ORIGINAL ARTICLE

Seroprevalence Rubella antibodies among young females and women of reproductive age group and pregnant women in Kirkuk City, Iraq

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ABSTRACT

Background: The purpose of the present study to assess the seroprevalence of Rubella antibodies among women of reproductive age.
Methods: A study design was conducted between the period of February 2017 to February 2018.The sample of study is women with childbearing age was take on from Kirkuk General Hospital. (450) women with age between (14 – 48) years were involved in the study. Of each participant in the current study, a blood sample of 3 ml was collected through intravenous using a sterile and dry test tube. Sera samples were tested for detection of "IgM" and "IgG" antibody specific for Rubella virus by enzyme-linked immunosorbant assay "ELISA".
Results: In our study 720 women in childbearing age were investigated for rubella IgG and IgM antibodies, among these 266 (36.94%) were positive for rubella IgG antibodies and 9 (1.25%) for rubella IgM antibodies.
Conclusion: This study displayed an insignificant relationship between rubella seroprevalence and age, residency, and parity.
Keywords: Rubella antibodies, reproduction, pregnant women

INTRODUCTION

The Rubella virus is an encased, positive-sense, RNA virus, genus Rubivirus, of the family Togaviridae which causes German measles, a mild, self-limiting, febrile, exanthematous infection in children and adults[1]. The most serious effects of the rubella infection occur in pregnant women during the first trimester of gestation, resulting in abortions, still births and congenital rubella syndrome. Rubella virus is a biological teratogen of the TORCH complex and is transmissible in utero[2]. Congenital rubella syndrome (CRS) causes heart defects, ocular abnormalities, deafness and mental retardation. Approximately 100,000 children are still born with CRS even though rubella vaccination has strongly decreased such incidences[3] Because a large number of cases are sub-clinical, accurate diagnosis of infection is necessary and requires a serological test[4].Two strategies for immunization against rubella have been applied in different countries for the direct protection of adolescent girls and adult women[5]. The first vaccine against measles was introduced in 1969, the one dose of the vaccine led to the production of an antibody in about 95% of people exposed to infection. Antibody levels persist for at least 18 years in the majority of recipients and the failure rate does not exceed 5%[6]. Although reinfection may occur in immunized pregnant women, these reinfections have resulted in only 8% risk of CRS in the first trimester of pregnancy[7].This study is the second part of a comprehensive study to assess the health status of women of childbearing age in Kirkuk, Iraq. The first part highlighted an influential problem for women of childbearing age is urinary tract infection.

The main aim of current investigation is to assess prevalence of anti-rubella antibodies among three important sample of population adolescent females and married women and pregnant women in Kirkuk City, Iraq.

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METHODS

This epidemiological study used a cross sectional design for the time period February 1st to February 1st of 2018.
Subjects of the study: The initial sample consisted of 450 randomly selected women from the following three groups: 150 women who were pregnant, 150 married and 150 unmarried. They were selected from outpatient clinic for obstetrics and gynecology at Kirkuk General Hospital.At the beginning of the study, all participants were aged between 18 and 44 years, were apparently healthy and willing to participate in the study and resided in urban/ rural areas.
Information sheet: After getting written consent from the sample, a form was utilized to conduct the study. The form consisted of the socio demographic particulars like age, occupation, duration of pregnancy, and vaccination status.
Procedure : A variety of methods are used to assess seroprevalence of rubella . Each has its advantages and drawbacks. It was decided that the best method to adopt for this investigation is enzyme-linked immunosorbent assay or ELISA. "Sera samples were tested for detection of IgM and IgG antibody specific for Rubella virus". Three ml Blood samples were obtained intravenously with consent and using a sterile and dry test tube.
Data analysis :Statistical significance was analyzed through the utilization of SPSS 20. Prevalence of IgG Antibody was calculated using percentages.

RESULTS

The prevalence rate of negative "IgG" Antibody was **16%** . The higher percentage of IgG –ev Antibody was found among pregnant in their third trimester, aged between 16-25 years, 43%, 39.6% 7.5% respectively. The most of sample with negative IgG were housewives (65.9%), from rural areas (72.4%), and were unable to read and write (62.6%).

Table 1: Rubella seropositivity according to age groups

Age	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
16-25 y	70(15.6%)	1	0.2%	69	15.3
26-35y	236(58.4%)	37	8.3%	199	44.3
36-45y	144(26%)	34	7.5%	110	24.4
Total	450(100%)	72	16%	378	84%

Chi square=17.284, P value=0.000

Table 2: Rubella seropositivity according to Marital Status

Marital Status	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
Unmarried	300(66.7%)	41	9.1	259	57.5
Married	150(33.3%)	31	6.9	119	26.5
Total	450(100%)	72	16%	378	84%

Chi square=3.646, P value=0.056

Table 3: Rubella seropositivity according to Educational level

Educational level	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
Diploma or College	109(24.3%)	18	4	130	28.9
High school	123(27.3%)	14	3.1	122	27.1
Illiterate	218(48.4%)	40	8.9	126	28
Total	450(100%)	72	16%	378	84%

Chi square=13.01, P value=0.000

Table4: Rubella seropositivity according to Economic status

Educational level	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
High	88(19.5%)		5.5	126	28
Middle	12 (%27.8)5	18	4	120	26.7
Low	2 (%52.7)37	29	6.5	132	29.3
Total	450(100%)	72	16%	378	84%

