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THE ROLE OF ANTICHLAMYDIA ANTIBODY IN DETECTION OF ECTOPIC PREGNANCY

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ABSTRACT

Background: Ectopic or extra-uterine pregnancy occurs when the blastocyst implants outside of the uterine cavity's endometrium. According to several studies, a greater percentage of pregnant women with ectopic pregnancy will have serological evidence of a prior Chlamydia trachomatis infection. As infection with C. trachomatis causes the production of detectable antibodies in serum which target microorganisms, but unfortunately; there is no long-term immunity to urogenital chlamydial infections. Objectives: To compare the frequency of *Chlamydia trachomatis* infection in women with ectopic and with normal pregnancy. Methods: A case control study, carried out at Mosul and Al Hamdaniya General Hospitals (Nineveh-Iraq). The study included 100 randomly selected pregnant of them 50 ladies had diagnosed first trimester tubal pregnancy (case group) and another 50 ladies with early normal intra uterine pregnancies (after matching for age and gestational age with case group). The study conducted from September 1st, 2023, to March 1st, 2025. The questionnaire included two main parts, part one for demographic and anthropometric information of the study participants, part two for the patient's antichlamydia antibody titer, part three for the diagnosis of CHD and part four for the prenatal risk factors. **Results:** The mean age of the study participants is 29.24 ± 5.87 years. No statistically significant difference between the two groups regarding their ages, residency, gravidity, parity, presence of miscarriage, gestational age and body mass index (P value > 0.05) for all. Moreover; 42 (84%) of women with ectopic pregnancy had positive antichalmydial antibodies while 8 (16%) of them had negative antichlamydia antibodies. Furthermore; statistically significant difference was found within ectopic pregnancy group of patients regarding their age, residency, gravidity and presence of miscarriage (P value <0.001) for all of them. Lastly; statistically significant difference was found between cases and controls regarding IgG and IgM titer (P value < 0.001) for both of them. Conclusion: Chlamydia trachomatis is clearly higher in women who have ectopic pregnancy, and it has a strong association with the development of ectopic pregnancy. Additionally, patients with ectopic pregnancy are more likely to be multiparous, multigravida, and have experienced prior miscarriages.

KEYWORDS: Sexual transmitted disease, extrauterine pregnancy, Nineveh, Iraq.

1- INTRODUCTION

Ectopic or extra-uterine pregnancy occurs when the blastocyst implants outside of the uterine cavity's endometrium.^[1] Approximately 95% of EP implants are situated in the fallopian tube and 70-80 percent are found in the fallopian tube's ampullary region.^[2] About half of women with an EP diagnosis had known risk factors, such as prior EP history, *Chlamydia trachomatis*, pelvic inflammatory disease, and history of pelvic surgery, advanced maternal age, smoking, intrauterine

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contraceptives, exposure to methylstilbestrol during pregnancy, and assisted reproductive technology.^[3-4]

Globally, *Chlamydia trachomatis* is the most prevalent bacterial infection that is contracted through sexual contact. Compared to other sexually transmitted infections, the symptoms of chlamydial infection are less severe.^[5-6] The patient is largely unaware of the infection due to these modest symptoms until secondary or tertiary symptoms appear.^[7] Acute salpingitis and pelvic inflammatory disease are two serious consequences that

frequently accompany recurrent or ongoing Chlamydial infections.^[8]

The chlamydia epidemic persists despite extensive screening and treatment initiatives, as evidenced by the annual rise in the number of cases recorded.^[9] Infection with C. trachomatis causes the production of detectable antibodies in serum which target microorganisms, but unfortunately; there is no long-term immunity to urogenital chlamydial infections.^[10] Detecting particular antibodies in a single serum samples for lower genital tract infection is not reliable as they can also be present in sera from non-infected women.^[11] Although it is challenging to distinguish between previous and current lower genital tract infections and there is strong evidence that the presence of these antibodies is linked to upper genital tract infections, especially at high titers.^[12] Recurrent chlamydial infection induces inflammation, fibrin deposition, and scarring in the tubules.^[13] Persistent chlamydial antigens can cause a delayed hypersensitivity reaction, leading to ongoing scarring even after negative cultures. Inflammation in the fallopian tube may prevent embryo development and trigger early implantation.^[14] Because the fallopian tube's epithelium is not covered by a submucosal layer. As a result, a fertilized ovum can readily penetrate the epithelium and implant inside the muscularis layer of the tube.^[15] Then after; maternal blood flows into the trophoblastic or nearby tissue's pours as quickly growing trophoblasts break down the muscularis layer.^[16]

