

SEROPREVALENCE OF RUBELLA AND CYTOMEGALOVIRUS IN NURSING STUDENTS

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ABSTRACT

Objective: To detect the prevalence of rubella and cytomegalovirus antibodies in the nursing students.

Methodology: A total of 89 volunteer students in the age range of 18-20 years participated in the study. IgM and IgG antibodies were measured using the Enzyme Linked Fluorescent Assay VIDAS® system kit and apparatus.

Results: In CMV serology, while anti-CMV IgG was positive in 85.4 % and anti-CMV IgM was positive in 9.0 % of the patients, the common positivity of anti-CMV IgG and anti-CMV IgM antibodies was determined as 2.2%. In the rubella serology, while rubella IgG positivity was 83.1%, rubella IgM positivity was not detected.

Conclusions: It was found that higher rate of the students had experienced rubella and CMV in one period of their life. This is highly important for both their health and the health of the society they provide their services to.

KEY WORDS: Cytomegalovirus, Rubella, Nursing Students.

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INTRODUCTION

Cytomegalovirus (CMV) and rubella are agents of viral infection which are commonly encountered in developing countries and are

generally asymptomatic or lead to a mild clinical picture. Intrauterine infections due to rubella and CMV can cause serious complications such as congenital malformation and abortus.^{1,2}

CMV can cause serious infection especially in underdeveloped or developing countries, where hygienic conditions are poor.^{2,3} While CMV has an asymptomatic course or shows a mild clinical evidence in immunocompetent individuals, it may lead to a serious clinical picture, such as interstitial pneumonia, hepatitis, retinitis and encephalitis, or may even result in death among immunocompromised individuals.^{4,5} In recent years, CMV has been one of the most frequently encountered opportunist viral pathogens due to increased use of immunosuppressive medicine for bone marrow and solid organ transplantation.⁶ In addition, CMV is the

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most important cause of congenital infections.⁷ Congenital CMV infections are encountered at a rate of 0.15-2.2% in various places in the world.^{8,9} Although babies infected with CMV during the intrauterine period are generally asymptomatic at birth, in later stages of infancy, 10 to 15% may experience the most frequently encountered symptoms such as jaundice, hepatomegaly, splenomegaly and petechiae as well as serious complications such as sensorineural hearing loss, mental retardation, and neuromuscular defects.^{10,11}

The rubella virus, a member of the *Togaviridae* family, causes an infection, which is limited to mild fever and skin eruptions in children. The significance of rubella virus infection regarding the health of the society is that it significantly increases the risks of abortus and teratogenic effect in exposure to this virus in the first trimester of pregnancy.^{1,12} In the first year of approximately 90% of the newborns, a clinical picture called Congenital Rubella Syndrome develops after a rubella infection.¹³ Congenital Rubella Syndrome is characterized with deafness, cataracts, cardiac anomalies and mental retardation. Diabetes, thyroid disease, growth hormone deficiency, and progressive panencephalitis are also observed as late complications.¹⁴

Health workers are at more risk for exposure to infectious agents due to their close contact with their patients. Non-immunized nurses are among the risky groups for rubella infection as they are commonly at fertile ages during most of their working life.¹⁵ Student nurses participating in patient care may also be at risk of exposure to infectious agents. Therefore, it is important to identify the prevalence of rubella and CMV antibodies in nursing students, to immunize (for rubella) and educate these students about obeying the rules of protection against infection.

This study aimed to investigate the existence of CMV and rubella antibodies among the female nursing students because they can be considered prospective mothers in their age range and nursing practices involve several risks to the health of others.

METHODOLOGY

This descriptive study was carried out on 89 volunteers who were students at the School of Nursing, Ataturk University. The students participating in the study were healthy individuals who had not been vaccinated against rubella, had no malignant disease, and had not received any immunosuppressive treatment.

A five ml venous blood sample taken from each student was transmitted to the Microbiology Laboratory of the Faculty of Medicine. The blood serum samples were screened for CMV and rubella specific IgM and IgG antibodies using Enzyme Linked Fluorescent Assay (ELFA) VIDAS® system (bioMérieux). Anti-CMV IgG avidity index was calculated for the samples in which anti-CMV IgG and anti-CMV IgM antibodies were both positive. The results were analyzed using the criteria of the commercial kit. .

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Ethical Consideration: All the participants were informed about CMV and rubella infections and their complications. The purpose of the study was explained and the written informed consent of all the students were obtained. The study was approved by the management of the school.

