



# African Journal of Advanced Pure and Applied Sciences (AJAPAS)

Online ISSN: 2957-644X

Volume 3, Issue 1, January-March 2024, Page No: 176-179

Website: <https://aaasjournals.com/index.php/ajapas/index>

معامل التأثير العربي 2023: (1.55)

SJIFactor 2023: 5.689

ISI 2022-2023: 0.557

## Seroprevalence of Rubella Antibodies Among Reproductive-Age Women in The Municipality of Alasabaa-Libya

Abdulfatah Ramadan Swesi \*

Department of Medical Technology, High Institute of Sciences and Technology, Alasabaa, Libya

\*Corresponding author: [abdulfatahswesi@gmail.com](mailto:abdulfatahswesi@gmail.com)

Received: January 11, 2024

Accepted: February 27, 2024

Published: March 06, 2024

### Abstract:

Rubella is a contagious viral infection resulting from the rubella virus, that is transmitted through breathing droplets while an inflamed person coughs or sneezes. Rubella is of the greatest concern when a woman contracts the virus during pregnancy, especially in the first trimester. In such cases, the virus can be devastating for the development of fetus and cause complications known as congenital rubella syndrome. Which can result in a wide range of severe birth defects including cardiac abnormalities, growth retardation, hearing impairments, and cataracts. This study aimed to determine the prevalence rate of rubella in women of reproductive age in the municipality of Alasabaa-Libya. A cross-sectional study was performed on a random sample of female students from the High Institute of Science and Technology-Alasabaa, during the period from March to May 2022. Blood samples were accumulated individually from 90 females aged 18-23 years and rubella antibodies were quantitated by using Cobas e 411 autoanalyzer. Overall, 78 (86.7%) had IgG positive antibody to rubella, whereas 12 (13.3%) were negative for the rubella IgG antibody. While all the participants 90(100%) showed negative for rubella IgM antibody. In conclusion, the results confirmed the high occurrence of rubella IgG antibody amongst enrolled women showing that they had immunity against rubella virus. But there are approximately 13.3% of assayed females continue to be prone to rubella virus infection. SO a regular third dose could be recommended in the country wide vaccine program to prevent outbreaks among young females.

**Keywords:** Seroprevalence, Rubella, Antibodies, Alasabaa, Libya.

**Cite this article as:** A. R. Swesi, "Seroprevalence of rubella antibodies among reproductive-age women in the municipality of Alasabaa-Libya," African Journal of Advanced Pure and Applied Sciences (AJAPAS), vol. 3, no. 1, pp. 176–179, January-March 2024.

Publisher's Note: The African Academy of Advanced Studies – AAAS stays neutral about jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2023 by the authors. Licensee African Journal of Advanced Pure and Applied Sciences (AJAPAS), Libya. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## الانتشار المصلي للأجسام المضادة للحصبة الألمانية بين النساء في سن الإنجاب في بلدية الأصابعة – ليبيا

عبد الفتاح رمضان سويسي \*

قسم التقنيات الطبية، المعهد العالي للعلوم والتقنية الأصابعة، ليبيا

### الملخص:

الحصبة الألمانية هي عدوى فيروسية معدية تنتج عن فيروس الحصبة الألمانية، الذي ينتقل عن طريق قطرات التنفس عندما يسعل أو يعطس الشخص المصاب. تشكل الحصبة الألمانية مصدر قلق كبير عندما تصاب المرأة بالفيروس أثناء الحمل، وخاصةً في الثلاثة أشهر الأولى من الحمل. في مثل هذه الحالات، يمكن أن يكون الفيروس مدمراً لنمو الجنين