According to several studies, a greater percentage of pregnant women with EP will have serological evidence of a prior Chlamydia trachomatis infection than pregnant women without prior EP.^[17] Additionally, compared to ectopic patients who tested negative for Chlamydia antibodies, ectopic pregnant women who tested positive for exposure to Chlamydia trachomatis had a higher prevalence of pelvic adhesions.^[18] Furthermore, as previously mentioned, there was a substantial correlation between rising antibody titer and the severity of tubal injury in terms of pelvic adhesions.^[19] This suggests that the presence and severity of tubal injury are quantitatively correlated with rising antibody titers.^[20]

The aim of study is to compare the frequency of *Chlamydia trachomatis* infection in women with ectopic and with normal pregnancy.

2-PATIENTS AND METHODS

This is case control study, carried out in agreement with the ethical guidelines derived from the Helsinki Declaration at Mosul and Al Hamdaniya General Hospitals (Nineveh-Iraq). Before a sample was taken, the patients' verbal consent was obtained after an explanation of the study's objectives. The study included 100 randomly selected pregnant women from the outpatient's clinic as well as those admitted to the emergency room or labor room, of them 50 ladies had diagnosed first trimester tubal pregnancy (case group) and another 50 ladies with early normal intra uterine pregnancies (after matching for age and gestational age with case group). The study conducted from September 1st, 2023, to March 1st, 2025.

An ectopic pregnancy was diagnosed by the following procedures: Over 1500 IU/ml of beta HCG considered the diagnostic threshold for ectopic pregnancy. Uterine cavity and cervical canal empty (although a transvaginal ultrasound scan show a gestational sac in either adnexia or tube), ultrasound was done by the radiologist. Those who were used an intrauterine contraceptive device (IUCD), or had past medical history of ectopic pregnancy, infertility, tubal surgery, IVF, smoking, in addition to other ectopic pregnancy types and heterotopic pregnancies were excluded from the study.

For every patient, a general examination and body mass index calculation were performed. Moreover; the following tests were performed on the groups under study: serum anti-chlamydial IgG antibody, beta HCG titer, pregnancy test, and complete blood count.

Statistically analysis done by using SPSS 30.0 software application. Data was analyzed using both descriptive statistics (frequency distribution and percentage) and inferential statistics (Chi-square test for categorical variables, t-test for quantitative continuous variables). A P-value of <0.05 indicates statistical significance.

3. RESULTS

The mean age of the study participants is 29.24 ± 5.87 years. No statistically significant difference between the two groups regarding their ages, residency, gravidity, parity, presence of miscarriage, gestational age and body mass index (P value > 0.05) for all. As shown in figure 3.1.

 Table 3.1: Comparison between cases and controls regarding sociodemographic, and anthropometric information.

Variable	e Case, number Control, number and percent and percent		P -Value	
Age:				
- Less than 20	3 (6%)	1 (2%)		
20-30 years	26 (52%)	21 (42%)	0.357	
- 30-40 years	21 (42%)	28 (56%)		
- Mean ± Standard deviation	28.72 ± 7.76	29.51 ± 4.89		
Residency:				
- Urban	41 (82%)	40 (80%)	0.762	

