease can be transmitted to humans through blood transfusion, from an infected person to a healthy person, during a blood donation. Insects, such as flies and cockroaches, can contribute to the transmission of eggs present in cat feces to food. This disease infects humans following infection with a parasite called Toxoplasma gondii, so named because of the parasite's curved shape in its active state (Baril et al., 1999). The stage of pregnancy at which the mother contracts toxoplasmosis is an important factor in the rate and severity of congenital transmission. The risk of transmission is relatively low (less than 20%) during the first trimester, but reaches nearly 80% at the end of pregnancy. It is important to note that the consequences for the fetus are more serious when the infection occurs early in pregnancy (Rorman et al., 2006).

This disease has received considerable medical attention in recent years due to its high prevalence and its significant impact on human health, particularly in pregnant women and newborns, as it is responsible for numerous cases of miscarriage or stillbirth. The parasite is transmitted to the fetus through the placenta during pregnancy. After birth, newborns present with severe symptoms such as intellectual disability, epilepsy, retinal and brain damage, and hydrocephalus, characterized by a deformation of the fetal head or an abnormally small size. These cases represent approximately 70 to

90% of all cases (Berrebi et al., 2007). Infection of the lymphatic system can lead to an increase in the size of the liver and spleen as well as a high fever, whereas the disease is of little or no importance to healthy individuals (80% of infected people do not show any symptoms) (Lin et al., 2000).

This disease is an inflammatory condition that penetrates the placenta, mixes with the blood and causes fetal malformations and general growth deficits, particularly in the nervous system, and leads to multiple future health problems, including with regard to the child's motor and sensory performance if it is accompanied by mental growth deficits (Goldstein et al., 2020). Assessing pregnant women's awareness and preventative practices is crucial for lowering the risk of maternal and fetal problems, given the potentially serious implications of toxoplasmosis during pregnancy and the vital role of prevention. In order to produce evidence that can guide effective health education strategies and preventive interventions for protecting maternal and fetal health, this study sought to assess the levels of knowledge, attitudes, and preventive practices regarding toxoplasmosis among pregnant women while investigating the influence of demographic characteristics and the relationships among these domains.

Materials and Methods:

The present cross-sectional study was carried out at the Al-Bayda Medical Center in Libya between October and December of 2025. It focused on assessing pregnant women's toxoplasmosis-related knowledge, attitudes, and behaviors as well as look into the associations between these factors as well as specific participant demographics. 240 pregnant women who visited the Al-Bayda Medical Center's obstetrics and gynecology department during the study period made up the study population. Prior to data collection, all participants gave their informed consent. A questionnaire created especially to meet the objectives of the study was used to gather data.

This survey comprised demographic data as well as questions intended to evaluate toxoplasmosis-related knowledge, attitudes, and preventive measures. Additionally, data was gathered through one-on-one interviews in which participants were asked questions and their answers were recorded. When data collection had been completed, SPSS (Statistical Package for the Social Sciences), version 23.0, was used to code, input, and analyze the data. Frequencies, percentages, averages, and standard deviations are examples of descriptive statistical techniques that were employed to characterize the features of the sample and the variables under investigation. The association between knowledge, attitudes, and preventative practices was examined using correlation tests, and group differences based on specific demographic variables were identified using t-tests. $P < 0.05$ was established as the cutoff point for statistical significance.

Results:

Table (1): Distribution of participants according to demographic characteristics (n = 240).

Variable	Category	Frequency (n)	Percentage (%)
Age Group	Less than 20 years	11	4.6%
	21–30 years	129	53.8%
	31–40 years	76	31.7%
	More than 40 years	24	10%
Stage of pregnancy (gestational age)	First trimester	67	27.9%
	Second trimester	33	13.8%
	Third trimester	140	58.3%
History of Previous Miscarriage	Yes	80	33.3%
	No	160	66.7%
Presence of Cats at Home	Yes	87	36.3%
	No	153	63.7%

The demographics of the pregnant participants in the study are shown in Table 2. According to the findings, the majority of participants (53.8%) were between the ages of 21 and 30, followed by those between the ages of 31 and 40 (31.7%), with women under the age of 20 making up the smallest percentage (4.6%). In terms of gestational age, the third trimester accounted for the largest percentage of participants (58.3%), followed by the first trimester (27.9%), and the second trimester (13.8%). The findings also show that 33.3% of participants had previously experienced a miscarriage, whereas 66.7% did not. Regarding the existence of cats in the home, 36.3% of participants said they had cats, while the majority (63.7%) report not having any.

