

# Detection of the Level of IgM and IgG Antibodies in the Serum of Aborted and Non-Abortive Women in Diyala

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## Keywords:

*IgM, IgG*, aborted and non-abortive women

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## ABSTRACT

The current study was conducted in Diyala Governorate during the period from 20/4/2021 to 20/8/2021 on women who had aborted and non- abortive women. A questionnaire was prepared to collect information on each case included in the study. The examination was conducted on 250 serum samples using a latex test, the highest abortion rate was recorded in the age group 26-30 years, with a rate of 31.57%. There are significant differences at the level of  $P \leq 0.05$ . The incidence was higher in the city, at 64.63% and the highest rate was recorded in the middle-income group, at 54.87%, and it was higher among housewives, at 75.60%. It was also noted that the infection rate was higher among women who suffered from first period miscarriage, 46.34%. Either the abortion stage was higher during the trimester the first pregnancy a rate of 60.97%. There are significant differences at the level of  $P \leq 0.05$ . Nine cases of IgM positive for aborted women were recorded out of 250 cases, at a rate of 3.44%, and the highest percentage appeared in the age group of 21-25 years, and it amounted to 5.71%. The highest rate of infection was in the age group 26-30 years, amounting to 31.57%. 5 cases were recorded positive for both IgM + IgG antibodies out of 250 cases, at a rate of 1.88%, and the highest rate of abortion was recorded in the age group 21-25 years, which amounted to 2.85%. The study showed a high percentage of IgG antibody compared to IgM antibody ratios for both abortions when the diagnosis was made by latex test.



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## 1. Introduction

Although physicians have long known that the expectant mother's immune system adjusts to prevent her body from rejecting the fetus, prior research at Stanford and elsewhere suggested that inflammatory immune responses may help trigger early labor, if scientists identify an immune signature of impending preterm birth. The study confirmed immune features of pregnancy that were already known. For instance, the scientists saw that natural killer cells and neutrophils have enhanced action during pregnancy [9]. The researchers also uncovered several previously unappreciated features of how the immune system changes, such as the finding that activity of the STAT5 signaling pathway in CD4+T cells progressively increases throughout pregnancy on a precise schedule, ultimately reaching levels much higher than in non-pregnant

individuals. The STAT5 pathway is involved in helping another group of immune cells, regulatory T cells, to differentiate. Interestingly, prior research in animals has indicated that regulatory T cells are important for maintaining pregnancy. The immune system does not act in isolation, and we're now very interested in profiling its interplay with other aspects of mothers biology, such as their genetics, metabolism and the body's microbial communities to come up with a holistic biological clock of pregnancy [18]. Spontaneous abortion, which is the loss of a pregnancy without external intervention before 20 weeks of pregnancy, affects up to 20 percent of pregnancies are recognized. Spontaneous abortion can be divided into threatened abortion, imperative abortion, incomplete abortion, missed abortion, septic abortion, complete abortion, and spontaneous recurrence. Abortion ultrasound imaging is useful in diagnosing a spontaneous miscarriage, but other tests may be needed if an ectopic pregnancy cannot be ruled out. Chromosomal abnormalities cause approximately 50 percent of cutaneous spongiform miscarriages. Several other factors may also play a role [20], [16]. This worldwide infection annually causes severe consequences mainly in pregnant women, causing miscarriage, fetal abnormalities and stillbirths being the most common consequences [27]. These diseases have constituted a health problem in recent decades due to the increase in infections rates and the consequences resulting in Iraq in particular, as is the case in the Middle East in general, this disease causes many cases of recurrent miscarriage [13].

However, infection of pregnant women with the German measles virus poses a danger to the fetus, as its transmission through the placenta causes miscarriage of the fetus [28]. Poor pregnancy outcomes due to malaria are related to the macrophage-rich infiltrates and pro-inflammatory cytokines such as tumor necrosis factor-alpha that accumulate in the intervillous space. The maternal immune system is in close contact with cells and tissue from the semi-allogenic fetus during pregnancy. Therefore, there must be specific mechanisms to moderate the maternal immune system so that the pregnant woman does not reject her own fetus [12], [23]. However, the pregnancy can be compromised by a number of complications, such as threatened abortion, recurrent spontaneous miscarriage, preeclampsia, and preterm delivery [17]. While, susceptibility to recurrent miscarriage is probably mediated by Th1 type immune response with pronounced expression and secretion of pro-inflammatory cytokines like TNF- $\alpha$  and IFN- $\gamma$  paralleled with decreased production of anti-inflammatory cytokines like IL-10 [4]. The obtained result revealed that a significant increase of serum toxoplasma IgG, IgM and cortisol, on aborted groups compared with control group. Once a live embryo is detected by ultrasonography in normal-pregnant women, the rate of fetal loss is 5%. However, in women with recurrent pregnancy loss, the rate of loss after detection of fetal cardiac activity is 4-5 times higher [1].

