Assessment of Microbial Infection Causing of Miscarriage in Holy Karbala Pregnant Women

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تقييم المسببات الميكروبية المسببة للإجهاض عند النساء الحوامل في كربلاء المقدسة

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ABSTRACT

Background:

Miscarriage is a major clinical problem in obstetrics with an estimated incidence of around 25% of all pregnancies worldwide. Traditionally, these events are categorized by gestational length: early versus late miscarriage, where early miscarriage is loss of the pregnancy before 12 weeks of completed gestation, and late between 12 and 22 weeks of gestation.

Material and Method:

At the obstetrics and gynecology hospital in Karbala, Iraq, our study was conducted from December 2024 to May 2025 to determine the demographic characteristics of women with a miscarriage. Study participants answered predesigned questionnaires which included data on sociodemographic and reproductive variables such as; name, age, parity, number of previous miscarriages, educational level, gestational age at presentation and other clinical details. Women with miscarriages who were free of autoimmune diseases had their peripheral blood samples taken. Sera were transferred and stored at −20°C until analysis. The serological tests for *Toxoplasma gondii (T. gondii)* and cytomegalovirus (CMV) (IgM and IgG antibodies) were performed using enzyme-linked immunosorbent assay (ELISA). Furthermore, microbiological specimens from placental tissues were obtained and the bacterial isolation and characterization were performed by the VITEK® 2 Compact automated system.

Results:

The present investigation revealed that among patients and control groups, most of the women within age group 20-30 years, and a statistically significant difference was obtained between the both of two cohorts. Twenty (28.6%) of patients were lived in urban areas and the rest 50 (71.4%) of the patients lived in rural areas. Based on the number of previous miscarriages, the highest number was observed in the first group (those with no prior miscarriage), totaling 31 cases (44.3%), and 29 cases (41.4%) in the second group (those with a previous miscarriage). Lowest percent was in the third group, those with two miscarriages, with significant differences. The knowledge level also differed significantly between patients and healthy control women. Microbiological and serological tests demonstrated four different types of infections among studied patients that including: bacterial infections, *T. gondii*, CMV, and co-infection of *T. gondii* and CMV.

Conclusion:

This demographic analysis for studied participants discloses several notable patterns that may participate to the physiological dynamics causing abortion and those women had four different infection kinds including: bacterial infection, *T. gondii*, CMV, and those who had both *T. gondii* and CMV.

Key words: Abortion, miscarriage, *T. gondii*, CMV, Bacterial infection.

INTRODUCTION

Miscarriage is a major clinical problem in obstetrics with an estimated incidence of around 25% of all pregnancies worldwide. Traditionally, these events are categorized by gestational length: early versus late miscarriage, where early miscarriage is loss of the pregnancy before 12 weeks of completed gestation, and late between 12 and 22 weeks of gestation [1].

Bacterial, viral, parasitic, and fungal infections in the mother can cause pregnancy complications at any point in gestation. Various previous studies have used different methods and showed that pregnant women have a higher susceptibility to specific pathogens due to compensatory physiological and immunological adaptations. Among the so-called "TORCH" pathogens, *T. gondii* and CMV have been suggested as potential contributors to adverse pregnancy outcomes such as congenital infection, miscarriages, and intrauterine growth restriction [2].

While the majority of TORCH pathogens produce mild-to-moderate morbidity in the population, maternal infections during pregnancy can have dire fetal consequences owing to both systemic and localized pathogenic mechanisms. There is recent evidence that various microbial agents, including neurotropic viruses, can overcome the placental barrier. In addition, abnormal maternal cytokine responses to pathogens have been associated with a wide range of poor pregnancy outcomes, including spontaneous abortion, congenital defects, and intrauterine growth restriction[3].

T. gondii has a high ability to infect host cells and pass through the placental barrier, thus it is considered one of the most important abortificient parasitic agent. This type of transmission could lead to fetal infection, congenital malformations, or intrauterine death. Transmission to humans, however, happens by several means, most significantly via ingestion of tissue cysts in undercooked meat, ingestion of food or water contaminated by oocysts expelled in cat feces, and transplacental transmission from an infected mother to the fetus during pregnancy [4].