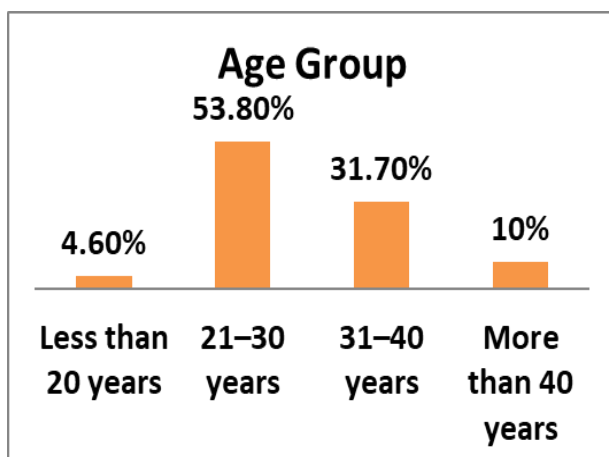


figure (1): illustrates the distribution of respondents

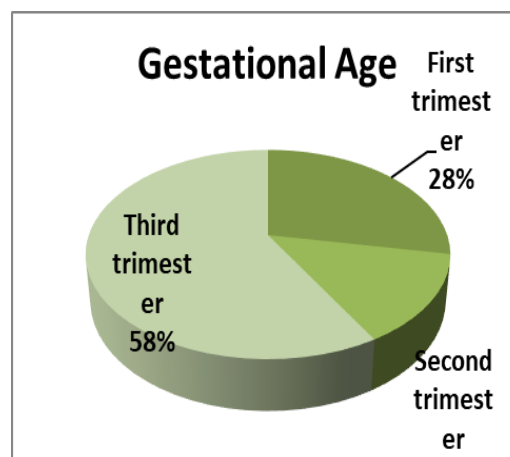


figure (2): shows the frequency distribution of respondents according to gestational age.

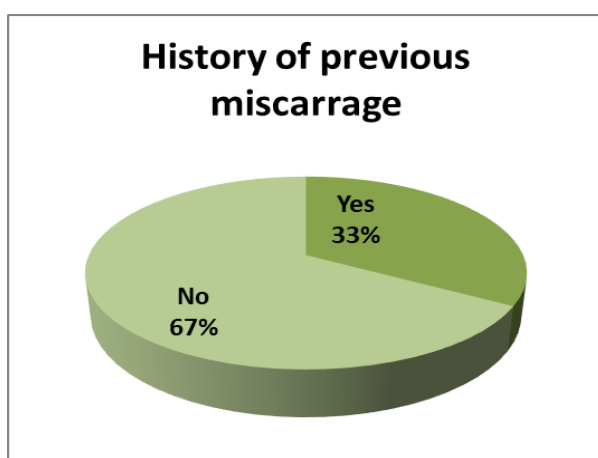


figure (3): shows the frequency distribution of respondents according History of Previous Miscarriage

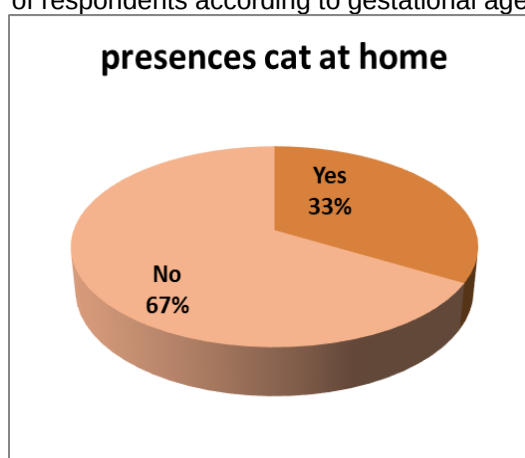


figure (4): shows the frequency distribution of respondents according Presence of Cats at Home

Results relating to the assessment of pregnant women's knowledge about toxoplasmosis (Toxoplasmosis):

Table 2 illustrates pregnant women's level of knowledge about toxoplasmosis through the analysis of percentages, arithmetic means, t-values, and statistical significance. The results indicate that most statements garnered strong consensus, demonstrating a good understanding of the disease, its sources of infection, and prevention methods within the sample. The highest percentage of "strongly agree" responses concerned the statement that toxoplasmosis can cause miscarriage or fetal malformations (77.1%, mean 4.7250, highest among the means, t-value 49.432, statistical significance 0.000). This demonstrates a clear awareness of the seriousness of the disease during pregnancy.

