

Evaluation of Anti-Rubella IgG Antibody among Pregnant and Childbearing Women in Babylon Province –Iraq

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Abstract:

Background: In countries where the rate of susceptible women to rubella infection is higher than 10%, preconception or prenatal screening is important to reduce the burden of the disease.

Objectives: Determination of anti-rubella IgG seropositivity and susceptibility rates among pregnant and childbearing women in Alhela/ Babylon province.

Subjects and methods: A total of 184 women were enrolled in the present study which was conducted in al-Hella/Babylon province during the period from 1st May/2010 to 15th September/2011. Ninety eight pregnant women were chosen from those attending the primary health care centers in Al-Hela. They include 46 (46.9%) who had previous abortions with a mean age 27.2 ± 5.3 years, and 52 (53.1%) without previous abortion with mean age 23.7 ± 5.1 years. Additionally, 86 non-pregnant childbearing women were enrolled as a control group. Of those, 39 (45.3%) had previous abortion with mean age 33.5 ± 7.8 years. Certain demographic factors were collected by personal interview. Anti-rubella IgG specific antibody were detected by enzyme linked immunosorbent assay (ELISA). Data were statistically analyzed using SPSS version 13 computer assisted program. P value of < 0.05 was considered significant.

Results: The results revealed that the IgG seropositivity among pregnant women without previous abortion, and those with previous abortion was 96.1% and 76% respectively, with a statistically significant difference ($P= 0.04$). The seropositivity among non-pregnant women without previous abortion, and those with previous abortion was 85.1% and 100% respectively, with statistically insignificant difference ($P=0.11$). The overall susceptibility rate for rubella infection was 10.7%. There was insignificant effect of age, educational levels, residency, presence of pregnancy, and history of previous abortion on the seropositivity rate of IgG specific anti-rubella antibody.

Conclusion: Evaluation of the susceptibility of women in reproductive age to rubella infection is essential to set a strategy for prevention of congenital rubella syndrome.

Keywords: rubella, congenital rubella syndrome, susceptibility rate.

Introduction

Rubella is a common childhood rash disease. The most serious consequences of rubella result from infection during the first trimester of gestation including miscarriage, fetal death and congenital anomalies [1]. Up to 90% of infants born to mothers infected during the first 11 weeks of gestation develop congenital rubella syndrome (CRS) [2,3]. Therefore, it is essential to evaluate the susceptibility of women (antirubella IgG seropositive) in the

reproductive age in order to set a strategy for prevention of CRS [4,5] . Studies conducted to determine the anti-rubella IgG seropositivity rate among pregnant women have yielded a range of (86.5%-100%) [6-10]. The association of seropositivity rate with age, residency, mother occupation, number of previous gestations, number of household contacts, economic status, and levels of education have yielded controversial results [11-16]. In Iraq, a previous study on pregnant women found that the seroprevalence was 88.2% [17]. On the other hand, the seropositivity rates among childbearing women are reported to be ranged between 90.9%-100% [6, 10, 16]. The world Health Organization considered a rubella susceptibility rate of more than 10% of all women in community as a predisposing factor for CRS and a value of more than 20% as very high risk [18]. Therefore, the Advisory Committee on Immunization Practices recommended that women whose rubella vaccination history is unreliable or who lack laboratory evidence of immunity should receive MMR vaccine upon completion or termination of pregnancy [19].

Patients & Methods:

A total of 184 women were enrolled in the present study which was conducted

In Al-Hela/ Babylon province during the period from 15th May.2010 to 15th October 2011. Ninety eight pregnant women were chose from those attending the primary health care centers in al-Hela. They include 46(46.9%) who had previous history of abortions, 52(53,1%) with out previous abortions age. Additionally, eighty six non-pregnant childbearing women were enrolled as a control group. Of those, 39(45.3%) had previous history of abortion and 47(54.6%) without previous history abortion. Certain demographic factors were collected by personal interview. A questioner form was designed for the following parameter: age, gender, pregnancy history, abortion, educational level, and residency. One hundred eighty four serum samples were collected from these women and stored in freezer at -20C° until used. Anti-Rubella IgG specific antibody were detected by enzyme linked immunosorbent assay (ELISA) according to standard technique [8]. Results were translated to computerized data based and processed using SPPSS version13 program. P value of $p < 0.05$ was consider significant according Chi-Square analysis [14].

Results:

The anti-rubella IgG seropositivity rate was significantly higher in pregnant women without previous abortion compared to pregnant women with previous abortion (96.1% vs 76%) ($P=0.04$). Likewise, a significant higher rate was found in childbearing women with previous abortion compared to pregnant women with previous abortion (100% vs. 76%) ($P =0.02$). Whereas, the seropositivity rate among childbearing women with previous abortions was insignificantly higher than that in childbearing women without abortion (100% vs. 85.1%), ($P=0.11$), Table 1.