Bacterial infections are deemed the main factors causing miscarriage, where several species of bacteria like *Escherichia coli (E. coli), Staphylococcus aureus (S. aureus), Streptococcus agalactiae (S. agalactiae),* and *Enterococcus faecalis (E. faecalis)* could invade female's reproductive system, causing chorioamnionitis [5 and 6]. Regarding viral infections, CMV is one of the most common viruses belonging to the Herpesviridae family, and it is known to play a role in causing miscarriage and fetal mortality. This virus could directly infect the placenta and cause developmental abnormalities, as well as it could be transmitted from mother to its fetus via the placenta (vertical transmission), the immunological response to viral infection may lead to an imponderables between Th1 and Th2 cytokines, leading to pregnancy failure [7].

MATERIAL AND METHOD

• Subjects, sampling and general methodology

Peripheral blood specimens were obtained from women with clinically diagnosed miscarriage without evidence of autoimmune disease. The current case–control investigation was included 90 participants (70 patients and 20 controls) and conducted at Obstetrics and Gynecology Hospital in Kerbala/Iraq, from December 2024 to May 2025.

All participants filled out a questionnaire involving some information like name, age, children number, number of previous abortions, knowledge level, pregnancy month , autoimmune disease and the duration of urinary tract infections (UTIs). Venous blood was collected into sterile gel tubes, which were left to clot at room temperature for 20–25 mins before usage. The plasma was centrifuged at 3000rpm for 10mins, aspirated with a micropipette and divided evenly into three Eppendorfs containing only the plasma. These specimens were kept at (−20°C) until later use.

Detection of IgM and IgG antibodies for T. gondii and CMV was determined by enzyme-linked immunosorbent assay (ELISA) as a qualitative test using the commercial kit from (BTLAB, China) [8 and 9]. Placenta tissue samples were also obtained for microbiological research. Isolated pathogenic bacteria were identified by the standard protocol by using VITEK® 2 Compact automated system [10 and 11].

• Ethical approval

To conduct current study, verbal acceptance has been taken from all patients prior to collect the specimens. In addition, the ethical approval was acquired from Karbala Sciences College Ethical Committee. During specimen's collection and processing, all health measures and safety rules have been taken.

• Statistical Analysis

The analysis of outcomes in present study was performed using SPSS software, version 26. Comparative assessment between groups were conducted using z-test and the Chi-square test to assess the differences in proportions and categorical variables; the results of all hypothesis tests with p-values <0.05 (two-side) were considered to be statistically significant. Graphical representations of the data were generated employing Microsoft Excel 2010 to draw key findings and boost clarity of presentation.

RESULTS AND DISCUSSION

• Characteristics data of patients and control subjects

Table (1) displays demographic characteristics of both patients and control subjects, which involving: age, residency, number of last abortions, as well as Knowledge level. Mean and standard deviation (SD) of patient's ages were 27.5±7.2 and 29.7±5.1 for healthy women, without significant differences between them. Both groups were divided into two age categories including: 20-30year, and 31-41year. Comparison within groups (within-patient group and within-control group) demonstrated that significantly highest percentage for both was found in 20-30year age

category. As well, significant differences between groups (between patients and controls) were recorded. For 20-30 age category, patients were significantly higher than controls. However, non-significant difference was presented between groups within 31-41 age category. Regarding to residency, 28.6% of patients lived in urban, while 71.4% resided in rural regions.

With respect to numbers of last abortions, highest percentage of patients was in 1st group (have no abortion), at 44.30%, and 2nd group (had one abortion), at 41.4%, while lowest significant percentage was in 3rd group, which have two abortions, with statistically significant differences. According to Knowledge level, participants were dividing into two categories: Non-knowledge and Knowledge; our investigation reveals a significant difference between cases and healthy individuals, where 80% of patients have no prior knowledge, while 20% have knowledge.

The demographic analysis in present investigation showed important patterns, which may be implicated with physiological dynamics that lead to miscarriage in women. The classification according to age showed that younger females may be more vulnerable to termination throughout the time of early gestation.