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- Rural	9 (18%)	10 (20%)		
Gravidity:				
- Primigravida	6 (12%)	5 (10%)	0.992	
- Multigravida	44 (88%)	45 (45%)	0.885	
Parity:				
- Primiparous	5 (10%)	5 (10%)	1	
- Multipara	45 (90%)	45 (90%)	1	
Presence of miscarriage:	8 (16%)	11 (22%)	0.234	
Gestational age (weeks), mean ± Standard deviation	6.35 ± 0.57	6.47 ± 0.78	0.872	
Body mass index (kg/m^2) , mean \pm Standard deviation	26.19 ± 1.7	25.89 ± 2.2	0.662	

Figure 3.1 shows that 42 (84%) of women with ectopic pregnancy had positive antichalmydial antibodies while 8 (16%) of them had negative antichlamydia antibodies.



Figure 3.1: Distribution of the women with ectopic pregnancy according to their antichlamydia antibodies.

Table 3.2 explores the association between demographic characteristics within the ectopic pregnancy group. Statistically significant difference was found with regard to age, residency, gravidity and presence of miscarriage (P value <0.001) for all of them.

Variable	Number and percent	P -Value
Age:		
- Less than 20	3 (6%)	< 0.001
20-30 years	26 (52%)	
- 30-40 years	21 (42%)	
- Mean ± Standard deviation	28.72 ± 7.76	
Residency:		
- Urban	41 (82%)	< 0.001
- Rural	9 (18%)	
Gravidity:		
- Primigravida	6 (12%)	<0.001
- Multigravida	44 (88%)	
Parity:		
- Primiparous	5 (10%)	<0.001
- Multipara	45 (90%)	
Presence of miscarriage:		
- Yes	8 (16%)	<0.001
- No	42 (84%)	

Fable 3.2: Association	between demograp	hic characteristics within	the ectopic	pregnancy group.
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Table 3.3 illustrates comparison between the study groups regarding their mean \pm standard deviation of antichlamydia antibodies. Statistically significant difference was found between them regarding mean \pm

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standard deviation of IgG and IgM titer (P value < 0.001) for both of them.

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Variable	Cases	Controls	P -Value
IgG (U/ml), mean \pm standard deviation	6.1 ± 4.9	2.7 ± 1.2	< 0.001
IgM (U/ml), mean ± standard deviation	4.3 ± 2.1	1.5 ± 1.1	< 0.001

4. DISCUSSION

Chlamydia infections are usually presented asymptomatically, making them susceptible to complications such as ectopic pregnancy, pelvic inflammatory disease (PID), chronic pelvic pain, and tubal factor infertility when left untreated.^[21]

The current study found that ectopic pregnancy is significantly higher among the age groups of 20-30 and 30-40 years, as these ages are more likely to be sexually active, this finding is parallel to what was found by Sarah Flaieh Essa et al.^[22] Additionally, ectopic infection found in this study to be significantly more common among urban residence which is going with Shaimaa Mohammed Hussein et al study finding.^[23] Furthermore; women with multigravida, multipara and miscarriage were significantly more likely to have ectopic pregnancy than those with primiparous and primigravida, similarly Elsa Tesfa Berhe et al found comparable findings.^[24] Moreover; Elsa Tesfa Berhe et al found that (82.9%) of cases with ectopic pregnancy had positive antibodies for chlamydia infection which so close to our study findings (84%).

The main finding in this study was the mean of antichlamydia antibodies titers was significantly higher than those with normal pregnancy. This difference is also found by Sahar kamal jalal^[25] and K Agholor et al.^[26]

Lastly; the limitation of the study; is the relatively small sample size, and retrospective case control design. Additionally; due to short time of data collection, as a result it could be susceptible to selection and recall bias.

5. CONCLUSION

Chlamydia trachomatis is clearly higher in women who have ectopic pregnancy, and it has a strong association with the development of ectopic pregnancy. Additionally, patients with ectopic pregnancy are more likely to be multiparous, multigravida, and have experienced prior miscarriages; consequently, screening and treatment of chlamydia infection in these patients may reduce the likelihood of ectopic pregnancy at a low cost.

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About this study, the authors disclose no conflicts of interest.

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