The statement that washing hands after handling raw meat or soil reduces the risk of infection also garnered strong agreement (75%, mean 4.5292, t-value 25.165), reflecting a good understanding of preventative behaviors. Similarly, the statement that the disease is often transmitted by cats or undercooked meat received a high agreement rate of 65.4%, with a mean of 4.5292 and a t-value of 32.146, demonstrating a good understanding of common sources of infection. The statement that consuming unwashed fruits and vegetables can lead to infection received a mean of 4.2000 and a t-value of 15.397, with a high agreement rate of 57.1%, reflecting a good understanding of the risks associated with food hygiene practices.

In contrast, the statement that toxoplasmosis can be transmitted from mother to fetus during pregnancy received the lowest agreement rate (26.7%), with a mean of 3.4458 (the lowest in the table) and a T-value of 5.649, indicating a greater need for further research on this important point. Overall, the results show that the level of knowledge about toxoplasmosis in pregnant women is high, as all T-values were statistically significant at 0.000, reflecting clear agreement and a general trend toward accurate information regarding the disease, its modes of transmission, and means of prevention.

Table (2): Distribution of Responses, Mean Scores, T-values, and Statistical Significance of Knowledge Items Regarding Toxoplasmosis

Knowledge Items	Strongly Agree (5)	Agree (4)	Somewhat Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean Score	T-value	Sig.
Toxoplasmosis is a disease caused by a parasite commonly transmitted through cats or undercooked meat.	65.4%	24.2%	8.3%	2.1%	0.0%	4.5292	32.146	0.000
Toxoplasmosis can be transmitted from a pregnant woman to her fetus during pregnancy.	26.7%	26.7%	11.3%	35.4%	0.0%	3.4458	5.649	0.000
Washing hands thoroughly after handling raw meat or soil reduces the risk of infection.	75.0%	12.5%	2.9%	9.6%	0.0%	4.5292	25.165	0.000
Individuals with weakened immune systems are more likely to develop complications from toxoplasmosis.	42.9%	37.1%	4.2%	15.8%	0.0%	4.0708	15.790	0.000
Toxoplasmosis can be diagnosed through a specific blood test.	58.3%	33.3%	8.3%	0.0%	0.0%	4.5000	35.925	0.000
Consuming unwashed fruits and vegetables may lead to toxoplasmosis infection.	57.1%	25.4%	5.8%	3.8%	7.9%	4.2000	15.397	0.000
Toxoplasmosis may cause miscarriage or fetal abnormalities if the mother becomes infected during pregnancy.	77.1%	18.3%	4.6%	0.0%	0.0%	4.7250	49.432	0.000

Results Related to the Assessment of Pregnant Women's Attitudes Toward Toxoplasmosis (Toxoplasma Infection):

Table 3 presents the level of attitudes and beliefs of pregnant women regarding toxoplasmosis, through the analysis of percentages, arithmetic means, t-values, and statistical significance. The results indicate positive attitudes and a high level of awareness among most respondents, with all levels of statistical significance at 0.000, demonstrating strong validity and a clear tendency to support the information presented in the statements. The statement concerning the need to inform pregnant women about methods of disease prevention received the highest percentage of "strongly agree" responses (81.7%), with a high mean of 4.8167 and a t-value of 72.582, one of the highest values in the table, reflecting near-total agreement on the importance of health education. Similarly, the statement that having cats in the home increases the risk of infection received a high percentage of "strongly agree" responses (82.1%), with a mean of 4.7250 and a t-value of 40.156, demonstrating a good understanding of risk factors.

