ORIGINAL ARTICLE

Trends in Seroprevalence for Rubella in Iraqi Women at Child-bearing Age

SANA A. ABDUL-WAHAB[1], SALWA SH. ABDUL-WAHID[2]
[1]*College of Dentistry, Uruk University, Baghdad, Iraq*
[2]*College of Medicine, University of Diyala, Iraq*
Correspondence to Dr. Sana A Abdul Wahab

ABSTRACT

Aim: To investigate the immunity against rubella using the serological status of rubella-specific IgG antibodies (antirubella IgG) in an Iraqi woman of childbearing age (15–49 years).
Methods: Retrospective cross-sectional study, conducted for the period from March 2014-April 2016 , test results for an (65) Iraqi' women aged 20–40 years who had visited an obstetric private clinic and had certain obstetrical problems including frequent abortion, miscarriage, intra-uterine death or fetal Congenital anomalies and here obstetrician requested laboratory results of rubella-specific IgM & or IgG antibody tests.
Results: There are differences in percent of abortion and congenital anomalies among different epidemiological areas in Baghdad and the percent of abortion at different age group the highest percent of abortion in women at age 31-40 (Table 1) as compared to age 20-40 (chi -square : 17-94, P-value : 0-002, P< 0.05 is significant) in middle of Iraq shows a significant differences in percent of congenital anomalies at age 20-24 as compared to age 31-40 (chi- square: 15-01 , P-value : 0-004 , P< 0.05 significant . The percent of abortion in women in eastern area of Baghdad show percent 80% between 30-40 years which is significant Chi -square: 51.72, P value 0.001. Between 2014 to 2016, antirubella IgM & IgG test results from (65) Iraqi women aged 20–40 years who had visited private obstetric clinics the results showed the percent of IgG / and IgM in aborted women at eastern area of Baghdad, IgG is highly significant especially at age 20 and 40 years age . Chi square: 51.25, P -value: 000 HS, P < .00 HS, Also difference in IgM chi-square: 37.10, P value: 000 HS.
Conclusions: In consideration of the factors associated with prevalence of women un-immunized to rubella, future public health efforts should be focused on catch-up activities. And recommended to strengthen disease control and prevent rubella, including a nation-wide immunization program.
Keywords: Rubella, Abortion, Congenital anomalies, IgM, IgG.

INTRODUCTION

Rubella virus is the sole member of the genus Rubivirus, in the family Matonaviridae. It is an enveloped virus with a single-stranded RNA of positive polarity and has a single antigenic type[1]. Rubella is an acute, contagious viral infection. While rubella virus infection usually causes a mild fever and rash in children and adults, infection during pregnancy, especially during the first trimester, can result in miscarriage, fetal death, stillbirth, or infants with congenital malformations, known as congenital rubella syndrome (CRS).The rubella virus is transmitted by airborne droplets when infected people sneeze or cough. Humans are the only known host[2,3]. Children with CRS can suffer hearing impairments, eye and heart defects and other lifelong disabilities, including autism, diabetes mellitus and thyroid dysfunction – many of which require costly therapy, surgeries, and other expensive care[4].

The highest risk of CRS is in countries where women of childbearing age do not have immunity to the disease (either through vaccination or from having had rubella). Before the introduction of the vaccine, up to 4 babies in every 1000 live births were born with CRS. (WHO' Report 2020, Rubella)[5], the virus causes intrauterine infection with recurrent abortion and congenital anomalies and damage to fetal organs. The infection of maternal rubella sometime goes unnoticed as there is no rash. Although rubella is usually a mild childhood disease, this infection in early pregnancy poses a serious problem due to its teratogenic effect[4].

In many developing countries infection with rubella virus is reflected a chive public health concern. up to two years age, children with congenital rubella syndrome (CRS) considered a source of infection and virus can be found. Two years age children with CRS considered a source of infection and virus can be find in their throat, urine & stool and susceptible persons could be infectious with rubella through interaction with these children[6].
The measurement of rubella virus specific IgM is the typical methods for lab confirmation of rubella[7]. The detection of IgG with enzyme immunoassay that afford quantitative result in international Unit (IU / milliliter) Abs is essential to evaluate the sero- prevalence of different people include pregnant women[8,9].

This study aims to determine the relation of rubella virus to abortion and determine the seroprevalence IgG and IgM in women with abortion at different age among different areas in Baghdad the no of abortion is more than two in pregnant women with different sociodemographic factors.

PATIENTS AND METHODS

Sixty five pregnant women were included in the study at age range (20-40) years from and thirty five from middle area of eastern of Baghdad and data included age, education and no of previous abortion via well prepared questionnaire. Serum samples were collected from pregnant women and tested for Rubella IgG and IgM in the serum. Whole blood were collected using plastic disposable polyethyle bottle and centrifuge at 300 rmp for

10 min , the supernant aspirated and put in open droff tube for assay .