Table 1: Anti-rubella IgG seropositivity rate among study groups.

Study groups	No. tested	Anti-rubella IgG	
		No	%
Pregnant without abortion	52	50	96.1
Pregnant with abortion	46	35	76
Non-pregnant without abortion	47	40	85.1
Non-pregnant with abortion	39	39	100
Total	184	164	89.1

Regarding the age groups, the results was among women less than 20 years showed that the highest anti – rubella IgG. However, there was insignificant seropositivity rate was among those with difference among the age groups 40 years and more. While the lowest rate (P=0.65), table (2).

Table 2: Anti –rubella IgG seropositivity rate by age groups.

Age groups (YS)	No. tested	Anti-rubella IgG positive	
		No.	%
>20	54	46	85.2
20-29	75	69	92.0
30-39	42	36	85.7
>40	13	13	100
Total	184	164	89.1

P=0.22[NS]

The distribution of anti- rubella IgG education and the lowest rate was among seropositivity rate according to the levels alliterated women. However, the education revealed that the highest difference was statistically insignificant rate was among women with higher (P=0.22), table (3).

Table 3: Anti –Rubella IgG seropositivity rate by educational levels.

Educational levels	No. tested	Anti- rubella IgG positive	
		No.	%
Alliterated	42	34	80.9
Primary school	85	79	92.9
Intermediate school	26	22	84.6
Secondary school	24	22	91.6
High education	7	7	100
Total	184	164	89.1

P=0.22 [NS]

Although the anti-rubella IgG seropositivity rate was higher in urban women compared to that of rural women (90.4% vs 84.2% 0) .However ,the difference was failed to reach the level of statistical significance (P=0.48), table (4).

Table 4: Anti –rubella IgG seropositivity rate by residency.

Residence	No. tested	Anti-rubella IgG positive	
		No.	%
Urban	146	132	90.4
Rural	38	32	84.2
Total	184	164	89.1

P=0.48 [NS]

The results also showed that the presence of pregnancy was not a risk factor for a significant increase in the seropositivity rate of anti –rubella IgG among the study groups (P=0.36), table

Table 5: Anti –rubella IgG Positivity rate by pregnancy.

Presence of pregnancy	No. tested	Anti-rubella IgG positive	
		No.	%
Pregnant	98	90	91.8
Non pregnant	86	74	86.0
Total	184	164	89.1

P=0.36 [NS]

The history of previous abortion was found to be insignificantly increase the seropositivity ate of anti-rubella IgG (P=0.36), table (6).

Table 6: Anti-rubella IgG seropositivity rate be previous abortion.

History of abortion	No. tested	Anti –rubella IgG positive	
		No.	%
Previously abortion	99	90	90.9
Previously non abortion	85	74	87.0
Total	184	164	89.1

P=0.36[NS]

The rate of susceptibility to rubella infection (anti-rubella IgG negative was 13.3% among pregnant women and 8.1 among childbearing women. The overall susceptibility rate among participant women was 10.7% table (7)

Table 7: The susceptibility rate among study groups.

Study groups	No. tested	Anti-rubella IgG			
		positive		negative	
		No.	%	No.	%
Pregnant women	98	85	96.7	13	13.3
Non-pregnant women	86	79	91.9	7	8.1
Total	184	164	89.3	20	10.7