The section on the impact of toxoplasmosis on the fetus also obtained a high agreement rate (72.9%), with a mean of 4.6125 and a t-value of 33.747, indicating a good understanding of the risks associated with the disease during pregnancy. The sections on the importance of prevention versus treatment also received a high agreement rate (69.6%), with a mean of 4.5292, reflecting the importance participants placed on preventive measures.

Conversely, the lowest agreement rate was observed in the section on anxiety related to infection (21.3%), despite a mean of 3.6375 and a t-value of 9.706. This suggests a moderate level of anxiety among women, but lower than that observed in the other sections. The item concerning the integration of toxoplasmosis screening into routine prenatal visits received 57.9% "strongly agree" responses, with a mean of 4.3125 and a t-value of 21.611, demonstrating strong support for integrating this screening into routine healthcare. Overall, the results in the table show that attitudes toward toxoplasmosis are characterized by high awareness and a positive orientation toward prevention, with varying levels of personal anxiety. They nevertheless confirm a good understanding of the risks associated with the disease and the importance of screening and awareness. In conclusion, all items obtained high mean scores, reflecting positive attitudes toward prevention and diagnosis. All t-values were statistically

significant ($p < 0.001$), indicating significant agreement within the sample. There was strong emotional awareness of the disease and its effects, although anxiety related to infection was moderate compared to the other item.

Table (3): Distribution of Responses, Mean Scores, T-values, and Statistical Significance of the Items Assessing Pregnant Women's Attitudes Toward Toxoplasmosis

Attitude Items	Strongly Agree (5)	Agree (4)	Somewhat Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean Score	T-value	Sig.
I am concerned about the possibility of contracting toxoplasmosis during pregnancy.	21.3%	38.3%	25.0%	13.8%	1.7%	3.6375	9.706	0.000
I believe that screening for toxoplasmosis is necessary for all pregnant women.	53.3%	19.2%	13.3%	11.7%	2.5%	4.0917	14.526	0.000
Pregnant women should be educated about methods of preventing toxoplasmosis.	81.7%	18.3%	0.0%	0.0%	0.0%	4.8167	72.582	0.000
I believe that having cats at home increases the risk of infection.	82.1%	10.8%	4.6%	2.5%	0.0%	4.7250	40.156	0.000
I believe that toxoplasmosis may negatively affect fetal health.	72.9%	19.2%	4.2%	3.8%	0.0%	4.6125	33.747	0.000
I think that preventing toxoplasmosis is more important than treating it.	69.6%	19.6%	5.0%	5.8%	0.0%	4.5292	28.273	0.000
I support including toxoplasmosis screening among routine pregnancy examinations.	57.9%	22.1%	13.3%	6.7%	0.0%	4.3125	21.611	0.000

Results Related to the Assessment of Pregnant Women's Practices Regarding Toxoplasmosis:

Table 8 illustrates the level of preventive practices against toxoplasmosis among pregnant women, through the analysis of percentages, arithmetic means, t-values, and statistical significance. The results show that the majority of women adopt rigorous preventive behaviors, with all statistical significance values being 0.000, indicating a strong commitment to these healthy practices. The item relating to avoiding undercooked meat had a "always" response rate of 90%, one of the highest in the table, with a high mean of 4.8208 and a t-value of 46.149, reflecting strong adherence to this behavior.

Similarly, the item concerning washing fruits and vegetables received the highest percentage of "always" responses of all items, at 96.7%, with a mean score of 4.950 and a t-value of 106.032, the highest t-value in the table, indicating a well-established and frequent practice. In the section concerning handwashing after handling raw meat or soil, 92.1% of participants responded "always," with a mean score of 4.8875 and a t-value of 71.510, demonstrating a good awareness of infection risks. The section concerning wearing gloves when cleaning cat litter or delegating this task to another person recorded an "always" response rate of 80.4%, with a mean score of 4.5708 and a t-value of 24.448, a good result indicating the commitment of most participants. The section on covering litter boxes had an "always" response rate of 54.6%, one of the lowest in the table, although the mean score of 4.1583 and the T-value of 16.947 were still satisfactory.