This line up the previous study [12], which revealed that maternal age under thirty years is correlated with high risk of abortion, especially in primigravida women, may be owing to hormonal fluctuation and immature immune amendment [12]. In addition, this results maybe because females at reproductive age were more biologically oversensitive to some pathogens that cause abortion, like *T. gondii,* CMV alongside bacterial agents. Previous report in Iran boosted this proposition [13], where this investigation demonstrated that anti-*T. gondii* IgG antibodies significantly more common in females had abortion history, with mean age about 30years, which revealed that those women at this age maybe more susceptible to get or reactivate latent infections due to their lifestyle, environmental exposures, or immunological alterations throughout pregnancy [13].

Table 1. The demographic Characteristics of patients and control subjects

Participants	Age groups No. (%)		Probability value
	20-30years	**31-41years**	
Patients	51 (72.9%)	19 (27.1%)	0.000*
Controls	13 (65%)	7 (35%)	0.003*
Probability value	0.035*	0.31^{NS}	
Age (Years) Mean±S.D			
Patients	27.5± 7.2		0.09^{NS}
Controls	29.7± 5.1		
Residence			
Participants	Urban	Rural	Odd (CI 95%)	Probability value
Patients	20 (28.6%)	50 (71.4%)	0.1000 (0.029-0.336)	0.000*
Controls	16 (80.0%)	4 (20.0%)		
Patients state				
Numbers of last abortions	No	1	2	Probability value
	31 (44.3%)	29 (41.4%)	10 (14.3%)	0.000*
Knowledge level				
Participants	No-knowledge	Knowledge	Odd (CI 95%)	Probability value
Patients	56 (80.0%)	14 (20%)	4.889 (1.69-14.08)	**0.003***
Controls	9(45.0%)	11 (55%)		

*Significantly differences at P<0.05 level by chi-square test and Z-test. NS: Non-significant differences

Residence appeared to be powerful predictor; where 71.4% of patients were came from rural compared to 28.6% from urban regions. The current study suggests an area of investigation for future health disparity studies, whereby the rural urban environment, its associated environmental and socio economical factors, and accessibility to care plays a role in health outcomes.

The association of education level with women's awareness of reproductive health was confirmed that educated women in Iraqi society, as result in the current study, have more knowledge of health care concept and preventing disease versus uneducated individuals. This underlines the need for educational campaigns targeting the less-educated section of population to enhance awareness in this important area. Similar to our study, Haque *et al*., also agreed of that women's reproductive health knowledge was higher women of urban areas than women of rural in Bangladesh [14].

Grouping patients by numbers last abortions may provide clues to possible underlying causative factors leading to pregnancy loss. In 44.3% of women, loss of this pregnancy (for the first time) is

abortive; this can be due to multiple, multifactorial causes, e.g., chromosomal aberrations, uterine malformations, as well as infection.

Importantly, primary infections with *T. gondii*, CMV or *L. monocytogenes* during First trimester can effectively break pregnancy immunological tolerance and elicit immunological reactions, both of which may lead to impaired placental health and embryonic survival [15].

The rate of 41.4% women with one prior abortion may represent chronic infection, immunological derangements, or autoimmune reactions. Women with a history of abortion had upraised natural killer cells activity, various Th1/Th2 cytokine ratios along with high antiphospholipid antibodies that will cause both implantation and inhibition of placentation [16]. The 14.3% of women who that have two previous abortions fall within a clinical definition of recurrent pregnancy loss, a multifactorial disorder that affects 1-2% of women and is linked with immune dysfunction [16 and 17]. Certain infections such as toxoplasmosis were implicated in obstetric complications such as repeated fetal loss through multiple mechanisms that included tropism for the placenta and chronic inflammation [18].

In our investigation, Knowledge level had a highly significant association with risk of Abortions, as Knowledge level was associated with odds ratio (4.889) that patients who had not knowledge were almost five fold more at risk to acquire infections. This is due to the fact that women who are less aware may not be able to recognize the immunological presentation or comply with obstetric recommendations, which in turn increases the risk of fetal loss. This finding shows that if reproductive health is not aware of early symptoms of pregnancy complications this is probably involved in harmful consequences. The present result was in agreement with findings of [19], who show that health awareness is a critical factor in perinatal health, influencing protective behavior and appropriate help–seek behavior.