Enzyme linked immunosorbent assay used for detection of the virus–100 ml of diluted sera. Put in absorption wells and control intubate at 37 °C for 30 min , remove conjugate rinse with diluted wash buffer Dispence 100 m L of TMB reagent into each well , mix incubate at 37 °C for 15 min. the add stop solution (INHcl) and read with microwell reader (Biocheck)

RESULTS

There are differences in percent of abortion and congenital anomalies among different epidemiological areas in Baghdad and the percent of abortion at different age group the highest percent of abortion in women at age 31-40 (Table 1) as compared to age 20-40 (chi square : 17-94, P-value : 0-002, P< 0.05 is significant) in middle of Iraq.

Table 2, show significant differences in percent of congenital anomalies at age 20-24 as compared to age 31-40 (chi- square: 15-01, P=value : 0-004, PK 0.05 significant. The percent of abortion in women in eastern area of Baghdad show percent 80% between 30-40 years which is significant (table 3). Chi-square: 51.72, P value 0.001, P0-0005 the difference is congenital anomaly ranged between 20-40 30% (table 4), Chi square 31.49, P-value < 0>001 P 0.000. Table 5 shows the percent of IgG / and IgM in aborted women at eastern area of Baghdad, IgG is highly significant especially at age 20- and 40-years age Chi - square: 51.25, P value: 000 HS, P < .00 HS. Also difference in IgM chi-square: 37.10, P value: 000 HS.

Table 1: The percent of abortion at different age group at middle of Baghdad

Age group	No	No of abortion	%age	X^2	P value
20 -24	10	3	30%	0.97	0.061
25 – 30	10	4	40%		
31-40	15	6	40%		
X^2	0.781	0.757			
P value	0.492	0.556			

Table 2: The Percent of congenital anomalies at different age group at middle of Baghdad

Age group	No	No with congenital anomalies	%age	X^2	P value
20-24	10	2	20%	0.92	0.14
25-30	10	3	30%		
31-40	15	6	40%		
X^2	0.781	0.85			
P value	0.492	0.32			

Table 3: The percent of abortion at different age groups at eastern of Baghdad

Age group	No	No of repeated abortion	%age	X^2	P value
20-24	20	10	50%	0.097	0.09
25-30	20	12	60%		
31-40	25	16	80%		
X^2	0.71	1.45			
Pvalue	0.68	0.48			

The older age group are remain un-protected from rubella infection and weaking immunity seen in more than 30 age old age group, this is consistent with so women infected during child bearing age or previously seroprevalence of rubella in pregnant women the decline in overtime in vaccinated population.

Table 4: The percent of congenital anomalies of different age groups at eastern of Baghdad

Age group	No	No of congenital anomalies	%age	X^2	P value
20-24	20	6	30%	10.12	0.006**
25-30	20	8	40%		
31-40	25	10	40%		
X^2	0.71	1.11			
Pvalue	0.68	0.61			

Table 5: Detection of Rubella IgG and IgM antibodies among different age groups of pregnant women in eastern area

Age group	N0	No with IgG+ %	No with IgM +%	X^2	P value
20 -24	20	14 (70%)	6 (30%)	5.21	0.07
25 -30	20	16 (80%)	4 (20%)	9.82	0.007**
31-40	25	20 (80%)	5 (20%)	11.82	0.003**
X^2	0.71	1.11	0.42		
Pvalue	0.68	0.57	0.81		

Table 6: Percent with IgG and IgM positive at middle area of Baghdad

Age group	N0	No with IgG +%	No with IgM +%	X^2	P value
20 -24	20	12 (60%)	8 (40%)	1.82	0.38
25 -30	20	8 (40%)	12 (60%)	1.82	0.38
31-40	25	15 (60%)	10 (40%)	2.30	0.32
X^2	0.71	0.85	0.72		
P value	0.68	0.36	0.67		

DISCUSSION

Statistical analysis showed that pregnant women age was directly related with anti-rubella IgG level and finding consistent with the results of most other studies that anti-rubella IgG positive rate increased by age[10,11].

The older age group are remained unreported from rubella infection and weaking immunity seen in more than 30 age and older this is agreed with increased age in women there is a decline in overtime in vaccinated population [(12, 13, 14)].

The occurrence of reinfection during pregnancy is unknown and the antigenic change is not responsible for rubella reinfection. The incidence of congenital anomalies repeated abortion in Eastern area of Baghdad is more than middle of Baghdad and this is due to either educational level or vaccination program which is consistent with Prevalence also more in eastern area of Baghdad is probably due to higher population growth and spread of rubella infection than resp droplets and poor immunization coverage or did not apply routine rubella vaccination program in childhood and this in agree with [(15, 16)].