Chi square=1.417, P value=0.492

Table 5: Rubella seropositivity according to residency

Residency	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
Rural	225(50%)	45	10	81	18
Urban	225(50%)	27	6	297	66
Total	450(100%)	72	16%	378	84%

Chi square=50.606, P value=0.000

Table 6: Rubella seropositivity according to parity and Previous Obstetric Performance

Parity	n	IgG Antibody			
		No	-ve(%)	No	+ve (%)
Primi Gravida	66(44%)	9	2	130	28.9
2nd Gravida	33(22%)	18	4	126	28
3rd Gravida	45(30%)	18	4	86	19.1
4th Gravida	6(4%)	27	6	36	8
Chi square=22.639, P value=0.000					
Previous Obstetric Performance					
Normal pregnancy outcome	122(42.4%)	8	2.8	174	60.4
Adverse pregnancy outcome	166(57.6%)	24	8.3	82	28.5
Total	288(100%)	32	11.1	256	88.9

Chi square=22.579, P value=0.000

DISCUSSION

In recent years, a great number of serological studies have been conducted to assess the seroprevalence of the rubella infection around the world[1]. Rubella screening is based on anti-rubella IgG and IgM antibody detection by ELISA as it the best method[2,3]. In the present study, the ELISA technique was used to determine seroprevalence of rubella antibodies among women as comparable with other studies[8,9,10,11]. In the existing investigation, the seroprevalence of the rubella was estimated 84% in the sample; therefore, 16% of women in the present study were non-rubella immune [NRI] and were susceptible to rubella infection. Thus, about a quarter of Kirkuk women are at risk of developing primary rubella infection. Rubella is spread through the respiratory path and its incubation period is thirteen to twenty days, during which time a viremia occurs and the virus spreads throughout the body, making its transmission from human to human more viable. The NRI prevalence rate was higher than that expected in society conducting rubella immunization program. Despite vaccination programs in effect, 5-10% of women of child bearing age are susceptible to rubella infection[12]. The increase of NRI may be due to disruption of the vaccination program during the period from 1992 to date. The report of World Health Organization (WHO) display that rubella virus is present in Iraq with fifteen cases of confirmed congenital anomalies in 2010[13]. The prevalence rate of NRI demonstrated in this study (25.3%) was higher than that which was reported in previous studies conducted in another Iraqi province, such as Waset[13], Thi-qar[14]. These results match those observed in earlier studies in other Middle Eastern countries, which revealed that NRI was reported in Tunisia[15]. Qatar[16], Saudi Arabia[17], Libya[18], Syria[19]. Additionally, the findings of the current study are consistent with many studies conducted around world, (Taiwan[20], Turkey[21], Malaysia[22], Iran[23]. However, the findings of the current study do not support the previous research that reported seroprevalence of rubella in Canada[24], USA[25], Italy[26] Russia[27]. In the present study, the most interesting finding indicated that positive IgG rate was 91.67% among low socioeconomic status group and 72.50% among high economic income people which is statistically significant ($p<0.05$). A possible explanation for these results may be that the crowded living environment in poorer residents increases the casual of rubella virus separation . The findings observed in this study mirror those of the previous studies that have examined the incidence of rubella specific IgG antibody in the different Indian socioeconomic status groups. The results of this study show IgG antibody positive in 55.9% in the upper socioeconomic status group and 67.3% and 71.8% in middle and lower socioeconomic status group respectively[28]. Another important finding was found in Bangladesh where a sample population from the lower socioeconomic class showed higher prevalence of the rubella antibody (69.2%) than the observed upper class sample (55.6%)[29]. Caidi et al[30] detected that the seroprevalence of rubella inrural and urban areas were 81.5% and 85% respectively, but no statistical differences were recordedbetween the examined groups. Also, Figueiredo et al[31] investigated seroprevalence of rubella

antibodies in a 15 to 39 year aged sample population in the municipality of Guaratinguetá, Brazil. They detected a significant disparity between seropositivity in urban and rural zones and the prevalence of seronegativity in rural areas which disclosessusceptibility to potential and continued circulation of the virus in this zone.This is also in accordance with Nuretal's[32] observation which showed high rubella seroprevalence among women in the reproductive age group in a rural district in Ankara, Turkey. In our study the seropositivity of rubella IgG antibodies was more in women with history of previous adverse pregnancy (40%) as compared to women with normal, previous obstetric performance (29.1%).

CONCLUSION

The present study was designed to determine the prevalence of anti-rubella antibodies in women among three population samples in Kirkuk, Iraq: adolescent females, married women, and pregnant women. One of the more significant findings to emerge from this study is that a program for the prevention and elimination of the rubella virus in Kirkuk supports a free antibody testing in populations as well as proceeds to vaccinate non-protected girls and women of childbearing age.

Recommendations: This research uncovers many questions in need of further investigation. There is a need for medical examinations to recurrently check for measles in all women who want to conceive and who qualify under childbearing age, as well as to examine pregnant women before birth and to vaccinate those who are seronegative to decrease morbidity and mortality associated with the rubella virus in infants.Considerable amount of work will need to be done to determine the factors that may be associated with low and high seroprevalence of anti-rubella antibodies among women.

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