

RUBELLA SEROPREVELANCE AMONG PREGNANT WOMEN IN KHARTOUM, SUDAN

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ABSTRACT

Background: Rubella and CRS has been eliminated in many developed countries and aimed to in some developing countries Many African countries including Sudan are lagging behind. **Materials and Methods:** This is a cross-sectional survey conducted during the period from Nov. 2013 to Jan. 2014. It included 148 pregnant women who attended the ANC at two of the largest Hospitals in the Capital. Possible risk factors were assessed by well-structured questionnaire and sera were analyzed for rubella IgG by semi-automated ELISA. **Results:** 134 were rubella IgG positive (90.5%). Among all potential risk factors and associations past history of abortion (p value 0.019), being in the Capital within last 8 yr. (p value = 0.030) and crowding in the house (p value 0.016) were found to be significant. Only one has been vaccinated against Rubella (0.67%). **Conclusion:** In this study 90.5% of the population was found to be Rubella IgG seropositive;

potentially protected as classified by WHO. That means the Rubella susceptibility rate is 9.5%. An extensive national surveillances regarding rubella and CRS prevalence is important for full evaluation. Then adoption of immunization strategy against rubella, which is cost-effective, is recommended.

KEYWORDS: Rubella, Seropositive, IgG, ANC, ELISA.

INTRODUCTION

Rubella is a mild febrile exanthematous illness of childhood. Its importance arises from the teratogenic effect and resultant CRS.^[1,2,3,4,6]

Classical Congenital Rubella Syndrome (CRS) includes blindness (due to cataract), sensorineural deafness (due to cochlear atrophy) and congenital heart disease (CHD) mainly due to patent ductus arteriosus.^[3]

Studies of infant with CRS revealed that CRS affects virtually all organs.^[3] Some symptoms even presented later in life; e.g.: pneumonitis, diabetes mellitus, abnormalities of thyroid gland.^[1,2,3,4,7] For serological screening to ascertain susceptibility: test for rubella-specific IgG is recommended, a level >10 IU/ml indicates immunity^[1,4,6,7,16] Although rare in many industrialized countries, rubella continues to occur in many developing countries with no vaccination program. In Sudan few studies were conducted regarding Rubella epidemiology in the previous decade, but with no further planning regarding rubella elimination.^[5] So this is a step in the evaluation road.

MATERIALS AND METHODS

This was a descriptive cross-sectional study. Conducted at Antenatal Care Clinic (ANC) of both: Omdurman Maternity hospital and the National Ribat University Hospital. During the period from November 2013 to January 2014. 148 pregnant Sudanese woman, > 16 year old with no history of laboratory confirmed rubella, nor a child with CRS were enrolled in this study.

Data and specimens collection

After counseling and signing an informed consent; a structured questionnaire was filled during personal interview with each participant. In the questionnaire relevant demographic, medical and obstetrical information were sought.

Specimens handling and laboratory testing

Three mls of blood was collected under aseptic technique in plain tubes, allowed to clot and centrifuged at room temperature. Then sera were stored at -20 C till processed. The sera were analyzed using semi-quantitative, semi-automated commercial diagnostic ELISA kits (Human, Human Gesellschaft für Biochemical and Diagnostic mb H, Germany) according to

the manufacturer's instructions. Criteria for validity of the test were fulfilled. Results were reported as positive, negative or equivocal according to the manufacturer's cut-off values. All equivocal samples were retested and the sample was classified as equivocal, otherwise positive or negative. Positive results are those samples with IgG level 10 IU or more.

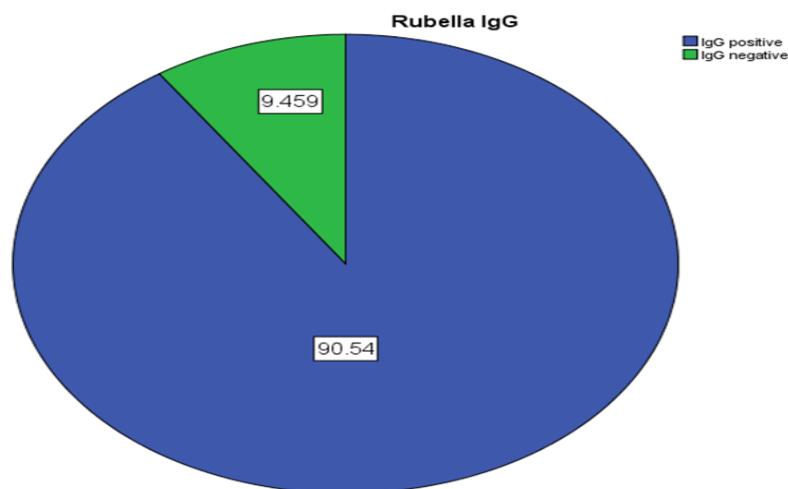
Data management

The data were analyzed using mean, chi-square tests, with aid of SPSS version 21.