Discussion

The overall seroprevalence of anti-rubella IgG among pregnant women obtained in the present study was 86.7 % This result is almost similar to another study conducted in Baghdad [17], but it is higher than those reported by certain studies [11,15], and lower than other studies conducted elsewhere abroad [7,9, 12,14,20] .We thought that one of the important reasons behind these variable results is the strength and reliability Baghdad [17] , but it is higher than those reported by certain studies [11, 15], and lower than other studies conducted elsewhere abroad [7, 9, 12, 14,20] .We thought that one of the important reasons behind these variable results is the strength and reliability of the implemented vaccination programs . Moreover, premarital or prenatal vaccination against rubella has been adopted by certain countries [10,20] .Of note ,in our participants we do not know the source of anti-rubella IgG whether from natural infection or from previous vaccination during the childhood, because in our country, premarital our country, premarital or prenatal vaccination are not routinely done. Furthermore even MMR vaccination program during the childhood was frequently interrupted at least through the last 15 years due to sanction and subsequent unsuitable security conditions .In the present study, the non –pregnant women in the childbearing age had an overall anti- rubella IgG positivity rate 91.8 % This result is within the rage obtained by other reports [6, 10,16]. The slightly higher positivity rate in non –pregnant compared to pregnant women obtained in the current study (86.7% vs 91.8%) may due to residual IgG antibody after clinical or subclinical infection by rubella virus during the last pregnancy , since 12.2% of pregnant women enrolled in this study were positive for anti-rubella IgM (previous study) [20]. Most previous studies like the present one agree that the anti-rubella IgG positivity rate was increased by age [6, 13, 14, 16] .Probably the chance of exposure to wild rubella infection is increase as the age progress. The insignificantly higher anti-rubella IgG positivity rate among urban compared to rural women (90.4% vs 84.2%) is consistent with previous studies [12,16], but it is inconsistent with other [11].The higher population density in urban areas and the transmission of rubella virus through the respiratory droplets undoubtedly prone people reside in such areas to higher risk for acquiring rubella infection .Although it was insignificant , the anti-rubella IgG positivity rate was appeared to be highest among women with higher education .Similar result with another study in Tehran (Rubella serology in pregnant women attending health centers of Tehran University) [13] who found insignificant effect of educational levels on the IgG positivity rate among pregnant women .Motivation of health education regarding the risks of rubella infection seems beneficial for women to minimize the burden of the disease. The overall rate of susceptible (non-immune) women was 10.7% with slightly higher in pregnant women compared to non –pregnant women (13.3% vs 8.1%) Previous studies have reported variable rates [8,9,14,16]. Nevertheless, the world Health Organization considered a rubella susceptibility rate of more than 10% of all women in a community as a predisposing factor for CRS and a value of more than 20% as very high risk [18]. Therefore, the present study recommends that all women whose rubella vaccination history is unreliable or who lack laboratory evidence of immunity should receive MMR vaccine upon completion or termination of pregnancy and vaccinated women should be informed to avoid pregnancy for 28 days after vaccination.

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21. **الخلاصة:**
22. **الخلفية الدراسية:** في البلدان التي تكون فيها نسبة النساء المصابة بالحصبة الألمانية هو أعلى من 10 ٪ ، لذلك أن نسبه بالفحص قبل الولادة للحد من تأثير هذا المرض على النساء الحوامل.
23. **أهداف الدراسة:** تحديد نسبة الإصابة بالحصبة الألمانية وتقدير معدل IgG بين النساء الحوامل والمنجبات في الحلة / محافظة بابل.
24. **المشاركين وطرق العمل :** تم أخذ 184 عينة من النساء في هذه الدراسة التي أجريت في الحلة / محافظة بابل خلال الفترة من 15 أيار / 2010 وحتى 15 أيلول / 2011 وقد تم اختيار ثماني وتسعين من الحوامل من أولئك الذين يرتدن مراكز الرعاية الصحية الأولية في الحلة وهي تشمل 46 (46.9 ٪) واللواتي كان لديهم إجهاض سابق مع متوسط عمر 27.2 ± 5.3 سنة ، و 52 (53.1 ٪) واللواتي ليس لديهم إجهاض سابق مع متوسط عمر 23.7 ± 5.1 سنة. بالإضافة إلى ذلك ، تم أخذ 86 من النساء غير الحوامل ولا منجبات كمجموعة سيطرة. وكشفت الدراسة أنه كان 39 (45.3 ٪) ممن لديهم إجهاض سابق مع متوسط عمر 33.5 ± 7.8 سنوات. وقد جمعت بعض العوامل الديموغرافية بعد المقابلة الشخصية. تم استخدام جهاز محددة اختبار انزيم المرتبط المناعي (ELISA). وقد تم تحليل البيانات إحصائيا باستخدام برنامج SPSS 13 بالكومبيوتر. وقدرت قيمة $P > 0.05$ حيث كانت نسبة معنوية.
25. **النتائج :** كشفت النتائج أن النسبة بين النساء الحوامل الغير المجهضات سابقا" ، واللواتي يعانين من إجهاض سابق كانت 96.1 ٪ و 76 ٪ على التوالي ، مع فارق معنوي إحصائيا ($P = 0.04$) : النتائج. كانت إيجابية لدى النساء غير الحوامل الغير المجهضات سابقا" ، واللواتي يعانين من الإجهاض السابقة 85.1 ٪ و 100 ٪ على التوالي ، مع فارق ضئيل إحصائيا ($P = 0.11$). كان معدل الإصابة بالحصبة الألمانية العام 10.7 ٪. كان هناك تأثير ضئيل بين فارق العمر ، المستوى التعليمي ، والإقامة ، وجود الحمل ، وتاريخ الإجهاض السابق لتحديد معدل IgG المخصص للحصبة الألمانية لهؤلاء النسوة.
26. **الاستنتاجات :** تقييم احتمالية إصابة المرأة في سن الإنجاب بالحصبة الألمانية ضروري لوضع استراتيجية للوقاية من متلازمة الحصبة الألمانية.