• **The clinically characteristics of studied patients**

The clinical characteristics of studied patients that including: infections types, and abortion period. Figure (1) exhibited infection's types in patients, where the studied patients showed four infections including: bacterial infections, *T. gondii*, CMV, and those have both *T. gondii* and CMV. Significantly high percentages of patients have bacterial infections (30%) and *T. gondii* (36%). Regarding to Abortion period, Figure (2) shows two periods in studied patients, where 57% at First Trimester and 43% at Second Trimester, with non-significant differences.
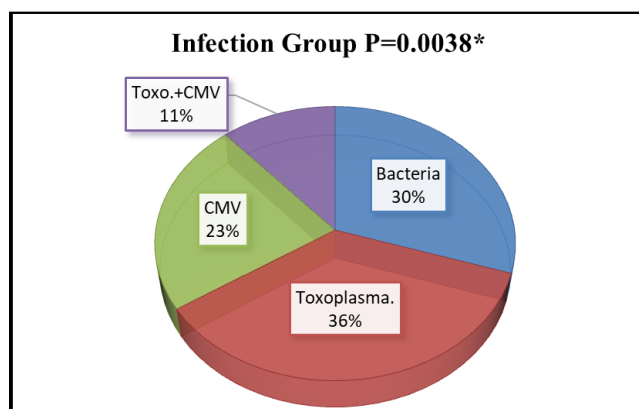
Figure 1. Types of Infections in patients
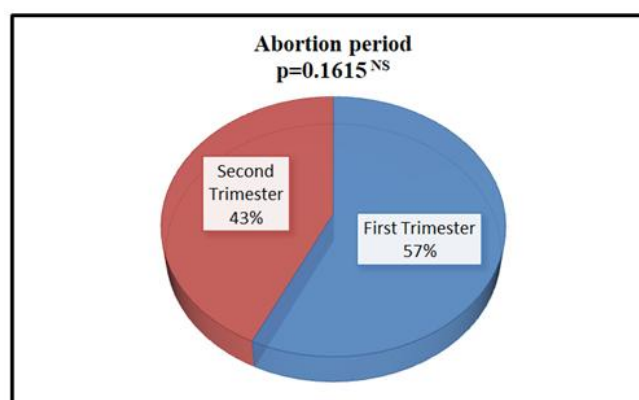
Figure 2. Abortion period patients

The distribution of infections in studied patients in the current study demonstrated a significant association between pathogenic vulnerability and pregnancy loss. *T. gondii* and bacterial infections revealed a higher prevalence rate compared with other infections, the present outcomes highlighted polyfactorial infectious burdens that might affect pregnancy's viability throughout direct placental invasion, inflammation, and dysregulation of immunological responses. *T. gondii* is widely prevalent infection that leads to abortion, stillbirth, as well as congenital abnormalities if transmitted during pregnancy [20]. This high prevalence rate in this investigation agrees with previous investigation of Shojaee *et al.*, which demonstrated that patients infected with Toxoplasmosis demonstrate about 2.45-fold higher risk of abortion compared with those non-infected patients [21]. Other study revealed that a substantial prevalence of Toxoplasmosis among pregnants; this study assured the importance of early identification and healthcare education to prohibit the congenital malformation and pregnancy losing [22]. Regarding to Bacterial infections, they also found as a critical contributor to abortion, this result may be explained considering the

inflammatory setting triggered by bacterial endotoxin might weak the placental function and fetal growth, which heightened the requiring for early microbial detection in pregnant women. This finding agrees with several previous investigations, which had been revealed pathogenic bacteria such as *L. monocytogenes, C. trachomatis*, and other bacterial spp. correlated with vaginosis were implicated in adverse pregnancy complication throughout mechanisms involving trophoblasts invasion, cytokine secretion, and premature rupturing of membrane [3]. *C*ytomegalovirus is one of herpesvirus that able to cause miscarriages, especially during time of primary infections in early pregnancy [23]. In spite of its impact in abortion is remaining less clearly known comparing with Toxoplasmosis, in vitro studies had revealed that CMV can stimulate placental dysfunction and apoptosis for trophoblastic cell [24]. It was revealed that CMV infections alterations placental cytokine such as IL-6, IL-1β, and IL-10 profiles, increasing inflammatory biomarkers as TNF-α and MCP-1, which may engaged in placental destruction and various pregnancy issues [25 and 26]. It was emphasized the roles of CMV in disruption the trophoblast functions by inducing of apoptosis and affect the differentiation, this study proposed a mechanistic way to abortion alongside poor fetal development [27].