ويسبب مضاعفات تُعرف بمتلازمة الحصبة الألمانية الخلقية، والتي يمكن أن تؤدي إلى مجموعة واسعة من العيوب الخلقية الشديدة بما في ذلك تشوهات القلب، وتأخر النمو، وضعف السمع، وإعتماد عدسة العين. هدفت هذه الدراسة إلى تحديد معدل انتشار الحصبة الألمانية لدى النساء في سن الإنجاب في بلدية الأصابعة - ليبيا. حيث أجريت دراسة مقطعية على عينة عشوائية من طالبات المعهد العالي للعلوم والتقنية الأصابعة، خلال الفترة من مارس إلى مايو 2022. تم جمع عينات الدم بشكل فردي من 90 أنثى تراوحت أعمارهن من 18-23 سنة، وتم قياس الأجسام المضادة للحصبة الألمانية بواسطة المحلل الذاتي Cobas e 411. بشكل عام، أظهر 78 (86.7%) إيجابية للجسم المضاد من النوع IgG، في حين كان 12 (13.3%) سلبيا للجسم المضاد من النوع IgG. بينما جميع المشاركين 90 (100%) أظهروا سلبية للأجسام المضادة للحصبة الألمانية من النوع IgM. في الختام، أكدت النتائج وجود ارتفاع في الأجسام المضادة للحصبة الألمانية من النوع IgG بين النساء المسجلات مما يدل على أن لديهن مناعة ضد فيروس الحصبة الألمانية، ولكن هناك ما يقرب من 13.3% من الإناث اللاتي خضعن للفحص ما زلن عرضة للإصابة بفيروس الحصبة الألمانية. لذلك يمكن التوصية بجرعة ثالثة منتظمة في برنامج التحصين على مستوى الدولة لمنع تفشي المرض بين الإناث الشباب.

**الكلمات المفتاحية:** الانتشار المصلي، الحصبة الألمانية، الأجسام المضادة، الأصابعة، ليبيا.

## Introduction

Rubella, also known as German measles, is a contagious disease resulting from the rubella virus, which belongs to the family Togaviridae and is the only member of the genus Rubivirus [1]. Rubella virus is a globular (40-80) nm positive, surface-projecting, single-stranded RNA virus with a spike-like haemagglutinin. The electron-dense (30-35) nm core is surrounded by a lipoprotein envelope [2,3]. Humans are taken into consideration as the sole reservoir of rubella virus transmitted by way of airborne droplets from infected individuals for the duration of sneezing or coughing. Both children and adults are at risk of rubella contamination which has an incubation period of two to three weeks [4]. Rubella is generally manifested using a slight fever and rash, primarily in youngsters and children. However, it can cause a serious birth disorder referred to as congenital rubella syndrome (CRS) when a pregnant female becomes infected, particularly in the primary trimester [5,6]. The birth defects associated with CRS are ocular, auditory, cardiac, and craniofacial. Infants with CRS who continue to exist the neonatal duration can also face critical developmental disabilities and have an accelerated risk for developmental delay, inclusive of autism [5,7,8]. Globally, about 100,000 youngsters are annually born with CRS [9]. There are not any specific drugs that exist to treat rubella infection and prevent transmission to the fetus. So, women must acquire immunity to rubella infection before the reproductive age to avoid such critical consequences [10]. One of the commonplace techniques of diagnosis and screening of girls in terms of these infectious agents is serological assessments and measurement of unique antibodies to rubella virus [11,12]. Due to the consequences of rubella infection on fetal health being pregnant, screening of girls for immunity to rubella virus and vaccination is very essential [13]. This study aimed to determine the prevalence rate of rubella in women of reproductive age in the municipality of Alasabaa-Libya.

## Material and methods

### Study design and population

This cross-sectional study was conducted on a random sample of female students from the High Institute of Science and Technology- Alasabaa, studying in the Department of Medical Technology, during the period from March to May 2022.

### Collection and examination of samples

About five mL of venous blood was collected by needle and syringe technique aseptically from each of the women participants. The blood sample was put in a sterile dry tube were performed in a medical technology laboratory. The serum was separated from the whole blood by centrifugation at 3000 rotations per minute (rpm) for 5 minutes. The collected sera were sent to a private laboratory for testing to detect both types of immunoglobulin G (IgG) and immunoglobulin M (IgM) against the rubella virus. The mentioned antibodies were examined by way of quantitative immunoassay the usage of a Cobas e 411 autoanalyzer, according to the Kit manufacturer's instructions.