Finally, the section on avoiding feeding raw meat to cats had an "always" response rate of 73.3%, with a mean score of 4.3958 and a T-value of 18.200, reflecting a satisfactory level of awareness. Conversely, the lowest percentage of "always" responses across all items concerned toxoplasmosis screening before or at the beginning of pregnancy, at only 55.8%, a mean score of 3.5958, and a T-value of 5.449. This indicates that this behavior is less frequently adopted than other preventive measures. Overall, the results confirm that pregnant women's practices regarding toxoplasmosis are

characterized by a high level of adherence to food hygiene and the handling of infection sources, while some gaps appear in practices related to preventive medical examinations.

Table (4): Distribution of Responses, Mean Scores, T-values, and Statistical Significance of the Items Assessing Pregnant Women's Practices Regarding Toxoplasmosis

Practice Items	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Mean Score	T-value	Sig.
I avoid eating undercooked or raw meat.	90.0%	4.6%	3.8%	0.8%	0.8%	4.8208	46.149	0.000
I wash fruits and vegetables thoroughly before consumption.	96.7%	1.7%	1.7%	0.0%	0.0%	4.9500	106.032	0.000
I wash my hands after handling raw meat or soil.	92.1%	4.6%	3.3%	0.0%	0.0%	4.8875	71.510	0.000
I wear gloves when cleaning a cat's litter box or delegate the task to someone else.	80.4%	5.4%	9.6%	4.6%	0.0%	4.5708	24.448	0.000
I make sure to cover outdoor sandboxes to prevent cats from using them.	54.6%	15.4%	22.9%	5.4%	1.7%	4.1583	16.947	0.000
I avoid feeding cats raw or undercooked meat.	73.3%	11.3%	3.3%	5.8%	6.3%	4.3958	18.200	0.000
I ensure that I undergo toxoplasmosis screening before pregnancy or during early pregnancy.	55.8%	2.5%	7.5%	13.8%	20.4%	3.5958	5.449	0.000

"Analysis of the correlation between knowledge, attitudes, and practices regarding toxoplasmosis within the sample, according to Pearson's correlation coefficient":

The findings showed a strong positive association between toxoplasmosis knowledge, attitudes, and behaviors. Higher levels of knowledge were linked to more positive attitudes and better preventative measures, according to the greatest correlation between knowledge and attitudes ($r = 0.548$, $p < 0.001$).

Table (5): Pearson Correlation Coefficients among Knowledge, Attitudes, and Practices Regarding Toxoplasmosis

Variables	Knowledge	Attitudes	Practices
Knowledge	1	0.548** (0.000)	0.261** (0.000)
Attitudes	0.548** (0.000)	1	0.292** (0.000)
Practices	0.261** (0.000)	0.292** (0.000)	1

Note: Values outside parentheses represent Pearson correlation coefficients (r), while values in parentheses represent significance levels (p -values). **Correlation is significant at the 0.01 level (2-tailed).**

Comparison of Knowledge, Attitudes, and Practices Regarding Toxoplasmosis among Pregnant Women by the Presence of Cats in the Household:

The results revealed statistically significant differences in knowledge, attitudes, and practices regarding toxoplasmosis, depending on whether or not a cat was present in the home ($p < 0.001$). Pregnant women without a cat scored higher in all dimensions than those who owned one. The most pronounced differences concerned attitudes, followed by knowledge, and then practices, suggesting that the presence of a cat in the home may be associated with greater awareness, more positive attitudes, and more appropriate preventive behaviors regarding toxoplasmosis.

Table (6): Independent Samples t-Test Results for Differences in Knowledge, Attitudes, and Practices Regarding Toxoplasmosis among Pregnant Women According to the Presence of Cats in the Household

Variable	Presence of Cats at Home	N	Mean	SD	Mean Difference	F-value	t-value	Sig.
Knowledge	Yes	87	4.0345	0.56431	-0.39409	77.500	-5.848	0.000
	No	153	4.4286	0.36715				
Attitudes	Yes	87	4.0312	0.59039	-0.56171	7.995	-7.602	0.000
	No	153	4.5929	0.47147				
Practices	Yes	87	4.2874	0.70677	-0.30648	13.201	-3.609	0.000
	No	153	4.5938	0.47440				

Comparison of Knowledge, Attitudes, and Practices Regarding Toxoplasmosis among Pregnant Women by Previous Miscarriage History:

The results show statistically significant differences across all study domains (knowledge, attitudes, and practices) according to previous miscarriage history, with higher mean scores observed among women without a prior miscarriage compared to those with a miscarriage history. The negative mean differences and t-values indicate that the differences favor the “No” group, with strong statistical significance across all domains ($p = 0.000$). This suggests that a history of miscarriage may be associated with lower levels of knowledge, attitudes, and preventive practices regarding toxoplasmosis.