Another study showed that the impact of CMV in miscarriages varied according to visual gestational period; and revealed that the impacts of CMV may be higher when infections occurred in advanced stages of infection or when associated with other pathogenic infections [28]. Moreover, our study demonstrated that studied patients had co-infections with toxoplasmosis and CMV at percent of 11% that is demonstrating clinical significance, because synergistic interactions among these infections may reinforce immunological-pathological impacts. A recent investigation conducted by Galván-Ramírez *et al.* showed a percent of 29.10% for co-infections of *T. gondii* and other microbes, being viruses or bacteria, and demonstrated this percent was related increased bad outcomes [29].

With regard to classification based on abortion period, the absence of significance showed that both abortion periods in studied women are equally affected in two groups. Common chromosomal abnormalities, implantation failure, and immunological maladaptation in early pregnancy are associated with the first-trimester abortions. On the other hand, infectious agents, particularly *T. gondii,* CMV and other pathogens are always reported to play a role in the early pregnancy loss [13].

Although they are less common, second-trimester abortions are often associated with increasing infections, placental insufficiency, and systemic maternal diseases. According to the same review by Giakoumelou et al, [13] approximately two-thirds of late abortions can be attributed to infections, predominantly including bacterial vaginosis and CMV infection. Such infections might compromise placental vascularization, induce preterm rupture of membranes, and lead to intrauterine fetal demise. Systemic infections such as rubella, brucellosis and toxoplasmosis can interfere with placental development and immune modulation and increase the risk for second-trimester loss [30].

While statistically significant differences were not apparent between the two gestational periods

from analysis between the two groups in this study, the nearly identical distribution indicates that infectious agents and immune factors may impact pregnancy at different stages. This underlines the need of trimester specific diagnosis with assays and antigen Evaluation of Immunological parameters.

- **Distribution of IgM and IgG Seropositivity among *Toxoplasma gondii*, Cytomegalovirus, and Co-infection (Toxo+CMV) Cases**

Figure (3) shows that all cases infected with *Toxoplasma gondii* and Cytomegalovirus (CMV), as well as co-infections (Toxo+CMV), were 78% ,66% ,100%) respectively for IgM antibodies, confirming that most infections in the sample were recent or active. This high percentage reflects an epidemiological pattern indicating continued community transmission. As for IgG antibodies, they were present in 40% of *T. gondii* infections and 25% of CMV infections, while rising to 37.5% in co-infections. These results suggest that some participants had previous infections or exposure to the virus.
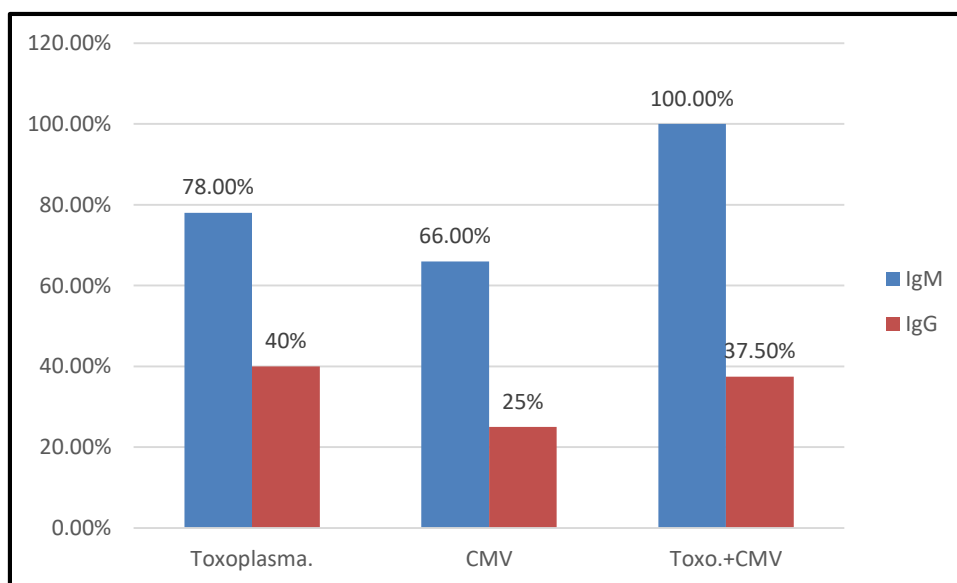
Figure 3. Distribution of IgM and IgG Seropositivity among *T. gondii*, CMV, and Co-infection (Toxo+CMV) Cases