The results for IgG and IgM rubella antibodies were interpreted according to the manufacturer's instructions as follows: for IgG (non-reactive:<10IU/mL, and reactive:≥ 10IU/mL) and for IgM (non-reactive:<0.8COI, and reactive:≥ 1.0 COI ).

### Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) software was employed to analyze the results. The prevalence of rubella antibodies was calculated using percentages.

## Results

An overall of 90 women aged 18-23 years (average age 20 years). The current finding showed that the total prevalence rate of IgG antibodies to rubella was 78 (86.7%) positive among of participants, this indicates that there was prior exposure at some undetermined time to rubella infection or from the rubella vaccination in childhood. Whereas 12 (13.3%) were negative for the rubella IgG antibodies. This result indicates that there was no previous exposure to rubella infection. While all the participants showed no positivity for rubella IgM antibodies. This indicates no recent infection. As shown in Table 1.

**Table 1** Frequency distribution of rubella IgG and IgM antibodies in the studied group.

No.	Variable	Frequency	Percentage
1	IgG positive	78	86.7%
2	IgG negative	12	13.3%
3	IgM positive	0	0%
4	IgM negative	90	100%

## Discussion

Rubella is widespread worldwide, and the infection is endemic in all nations that had no longer a highly successful toddler immunization or no immunization policy in any respect. An outbreak of rubella commonly happens in wintry weather, spring, and early summer reason and unfold very effortlessly via airborne droplets in the community [14]. This is the first research to assess the prevalence rate of rubella antibodies in women of reproductive-age within the municipality of Alasabaa-Libya. This city is located in the northwest of Libya, about 120 Km west of the city of Tripoli. The present study revealed that 86.7% of the women studied were positive for the rubella IgG antibodies, while 13.3% of the women were negative. These findings are lower than the rates reported from some other studies in females where the rate of IgG antibodies to rubella was determined as 98.5% in AL-Biyda city [15], 94.6% in Iran [16], 94.4% in Turkey [17], 92% in Saudi Arabia [18], 91.6% in Sana'a city [19] and 89% in Tripoli city [20]. However, the decrease rate from this study was said by Olajide et al., [21] in Nigeria, revealing that anti-rubella IgG was 38.8% amongst pregnant and non-pregnant women. The difference between the studies may be defined using the difference in the country-wide vaccination program as well as the prevalence of natural infection in each community [22].

## Conclusion and recommendations

This study attempted to evaluate rubella antibody levels in women of reproductive age in the municipality of Alasabaa-Libya. The results showed a high occurrence of rubella IgG antibodies among enrolled women suggests that they had immunity against rubella virus. However, there are approximately 13.3% of tested girls remain liable to rubella virus infection which causes prenatal complications during development that lead to congenital rubella syndrome. According to the Libyan program, the first and second doses of the measles-mumps-rubella (MMR)vaccine are given at 12 and 18 months of age. This may not be protective in adulthood. So, recommend maintaining protective IgG titers by administering a third dose at the start of schooling. This can contribute to immunity at young adults. And must be recommended that each prenatal instance be routinely screened for Rubella antibodies to save you unfavorable fetal consequences. In addition, studies just like this documenting the seroprevalence of rubella infections need to be conducted to establish baseline data inside the country.

## References

- [1] Lambert, N.; Strebel, P.; Orenstein, W.; Icenogle, J.; Poland, G.A. Rubella. *Lancet* 2015, 385, 2297–2307.
- [2] S. Baron, *Medical Microbiology*, 4th ed., 2005, NCBI, chapter: 55.
- [3] www.World Health Organization.com, Global measles and rubella laboratory, weekly *Epidemiological Rec.*, 80, (2008), pp. (384-8).
- [4] Mounerou S, Maléwé K, Anoumou DY, Sami N, Koffi A, Mireille P. Seroprevalence of rubella IgG antibody among pregnant women attending antenatal clinic in Lomé, Togo. *Am J Infect Dis Microbiol* 2015; 3(4):134– 136. <https://doi.org/10.12691/ajidm-3-4-3>
- [5] Binnicker MJ, Jespersen DJ, and Harring JA. Multiplex Detection of IgM and IgG Class Antibodies to *Toxoplasma gondii*, Rubella Virus, and Cytomegalovirus using a Novel Multiplex Flow Immunoassay. *Clin Vaccine Immunol.* 2010, 17(11):1734-1738.
- [6] WHO. Rubella fact sheet. World Health Organization, Updated March 2017. Available at: <http://www.who.int/mediacentre/factsheets/fs367/en/>