RESULTS

The mean age 28.5 (16 yr. -43 yr.) .Most of them were multipara (mean parity 2.2245), house wives, reside at the Capital. One third had past history of febrile rash, but only one has been vaccinated against rubella. Lives within families that are greatly varies in numbers (2 as minimum up to 20 members as maximum).Of the total number 134 were found to be positive for rubella IgG giving a seroprevalance of 90.5%.[Fig. 1].

Assessed Risk factors included: age, occupation, residence, monthly income, educational level, gestational age and parity which were found to be insignificant variables. However past history of abortion was a significant associate (p value 0.019).As well as number of family member and duration of being in the Capital (p value 0.016, 0.030 respectively).[Table 1].



"Figure 1": Rubella IgG seroprevalance (percentage).

DISCUSSION

As a level of 10 IU/ml of IgG is considered to be protective against Rubella by WHO^[16]; this high overall immunity rate (90.5%) in the absence of scheduled vaccination program suggests a continuous transmission of endemic rubella virus in Sudan.

Table 1: Rubella Seropositivity in relation to different risk factors.

Variables	Total		Seropositive	
	No.	%	No.	%
Occupation	20	13.5	19	95.0
• Employee				
• House-wife	128	86.5	115	89.9
Residence				
• In the Capital	132	89.2	121	91.7
• Else where	16	10.8	13	81.3
No. of family member				
• =<5	75	50.7	71	94.7
• 6-10	56	37.8	51	91.1
• 11-15	12	8.1	9	75.0
• >15	5	3.4	3	60.0
Past history Abortion				
• None	106	71.6	96	90.6
• Once	33	22.3	30	90.9
• > one	9	6.1	8	88.9

As a result most women become infected at early childhood. This is supported by the reports of the Sudanese surveillance for measles and rubella. In 2014, by Jun 487 cases of Rubella were detected. Most of the reported cases were children aged 5-9 years (52.2%), while the least were people > 15 yr. old (3.7%). Twelve women in their reproductive age were infected (2.5%), non was pregnant.^[18] So 9.5% of pregnant women are susceptible to primary Rubella and their fetuses are vulnerable to CRS.

The high seropositivity matches the previous Sudanese study in Khartoum (2008 - 2009) with 95.1% seroprevalence^[18], much more than the oldest survey conducted in 1997 with only 79.5% seropositivity.^[17] And even more than the percentage detected in rural west Sudan 65.3% 3 years ago.^[8] This may be as a result of marked increase in the population density in the Capital during the previous decade, as overcrowding facilitates the transmission of rubella.^[11, 15] The age was not found statistically significant ($p=0.264$) as risk factor for rubella seropositivity. This is an expected finding in areas with high prevalence.^[12,18] Matching the data from the two previous Sudanese studies^[8,18], as well as in Burkina Faso.^[9] In this study educational level was insignificant (p value= 0.278). While O. Adamet. *al.* found that rubella seropositivity increase significantly with the educational level (p value= 0.003).^[18] On the other hand Hamdanet. *al.* concluded that illiteracy was significantly associated with rubella infection (p value =0.02).^[8] In Argentina educational level was insignificant (p value=0.12)^[13] as well in Turkey.^[10] Other possible risk factors of

insignificant association include: residence, occupation, monthly income, gestational age, parity and bad obstetrical history. Abortion is a significant associate with rubella seropositivity (p value = 0.019). Rubella infection is one of well-known causes of early abortion^[4,7], easily mistaken for delayed menstrual period. That could explain why Rubella IgG seropositivity was 90.6% in women without past history of abortion vs. 87.5% in women with two previous abortions. History of miscarriage was not significantly associated with rubella seropositivity in Hamdan *et. al.* study carried in west Sudan^[8] nor Iranian^[14] survey. The duration of being in the capital was found statistically significant (p value = 0.030). With 94.4% seropositivity in women always residing in the capital vs. 100.0% in those who moved to capital recently or within 8 years. This may reflect the waning off of specific IgG gained during early childhood in contrast to strong immunity following recent infection after moving to capital, respectively. The number of family members was inversely related to rubella IgG seropositivity, which is statistically significant; p value = 0.016. This was not investigated in the previous Sudanese studies.^[8,18]

This could be understood as those families with members more than 15 member are most likely extended families with large houses and vast yards.

CONCLUSIN

This brief report is one of the most recent studies documenting high Rubella seropositivity in Sudan, where there is no vaccination policy against it status. It is recommended to consider elimination of rubella and CRS as a goal in Sudan. This can be achieved by two steps; first a national age-stratified serosurvey need to be done. Making Rubella and CRS reportable diseases will help a lot in the surveillance. Second: adoption of immunization strategy against rubella; including infant vaccination and campaign for women of child-bearing age. This is cost-effective.

Limitations: small cross-sectional nature of the study.

Ethics: The research proposal was approved by the ethical committee in Sudan Medical Specialization Board.

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