The results of the current study are consistent with the study by Mohammed (2016) [31] in the Tarmiyah area north of Baghdad, where IgM was 63.2% and IgG was 21.4%, as the IgG antibody rate was lower than the IgM rate among pregnant women infected with *T. gondii* parasite and highest frequency of specific antibodies anti-CMV IgM (18.4%) more than with anti-CMV IgG. This study agreed with the study conducted in the city of Zawia City, Libya IgM and IgG antibodies against *Toxoplasma gondii* and cytomegalovirus were detected. The study showed 28.4%of participants were positive for Toxoplasma IgG, 30.8% for IgM, 17.1% for CMV IgG, and 35.1% for IgM [32].

While the results of the current study did not agree with A study by Hassen et al., [33] indicated that the serological response was primarily focused on IgG, with an IgG positivity rate of about 49.4%, while IgM did not exceed 13.6%, suggesting that most infections were old or latent. Another study supported in Diwaniyah, Iraq, showing a very high IgG positivity rate of 96.2% compared to a low IgM rate of 1.8%, reflecting the predominance of chronic infection patterns in those communities [34].

The prevalence of co-infection in our study was(100 %) for IgM antibodies compared to (37.5%) for IgG antibodies, indicating that dual infection may represent a higher risk factor and contribute to an increased severity of the condition compared to single infections.

Recent literature indicates that the co-infection of CMV and *T. gondii* can increase pregnancy risk compared to single infections. This is explained by the fact that both pathogens belong to the TORCH group, which are capable of crossing the placenta and causing direct fetal infection. Moreover, the presence of a dual infection places additional stress on the maternal immune system, potentially reducing its ability to control both the virus and the parasite simultaneously, thereby increasing the likelihood of vertical transmission, miscarriage, or fetal complications. Previous studies have shown that the concurrence of Toxoplasma IgG with CMV IgM is associated with a marked increase in miscarriage risk compared with healthy women [35]. Therefore, co-infection represents an important risk factor that should be carefully considered when monitoring pregnant women.

• Prevalence of bacterial infections in patients

The prevalence of bacterial infections that isolated from studied patients is displayed in figure (4), which is reveals *S. aureus* as a most common species at 33.3%, Streptococcus at percent of 23.8%; *E. coli* appeared at percent of 14.3%. *Enterococcus faecalis (E. faecalis)* and *Listeria monocytogenes (L. monocytogenes)* present a rate of 9.5% for each. On the other hand, the least prevalent bacterial species among patients involving *Pantoea spp.* and *Klebsiella pneumoniae (K. pneumoniae)* at percent of 4.8%; with significant differences among them.

The current study showed that bacterial infections comprise about 30% of aborting females as formerly mentioned in figure (1), with a various range of spp. engaged to this infectious burden. Among these bacterial spp. is *S. aureus*, which was the commonest spp. accounting for 33.3% of isolates.

The most common is *S. aureus* indicating that this species may be implicated in local immunological activation, dysbiosis, and inflammation signaling, which are standard common mechanisms of pregnancy loss.
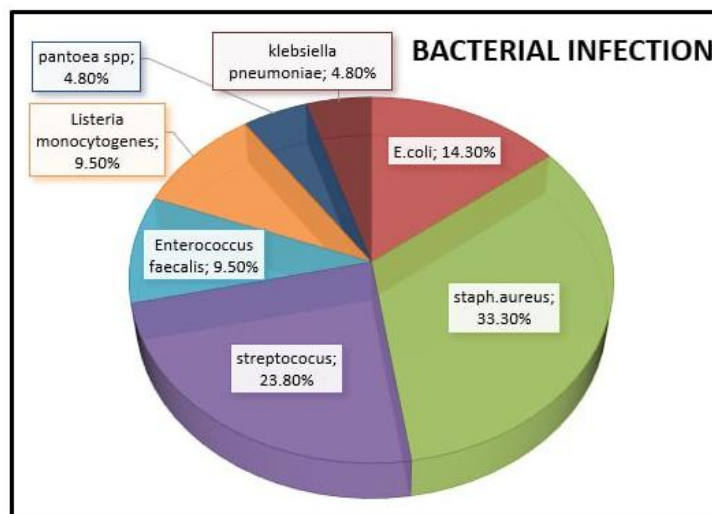
Figure 4. Bacterial infections across studied patients