## **2. Materials and Methods**

### ***2.1 Study samples***

The current study was conducted on pregnant and non-aborted women diagnosed by specialized doctors at Al-Batool Teaching Hospital for Maternity and Children, Baquba Teaching Hospital and Al-Khalis General Hospital for the period from 20/4/2021 to 20/8/2021. 250 samples of blood serum for women were collected at (129) A woman, aged (15-40) years, and 121 samples of non-abortion women as a control group, aged (15-40) years. A questionnaire was prepared to collect information for each case.

### ***2.2 Collection and Preparation of Samples***

5 ml of venous blood was withdrawn using sterile medical syringes after sterilizing the place of withdrawal with ethyl alcohol at a concentration of 70%. Then the serum was transferred to normal tubes at a speed of (5000) revolution-minutes and for a period of (10) minutes, and then the serum was transferred to normal tubes and it was lowered into a deep freeze at a degree of (-20) until immunological tests are carried out on

it using a latex agglutination test IgM and IgG.

### 2.3 Statistical analysis

The results of the current study were analyzed using the t-test and chi-square test ( $X^2$ ) using the statistical program known as the Statistical Package for Social Sciences (SPSS) under the probability level  $p \leq 0.05$ .

### 3. Results

Table (1) shows the relationship between abortion rates and the factors associated with abortion. The results recorded significant differences at the probability level of  $P \leq 0.05$  for the place of residence, where the infection rate in the city was higher, reaching 64.63 63, while the infection rate among rural women amounted to 37 35%. The study recorded significant differences at the probability level of  $P \leq 0.05$ . Regarding the economic situation, the highest rate of infection was within the medium economic situation, 87%, and 54%. It was followed by the poor economic situation, which reached 28.05%, and the lowest percentage of the good condition was 07%, 17%. Significant differences were recorded at the probability level of  $P \leq 0.05$ , and with regard to the profession, the highest infection rate was recorded among housewives, which amounted to 60.75%, while the lowest percentage among female employees was 24.39%

**Table (1)** the aborted and non-abortive samples and the percentage distributed according to the factors affecting abortion using latex test

the situation	aborted samples	percentage %	non-abortive samples	percentage %	$P \leq$
<b>housing</b>					<b><math>P \leq 0.05</math></b>
countryside	29	35.37	64	66.41	
city	53	64.63	104	33.58	
<b>Economic situation</b>					<b><math>P \leq 0.05</math></b>
poor	23	05.28	58	52.34	
medium	45	87.54	75	64.44	
good	14	07.17	35	83.20	
<b>Occupation</b>					<b><math>P \leq 0.05</math></b>
Officer	21	39.24	32	64.19	
Housewife	62	60.75	135	35.80	
<b>The number of miscarriages</b>					<b><math>P \leq 0.05</math></b>
1	38	34.46	77	83.45	
2	27	92..32	51	35.30	
3 $\geq$ A miscarriage	17	73.20	40	80.23	
<b>Stages of getting an abortion</b>					<b><math>P \leq 0.05</math></b>
During the first period	50	97.60	76	23.45	
During the second period	20	39.24	56	33.33	
During the third period	12	63.14	36	42.21	

Also, significant differences were recorded at the probability level of  $P \leq 0.05$ , and for the number of abortions, which amounted to the highest percentage among women who suffered from one miscarriage was 46.34%, and the lowest percentage among women who had suffered three or more miscarriages was 73 20%. The study also recorded significant differences at the probability level  $P \leq 0.05$  for the stage of

abortion, as the highest percentage reached 60.97% during the first trimester of pregnancy, followed by the abortion rate during the second trimester of pregnancy, it reached 24.39%, and the lowest rate of miscarriage during the third trimester of pregnancy was 63, 14%. The results of the current study, as shown in Table (4-2) for IgM antibody, showed that there were significant differences at the probability level of  $P \leq 0.05$  in the frequency of miscarriages in different age groups, where the highest percentage was in the age group (25-21) years, at a rate of 5.71%. Register in the age group (40-36) years, significant differences were also recorded at the level of  $P \leq 0.05$  in the probability of repeating the abortion rates for the IgG antibody, where the highest abortion rate was in the age group (26-30) years, with a rate of 31.57%, and the lowest percentage was recorded in the age group (15-20) years at a rate of 21.42%, While no significant differences were recorded at the probability level of  $P \leq 0.05$  in the frequency of abortion rates for IgM + IgG antibodies, where the highest infection rate was in the age group (25-21) years and by 2.85%, and it was not recorded in the age group (40-36) years.