Table (7): Independent Samples t-Test Results for Differences in Knowledge, Attitudes, and Practices Regarding Toxoplasmosis among Pregnant Women According to Previous Miscarriage History

Variable	Previous Miscarriage History	N	Mean	SD	Mean Difference	F-value	t-value	Sig.
Knowledge	Yes	80	3.9804	0.55386	-0.45804	71.457	-6.708	0.000
	No	160	4.4384	0.36399				
Attitudes	Yes	80	4.0750	0.53160	-0.47143	0.000	-6.375	0.000
	No	160	4.5464	0.54417				
Practices	Yes	80	4.3268	0.69993	-0.23393	4.173	-2.661	0.000
	No	160	4.5607	0.50629				

Discussion:

This study was conducted to assess the knowledge, attitudes, and practices of pregnant women regarding toxoplasmosis at Al-Bayda Medical Center in Al-Bayda City. The current findings showed that 65.4% of participants strongly agreed that toxoplasmosis is commonly transmitted through cats or the consumption of undercooked meat, while 24.2% agreed and 8.3% somewhat agreed. This indicates a very high level of knowledge among the participants regarding the main routes of disease transmission. Related practice findings further reflected this awareness, as 90% of the participants reported avoiding the consumption of undercooked meat. This was supported by a high mean score (4.52) and a statistically significant result ($p = 0.000$).

When comparing these findings with previous studies, numerous investigations have confirmed that the consumption of undercooked meat and the presence of cats as the definitive host of the parasite are among the most important sources of toxoplasmosis transmission to humans. Kijlstra and Jongert reported that approximately 50% of toxoplasmosis cases worldwide may be acquired through the consumption of undercooked meat, making it one of the most significant risk factors associated with the disease, particularly among pregnant women. These findings are consistent with the high level of knowledge demonstrated by the participants in the present study (Kijlstra and Jongert, 2008).

Some studies have also reported that the presence of cats in the household may be associated with an increased risk of exposure to *Toxoplasma gondii* infection, particularly among pregnant women and adolescents (Jones et al., 2009). In contrast, a large multicenter European study reported no strong

association between cat ownership and the risk of toxoplasmosis infection among pregnant women (Cook et al., 2000). Therefore, the findings of the present study generally reflect a high level of knowledge regarding the routes of disease transmission.

However, participants' knowledge regarding the possibility of maternal–fetal transmission of toxoplasmosis was relatively moderate. Only 26.7% strongly agreed and 26.7% agreed that the infection can be transmitted from a pregnant woman to her fetus, whereas 35.4% disagreed, with a mean score of 3.44. This finding suggests a relative deficiency in awareness of the seriousness of toxoplasmosis during pregnancy. Nevertheless, this issue is well documented in the scientific literature, which confirms that *Toxoplasma gondii* can be transmitted through the placenta, particularly when the mother acquires a primary infection during pregnancy, potentially leading to adverse fetal outcomes such as miscarriage and congenital abnormalities. For example, a study conducted by Hien et al. in Burkina Faso demonstrated that maternal–fetal transmission is possible and represents one of the major risks associated with toxoplasmosis during pregnancy (Hien et al., 2021).

The findings of the present study showed that 75% of participants recognized that proper handwashing after handling raw meat or soil reduces the risk of toxoplasmosis infection, with a mean score of 4.53 and a statistically significant result ($p = 0.000$), reflecting a good level of preventive knowledge. This awareness was also translated into practice, as 92.1% of participants reported washing their hands after handling meat or soil, while 96.7% reported thoroughly washing fruits and vegetables before consumption. These practices were associated with very high mean scores of 4.8875 and 4.950, respectively, and strong statistical significance ($p = 0.000$).

The findings demonstrate a positive relationship between correct knowledge and actual preventive practices, suggesting that theoretical awareness contributes to the adoption of protective health behaviors. This association between knowledge and preventive behavior highlights the importance of personal hygiene and proper food handling in reducing the risk of toxoplasmosis infection.