This is consistent with recent microbiological profiling of first-trimester miscarriage women where this species was isolated at higher rates in women with bacterial vaginosis and pregnancy loss; this finding corroborates with that *S. aureus* is a commonly isolated member of dysbiotic vaginal microbiota linked to abortion, thus making this prevalence rate well within the previously reported spectrum in similar clinical environments [36]. Another study showed that *S. aureus* was able to infect surface of choriodecidual of human gestational membranes and form biofilm that had a critical role in development of the bacteria resistance against antibiotics [37]. *E. coli*, and Streptococcus spp. were found at 14.3%, and 23.8% of isolates. These pathogens are known long-standing agents of maternal and neonatal infectious diseases. *E. coli* is a faecal Gram-negative facultatively anaerobe, which often associates with UTIs and intrauterine infections, especially in early pregnancy. To identify the culture-confirmed *E. coli* infections in pregnant women, a previous investigation isolated *E. coli* from 202 specimens of 7,213 clinical specimens from pregnant women, and showed *E. coli* group had higher rates of miscarriage before 28-weeks than non-*E. coli* group [38].

The prevalence of Streptococcus spp. at 23.8% makes sense and is consistent with evidence that intravaginal infections and dysbiosis may contribute to pregnancy loss. Our isolation rate of 23.8% conform to the scenario in which *Streptococcus spp.* through cytokines and protease cascades pathways that well known in infection-related abortion [13], participate on local inflammations, membrane exhaust, and cervical maturity.

A 9.5% isolation rate (from aborting women) was also recorded for *E. faecalis* and *L. monocytogenes*. Our observation is consistent with increasing evidence that some bacterial infectious agents (mainly those which can ascend the female genital tract or breach placental tissue) may also contribute to pregnancy failure by triggering inflammatory and immunologic disturbances. In terms of *E. faecalis* isolation in miscarriage women, *E. faecalis* was one of the

most frequently isolated bacterial species in aborting women and preterm birth in multiple Ukrainian hospitals, as revealed in a clinical study [39]. Similarly, Hamzah & Kadim reported that *E. faecalis* was the only species of Enterococus that had been isolated from vaginal swabs of Iraqi females who had miscarriages, reinforcing its local pertinence [40]. As for *L. monocytogenes*, its rate of isolation in cases of miscarriage coincides; with the study of Hiba *et al*. [41], which reported its isolation from cervical swabs in Iraqi patients who had miscarriages, with genetic recognition of its virulence gene called *hlyA*. Infectious agents such as Listeria can trigger immune responses at the maternal-fetal interface, resulting in the disruption of the membrane, release of cytokines, and ultimately, fetal rejection. In contrast, Ahmadi *et al*. [42] found no association between *L. monocytogenes* infection and spontaneous abortion and infertility as pregnancy consequences.

Pantoea spp. and *K. pneumoniae* with an isolated at 4.8% for each, were the less frequent bacterial isolates in our study. Its potential for mucosal surface colonization and broad ecological saprophytism may explain its incidental presence in vaginal microbiota, primarily in inflammatory environments associated with miscarriage. Although *K. pneumoniae* is a characteristic Enterobacteriaceae member, it is mostly associated with UTIs including corresponding Hospital-acquired infections while its role in pregnancy loss however is also increasingly recognized. Although the isolation rate of *K. pneumoniae* from pregnancy was relatively low, the isolation of *K. pneumoniae* from abortion patients is consistent with its established virulence factors such as capsule, production of endotoxins, and the presence of antibiotic resistance determinants which may contribute to pregnancy complications in relationship with the stability of host immunity. In a case-report conducted by Liu *et al*. reported a case of second-trimester abortion due to recurrent infection with K. pneumoniae (isolated from both blood and cervical secretion, and with placental examination demonstrate chorioamnionitis); this study emphasizes the ability of *K. pneumoniae* to ascend genital tract, create systemic inflames, and disturb placental integrity [43].