**Table (2):** the aborted and non-abortive samples distributed by age group and type of immunoglobulin using latex assay

Age group (year)	Examined samples	IgM <sup>ⓐ</sup>	%	IgG <sup>ⓑ</sup>	%	IgM+IgG <sup>ⓒ</sup>	%
15 – 20	42	1	2.38	9	21.42	1	2.38
21 – 25	70	4	5.71	17	24.48	2	2.85
26 – 30	57	2	3.50	18	31.57	1	1.75
31 – 35	50	2	4.00	11	22.00	1	2.00
36 – 40	31	0	0	13	41.93	0	0
<b>Total</b>	<b>250</b>	<b>9</b>	<b>3.44</b>	<b>68</b>	<b>27.5</b>	<b>5</b>	<b>1.88</b>

#### 4. Discussion

The current study was registered the abortion rate is higher in the city than in the countryside, with a significant difference, as shown in the Table (1). The results of the current study are in agreement with the study [10], [6], [8] and the study [22] in Sulaymaniyah and agree with (AL-Wattari, 2005) in Mosul, because the abortion rate in the city is higher than in the countryside. The results of the study did not agree with [2] study in Erbil, as they did not find a relationship between abortion and place of residence [14]. The reason for the rise in abortion in the city may be due to the eating habits followed, the increase in environmental pollutants, and the population inflation compared to the countryside. The current study found high abortion rates within the middle-income group of society, followed by the poor group, while the lowest abortion rates were recorded within the good group, as shown in Table (1). The high rates of abortion among the group with medium economic status, while the study did not agree with [5] that there are no significant differences between abortion and economic status. The current study found a high rate of abortion among housewives compared to female employees, as shown in Table (2). The current study agreed with the study [10], [6], [8] where they found a lower abortion rate among female employees compared with housewives. The current study recorded an increase in the percentage of women who suffered from one miscarriage with a significant difference as shown in Table (1). One abortion, while the current study did not agree with [20], as it did not find a relationship between women who suffered from the number of abortions. The current study did not agree with [7], as it found that the number of abortions for two times is higher than the number of one-time abortions, which may be due to a decrease in the immunity of the pregnant mother's body, and the time of abortion during pregnancy has an important role in determining the fate of the fetus [25], [11]. The period of pregnancy depends on the degree of resistance of

the fetus as well as on the immunity acquired spontaneously through the placenta, and thus the fetus is more vulnerable during the first trimester of pregnancy to the lack of its immune system, and antibodies are formed in the fetus's body after the third month of pregnancy [1], [3]. As for the age groups, the results of the current study recorded the highest percentage in the age group 26-30 years and the lowest abortion rate among the age group 15-20 years as shown in Table (2).

The current study agreed with [6], [24], as well as the study [15] in Bangladesh, where the highest percentages were recorded within the category 39-35 years old, while the results of the current study did not agree with [19], as it did not record significant differences between abortion and age groups. The reason for the high rates of abortion in the age group 26-30 is due to the increased chance of exposure to pathogens with age [21], and the effectiveness of the immune system gradually decreases with age, which exposes these groups to miscarriage. The highest abortion rate of IgM antibody was recorded in the age group 25-21 years and the highest percentage of IgG antibody appeared in the age group 26-30 years, while the highest abortion rate of IgM + IgG antibody was recorded in the age group 25-21 years old as shown in Table (2). This result is in agreement with the study [6], [10]. As acute abortion appeared in the young age groups as they are more fertile for childbearing and that the decrease in the body's immunity provides the opportunity for abortion, while chronic abortion appeared in the older age groups and this indicates that she had previously had an abortion. The current study recorded high IgG antibody, while IgM antibody recorded low results as shown in Table (2). The current results agree with the study [10], [6], [2] and the study [26] in Turkey, while the results of the current study do not agree with [7] in Diyala, where it was found that the proportion of IgM antibody for the pregnant group was 23.5%, while the IgG antibody was 8.6%, and the study [8] where the proportion of IgM was 58%, while the IgG antibody was 34%. The reason for the high levels of antibodies in the sera of women, especially IgG, which is the only antibody that is transmitted from the mother to her fetus through the placenta, is due to a defect in the placental transfer of IgG antibody, which leads to the accumulation of its levels in the pregnant mother. Her fetus through the placenta for some reason is one of the pathological causes related to tissue diseases of the placenta, as the presence of antibodies provides the necessary protection for the fetus until the maturity of its immune system is complete [6].

## 5. Conclusions

- The current study showed a high rate of abortion in urban areas and among the middle-income group and women housewives and more frequent abortions was among women who had one-time abortions, and the rates of abortions increased during the first trimester of pregnancy.
- The study showed a high percentage of IgG antibody compared to IgM antibody ratios for both abortions when the diagnosis was made by latex examination.

## 6. References

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