These results are consistent with a study conducted in Tunisia, which found that washing hands and vegetables before eating significantly reduced the likelihood of detecting antibodies against *Toxoplasma gondii*, thereby confirming the important role of health awareness in improving preventive practices (Lachkhem et al., 2020). These findings are further supported by another study, which emphasized the importance of adopting multiple preventive measures, including handwashing, washing vegetables thoroughly, and properly cooking meat, to reduce the risk of exposure to *Toxoplasma gondii*. The authors also highlighted that adequate knowledge is often associated with greater adherence to preventive practices (Tenter et al., 2000). The findings showed that most participants recognized that individuals with weakened immunity are at greater risk of developing complications from toxoplasmosis ($M = 4.07$). This result is consistent with CDC reports, which identify immunosuppression as a major risk factor for infection and severe disease outcomes (Centers for Disease Control and Prevention, 2023).

The present study showed that most participants were aware that toxoplasmosis can be diagnosed through blood testing, with a high mean score ($M = 4.50$). This finding is consistent with the literature, which identifies IgG, IgM, and avidity tests as the main diagnostic tools for toxoplasmosis (Montoya and Liesenfeld 2004). Furthermore, more than half of the participants supported screening before or during early pregnancy and expressed positive attitudes toward including toxoplasmosis testing in routine prenatal care. These findings suggest a positive link between knowledge and preventive behavior and highlight the importance of early screening in reducing the risk of congenital infection (Montoya and Liesenfeld 2004).

The findings revealed that the majority of participants recognized that toxoplasmosis during pregnancy can lead to miscarriage or congenital abnormalities, indicating a high level of awareness of its adverse effects on pregnancy. Similarly, most participants acknowledged the potential negative impact of the infection on fetal health ($M = 4.61$), reflecting a clear understanding of the disease's severity. These findings are consistent with previous studies reporting that primary toxoplasmosis infection during pregnancy may result in serious fetal complications, including miscarriage, stillbirth, neurological disorders, and ocular damage (Tenter et al., 2000). Furthermore, increased awareness of

the disease has been shown to promote positive attitudes and preventive behaviors among pregnant women (Lachkhem et al., 2020).

The study findings demonstrated positive attitudes toward toxoplasmosis screening and health education, with most participants supporting routine testing and awareness programs for pregnant women. These results are consistent with previous studies showing that positive attitudes toward screening and prevention encourage protective behaviors, although awareness alone may not always translate into complete preventive practices without effective health education programs (Alghafari, 2025, Pereboom et al., 2013).

The findings showed that 82.1% of participants believed that keeping cats at home increases the risk of toxoplasmosis, while 80.4% reported adopting preventive measures when handling cat litter. These results indicate a good level of awareness and commitment to protective practices. Similar findings have been reported in previous studies, which indicated that cat owners may have a higher risk of infection, particularly when environmental risk factors and improper handling of cat waste are present (Li et al., 2022).

Furthermore, these findings are consistent with a recent Egyptian study, which found that pregnant women who did not follow preventive measures such as handwashing after handling cats or cat litter were at a significantly higher risk of *T. gondii* infection. This highlights the important role of personal hygiene and protective practices in reducing infection risk and suggests that cat ownership does not necessarily increase risk when appropriate precautions are followed. These findings emphasize that knowledge should be accompanied by practical preventive behaviors to effectively reduce exposure to infection (Hassanen et al., 2023).

Conclusion:

According to the study, women who are pregnant at Al-Bayda Medical Center are typically well-informed about toxoplasmosis, particularly when it comes to the disease's transmission from cats and undercooked meat, as well as important risk factors including inadequate immunity. Strong commitment to protective behaviors is demonstrated by their preventative habits, which include hand hygiene, washing vegetables properly, cooking meat thoroughly, and wearing gloves while handling cat litter. Nonetheless, there is still a moderate level of awareness regarding mother-to-fetus transmission, indicating the need for better health education during pregnancy. Overall, the results show that knowledge, attitudes, and preventative activities are positively correlated, underscoring the need of connecting awareness with appropriate behaviors to lower the risk of infection and safeguard fetal health.

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