REFERENCES

1. VanNguyen T, VanHungPham K. Pathogenesis of Congenital Rubella Virus Infection in Human Fetuses: Viral Infection in

the Ciliary Body Could Play an Important Role in Cataract genesis. EBio Medicine. LANCET. 2015;2(1): 59-63.
2. Patić A, Štrbac M, Petrović V, Milošević V. et al. Seroepidemiological study of rubella in Vojvodina, Serbia: 24 years after the introduction of the MMR vaccine in the national immunization programme. PLoS One. 2020; 15(1): e0227413. doi: 10.1371/journal.pone.0227413.
3. Oh Y, Kim SH, Lee SG, Lee EH, et al. Recent trends in seroprevalence of rubella in Korean women of childbearing age: a cross-sectional study. BMJ. 2019;10(1): :e030873. doi: 10.1136/bmjopen-2019-030873.
4. Lulandala L, Mirambo MM, Matovelo D, Gumodoka B, et al. Acute Rubella Virus Infection among Women with Spontaneous Abortion in Mwanza City, Tanzania. J Clin Diagn Res. 2017; 11(3): QC25-QC27. doi: 10.7860/JCDR/2017/22634.9544.
5. https://apps.who.int/immunization_monitoring/globalsummary/timeseries/tsincidencerubella.html
6. Boshoff L, Tooke L . Congenital rubella: Is it nearly time to take action? SAJCH, 2012; 6(4): file:///C:/Users/Isam/Downloads/CongenitalRubellapublished.pdf
7. Bale JF Jr. Measles, mumps, rubella, and human parvovirus B19 infections and neurologic disease. Handb Clin Neurol. 2014;121:1345-53. doi: 10.1016/B978-0-7020-4088-7.00091-2. PMID: 24365423.
8. Hübschen JM, Bork SM, Brown KE, Mankertz A, Santibanez S, Ben Mamou M, Mulders MN, Muller CP. Challenges of measles and rubella laboratory diagnostic in the era of elimination. Clin Microbiol Infect. 2017 Aug; 23(8): 511-515. doi: 10.1016/j.cmi.2017.04.009.
9. Shih CT, Chang YC, Wang HL, Lin CC. Comparing the rubella seronegativity in pregnant women who received one dose of rubella vaccine at different ages in Taiwan. Vaccine. 2016 Sep 14; 34(40): 4787-4791. doi: 10.1016/j.vaccine.2016.08.024.
10. Honarvar B, Moghadami M, Moattari A, Lankarani KB. Seroprevalence of Anti-Rubella and Anti-Measles IgG Antibodies in Pregnant Women in Shiraz, Southern Iran: Outcomes of a Nationwide Measles-Rubella Mass Vaccination Campaign. PLoS ONE. 2013; 8(1): e55043 .
11. Gubio AB, Mamman AI, Abdul M, Olayinka AT. The risk factors of exposure to rubella among pregnant women in Zaria 2013. Pan Afr Med J. 2019 Jan 21; 32(Suppl 1): 4. doi: 10.11604/pamj.supp.2019.32.1.13335.
12. Honarvar B, Moghadami M, Moattari A, et al. Seroprevalence of anti-rubella and anti-measles IgG antibodies in pregnant women in Shiraz, Southern Iran: outcomes of a nationwide measles-rubella mass vaccination campaign. Plos one. 2013 ;8(1):e55043. DOI: 10.1371/journal.pone.0055043.
13. Azami M, Jaafari Z, Soleymani A, Badfar GH, Abbasalizadeh SH. Rubella Immunity in Pregnant Iranian Women: A Systematic Review and Meta-Analysis. Int J Fertil Steril. 2019 Oct; 13(3): 169-177. doi: 10.22074/ijfs.2019.5562.
14. Davidkin I, Peltola H, Leinikki P, Valle M. Duration of rubella immunity induced by two-dose measles, mumps and rubella (MMR) vaccination. A 15-year follow-up in Finland. Vaccine. 2000 Jul 15; 18(27): 3106-3112. doi: 10.1016/s0264-410x(00)00139-0.
15. Bosma TJ, Best JM, Corbett KM, Banatvala JE, Starkey WG. Nucleotide sequence analysis of a major antigenic domain of the E1 glycoprotein of 22 rubella virus isolates. J Gen Virol. 1996 Oct; 77(Pt10): 2523-2530. doi: 10.1099/0022-1317-77-10-2523.
16. Thayyil J, Kuniyil V, Moorkoth AP, Rao B, Selvam P. Prevalence of rubella-specific IgG antibodies in unimmunized young female population. J Family Med Prim Care. 2016 Jul-Sep;5(3):658-662. doi: 10.4103/2249-4863.197311.