- [7] Ishaque S, Yakoob MY, Imdad A, Goldenberg RL, Eisele TP, Bhutta ZA. Effectiveness of interventions to screen and manage infections during pregnancy on reducing stillbirths: a review. *BMC Public Health*. 2011;11(3):S3
- [8] World Health Organization. Rubella vaccines. WHO position paper. *Wkly Epidemiol Rec*. 2000;75:161-72.
- [9] World Health Organization (WHO). Global measles and rubella: Strategic plan 2012-2020.
- [10] Sallam TA, Al-Jaufy AY, Al-Shaibany KS, Bin Ghauth A, Best JM. Prevalence of antibodies to measles and rubella in Sana'a, Yemen. *Vaccine* 2006;24:6304–6308.
- [11] Sharma S, Duggal N, Agarwal S, Mahajan RK, Anuradha, Hans C. Seroprevalence of Toxoplasma, rubella and CMV infections in antenatal women in a tertiary care hospital in North India. *J Commun Dis* 2015;47:23–6.
- [12] Karad D, Kharat A. Seroprevalence of torch infections in bad obstetrics history in HIV and Non-HIV women in Solapur District of Maharashtra India. *J Hum Virol Retrovirol* 2015;2:00067.
- [13] Carazo S, Billard MN, Boutin A, De Serres G. Effect of age at vaccination on the measles vaccine effectiveness and immunogenicity: systematic review and meta-analysis. *BMC Infect Dis* 2020;20:251.
- [14] Centers for Disease Control and Prevention (CDC). Health information for international travel, *Yellow Book. Prevention of Specific Infectious Diseases* 2008; 1-4.
- [15] Saad, K. A. O., & Yousef, N. Evaluation of Rubella, Toxoplasma gondii, and cytomegalovirus seroprevalences in women with miscarriage as adverse reproductive outcome in current pregnancy in ALBIYDA /LIBYA IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) (2016); 11, 81-84.
- [16] Ganjooie TA, Mohammadi MM. The prevalence of antibodies against rubella in pregnant women in Kerman, Iran. *Saudi Med J* 2003; 24:1270–1271.
- [17] Pehlivan E, Karaglu L, Ozen M, et al. Rubella seroprevalence in unvaccinated pregnant population in Malatya, Turkey. *Public Health* 2007; (121): 462-468.
- [18] Alsibiani AS. Rubella immunity among pregnant women in Jeddah, Western region of Saudi Arabia. *Obstetrics Gynecol Int* 2014.
- [19] SallamTA,Raja'aYA,BenbrakeMS,Al-Shaibani KS, Al-hababi AA. Prevalence of rubella antibodies among schoolgirls in the city of Sana'a,Yemen.*East Mediterr Health J* 2003; 9:148–151.
- [20] Gashout A, Lazrag T, Gashut H, Swedan T. Qualitative assessment of risk for spontaneous abortion associated with toxoplasma and rubella: immunity appraisal. *Libyan J Infect Dis* (2008) ; 2(1): 52-56.
- [21] Olajide MO, Aminu M, Randawa JA, Adejo SD. Seroprevalence of rubella-specific IgM and IgG antibodies among pregnant women seen in a tertiary hospital in Nigeria. *Int J Women's Health* 2015;7:75– 83.
- [22] Center for disease control (CDC). Measles, Mumps, and Rubella (MMR) Vaccination: What Everyone Should Know. Available at: <https://www.cdc.gov/vaccines/vpd/mmr/public/index.html>