RESULTS

The age range of the students participating in the study was 18-22 years (mean age: 19.37±1.18 years). Out of 89 nursing students who were evaluated for CMV and rubella antibodies, 76 (85.4%) students showed anti-CMV IgG positivity and 8 (9.0 %) students showed anti-CMV

Table-I: The prevalence of rubella and CMV antibodies among the nursing students

N:89	Rubella				CMV					
	IgM		IgG		IgM		IgG		IgG + IgM	
	n	%	n	%	n	%	n	%	n	%
Positive	-	-	74	83.1	8	9.0	76	85.4	2	2.2
Negative	89	100.0	15	16.9	81	91.0	13	14.6	87	97.8

IgM positivity. In two students (2.2 %), positivity for both anti-CMV IgG and anti-CMV IgM antibodies was detected. While rubella IgG was positive in 74 of the students examined for rubella antibodies, positivity for rubella IgM was not observed.

DISCUSSION

CMV, a member of the Herpesviridae family, is endemic all over the world and is the most frequent cause of congenital viral infections.^{4,7} Human beings can be infected with CMV not only through contact with body fluids infected with the virus, such as urine, saliva, and semen, but also after blood transfusion and organ transplantation.^{16,17} Prospective mothers may be infected with CMV primarily as well as a latent virus activated during pregnancy (reactivation) or with another CMV strain (re-infection). The existence of CMV antibodies in the mother cannot prevent transplacental transmission of the virus to the fetus during repeated CMV infections. However, in these cases, CMV causes less sequelae in fetus. In related with this, although the rate of congenital CMV infections is increased in societies where CMV seropositivity is high, it causes less sequelae in infant. On the other hand, in societies where CMV seropositivity is low, although the frequency of infection is decreased, congenital CMV infections with more severe clinical symptoms are observed.¹⁸ In this study, anti-CMV IgG was positive in 85.4% and anti-CMV IgM was positive in 9.0% of the nursing students. The high avidity rate of CMV IgG in the two students that were CMV IgM and CMV IgG positive suggests that CMV infection results from reactivation or re-infection. Concomitant positivity for anti-CMV IgM in eight students (9.0%) may have been due to their sharing common closed areas for a long time.

Especially health staff who are in contact with children and immunosuppressed patients, who are the actual vectors of CMV, are under risk for CMV infection.¹⁹ The risk of infection will also increase in nursing students, whose sensitivity to CMV was evaluated in this study, because they have contact with infected patients during health services, particularly with the patients in pediatrics departments. Therefore, it is important to educate nursing students about paying attention to the rules of protection against infection and the need for regular controls in terms of infections during their reproductive age group. Improving hygiene conditions, limiting contact with infected children, and taking the necessary measures against sexual transmission will reduce the students risk of infection with CMV.

There are few studies^{20,22} on the frequency of congenital CMV infections in Turkey; however, a high incidence rate of congenital CMV infections is to be expected in our society because of high rate of CMV seropositivity. These studies reported a rate of 84.5-99% for anti-CMV IgG positivity in adults.^{20,22} A study²¹ on different groups reported CMV IgM positivity with rates ranging between 0% and 32%.

Congenital Rubella Syndrome causes birth defects and abortus. When acute maternal rubella infection is clinically and serologically evident early in pregnancy, therapeutic abortus is advised.²³ Thus, protection against rubella infection is of utmost importance. Usually, rubella can be prevented by vaccination. As many women in their reproductive years have immunity against this disease in developed countries today, the frequency of birth defect incidents related to rubella has extremely decreased. As women who have no immunity against rubella cannot be vaccinated during pregnancy, they are advised to keep away from people infected

with rubella especially in the first trimester of their pregnancy.¹⁸

In this study, prevalence of rubella IgG seropositivity in students was found as 83.1%. Similarly in a study performed by Oncu et al.¹⁵ anti-rubella IgG positivity was determined as 96.7%. The rate of sensitivity to rubella in developing countries has been reported to be as high as 68%.²⁴ In a study²⁵ conducted in Turkey, the rate of sensitivity against rubella infection in young women at the age of 15-19 years was found to be 13.5%. In our study, while 16.9% of nursing students were sensitive to rubella infection, no acute rubella case was determined.

Determination of the rate of sensitivity to rubella in women at reproductive age in developing countries will be helpful in establishing a national vaccination policy for public health. In Turkey, vaccination for rubella has been included in the regular vaccination program together with vaccinations for mumps and measles by Turkish Ministry of Health²⁶ since 2006. It has been anticipated that in accordance with the national vaccination program, immunization of prospective mothers against rubella during their childhood will decrease congenital rubella incidents

Limitations of the study: The current study is limited to a small sample and cannot be generalized. Future studies with larger sample size should be carried out to confirm there finding.

CONCLUSIONS

As infections with these two viral pathogens are common in our society, precautions should be taken for prevention and management of the infection. By screening before pregnancy, those who have no immunization against rubella should be detected and vaccinated. Importance should be given to educating individuals and raising society's consciousness about protection from CMV infections.

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