CONCLUSION

This demographic analysis for studied participants revealed several noteworthy pattern that maybe participate to the physiological mechanisms underlying miscarriage. Within the present cohort, four distinct categories of infection were identified: bacterial infections, *T. gondii*, CMV, as well as concurrent infections with both toxoplasmosis and CMV.

Acknowledgments

Conflict of interests

The current study had no conflicts of interest.

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الخلاصة

المقدمة:

يُعد الإجهاض مشكلة سريرية رئيسية في طب التوليد، حيث يُقدر معدل حدوثه بحوالي 25% من جميع حالات الحمل في جميع أنحاء العالم. وتُصنف هذه الحالات تقليديًا حسب مدة الحمل: الإجهاض المبكر مقابل الإجهاض المتأخر، حيث يُقصد بالإجهاض المبكر فقدان الحمل قبل اكتمال 12 أسبوعًا من الحمل، والإجهاض المتأخر بين 12 و22 أسبوعًا من الحمل.

طرائق العمل:

أُجريت الدراسة في مستشفى التوليد وأمراض النساء في كربلاء/ العراق، في الفترة من ديسمبر 2024 إلى مايو 2025 لتحديد الخصائص الديموغرافية للنساء اللاتي تعرضن للإجهاض. أجابت المشاركات في الدراسة على استبيانات مُصممة مسبقًا تضمنت بيانات عن متغيرات اجتماعية وديموغرافية وإنجابية مثل الاسم والعمر وعدد مرات الإجهاض السابقة وعمر الحمل عند العرض والمستوى التعليمي وتفاصيل سريرية أخرى. أُخذت عينات دم محيطية من النساء اللاتي تعرضن للإجهاض ولم يكن لديهن أمراض مناعية ذاتية. نُقلت عينات المصل وحُفظت عند درجة حرارة −20 درجة مئوية حتى التحليل. أُجريت الاختبارات المصلية لطفيلي المقوسة الغوندية (T. gondii) والفيروس المضخم للخلايا (CMV) (الأجسام المضادة IgM وIgG) باستخدام مقايسة الممتز المناعي المرتبط بالإنزيم (ELISA). علاوة على ذلك، تم الحصول على عينات ميكروبيولوجية من أنسجة المشيمة، وتم عزل البكتيريا وتوصيفها باستخدام نظام VITEK® 2 Compact الآلي.

النتائج:

كشفت هذه الدراسة أن معظم المرضى الاشخاص الاصحاء كانوا ضمن الفئة العمرية 20−30 عامًا، بوجود فروق ذات دلالة إحصائية. كان 20 (28.6%) من المرضى يعيشون في المناطق الحضرية، بينما كان 50 (71.4%) منهم يعيشون في المناطق الريفية. وفقًا لعدد حالات الإجهاض السابقة، لوحظ أعلى عدد من حالات الإجهاض السابقة في المجموعة الأولى (التي لم تعاني من اجهاض سابق)، بإجمالي 31 حالة (44.3٪)، و29 حالة (41.4٪) في المجموعة الثانية (عانت من اجهاض سابق)، بينما كانت أقل نسبة في المجموعة الثالثة، التي عانت من إجهاضين، مع وجود اختلافات كبيرة (p = 0.0003). كما اختلف مستوى المعرفة بشكل كبير بين المرضى والنساء الأصحاء. أظهرت الاختبارات الميكروبيولوجية والمصلية أربعة أنواع مختلفة من العدوى بين المرضى الذين تمت دراستهم والتي تشمل: العدوى البكتيرية، والمقوسة الغوندية، والفيروس المضخم للخلايا، والعدوى المشتركة للمقوسة الغوندية والفيروس المضخم للخلايا

الاستنتاجات :

يكشف هذا التحليل الديموغرافي للمشاركين في الدراسة عن عدد من الأنماط البارزة التي قد تشارك في الديناميكيات الفسيولوجية المسببة للإجهاض، تلك المريضات لديهم أربعة أنواع مختلفة من العدوى بما في ذلك: العدوى البكتيرية، والمقوسة الغوندية، والفيروس المضخم للخلايا، والذين لديهم كل من المقوسة الغوندية والفيروس المضخم للخلايا.

الكلمات المفتاحية:

الإجهاض، الإجهاض التلقائي، المقوسة الغوندية، الفيروس المضخم للخلايا، العدوى البكتيرية