

**Rubella-specific Immunoglobulin-G status among schoolgirls
in Pyinmana, Central Myanmar**

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Rubella is a common cause of childhood rash and fever. In Myanmar, only a few studies have been done on rubella infection in the past 30 years, and the surveillance system for congenital rubella syndrome (CRS) in Yangon has recently been established. Anti-rubella antibody levels were already identified in Myanmar among the infants, children and the pregnant women but not in schoolgirls. Therefore, this operational research was carried out to explore the rubella-specific Immunoglobulin-G (IgG) status among schoolgirls at two ages, between 11-12 years and between 15-16 years. A total of 100 schoolgirls attending the Basic Education High School, Pyinmana, 50 girls at age 11-12 years and 50 girls at age 15-16 years, were chosen by simple random sampling. After obtaining written informed consent, 5 ml of blood was withdrawn from each subject and the sera were tested for rubella IgG using Rubenostika® IgG II Microelisa System. Forty-two girls (84%) at 11-12 years age group and 41 girls (82%) at 15-16 years age group had rubella IgG. This finding could be used as a crude indicator for rubella susceptibility among adolescent schoolgirls, for a representative rural setting in Central Myanmar, which in turn can be utilized as a base-line data by the health authorities in selecting appropriate vaccine strategy to control rubella infection and CRS in Myanmar.

INTRODUCTION

Rubella is a common cause of childhood rash and fever: its public health importance relates to the teratogenic effect of primary rubella infection in pregnant women [1,2].

After infection in the first trimester, there is an approximately 50% risk of spontaneous abortion [3].

Congenital rubella syndrome (CRS) manifestations in surviving infants may be transient (e.g. purpura), may include permanent structural manifestations (e.g. deafness, congenital heart disease, cataracts) or late-emerging conditions (e.g. diabetes mellitus) [4].

CRS may be diagnosed by its classic triad of clinical signs: cataract, heart disease and

deafness [5]. However, many infants only have one of these manifestations, or may present earlier with neonatal signs: laboratory confirmation of the disease is therefore recommended.

In infants with CRS, rubella-specific IgM can be detected in nearly 100% at age 0-5 months; about 60% at age 6-12 months; and 40% at age 12-18 months. IgM is rarely detected after 18 months [6]. Its detection usually indicates prenatal rather than postnatal infection [4].

The persistence of rubella-specific IgG beyond 6 months (the age when maternally derived IgG would usually have waned) can be detected in 95% of infants with CRS [7]. However, the presence of IgG in a child over 6 months of age may indicate either prenatal or postnatal infection.

In Myanmar, only a few studies have been done on rubella infection in the past 30 years [8,9], and the surveillance system for CRS in Yangon has recently been established [10]. Measles-mumps-rubella (MMR) vaccine is now available in the private sector, but rubella is not included in the Expanded Programme on Immunization (EPI) in Myanmar.

Although rubella infection is not a priority health problem in Myanmar, it is high time to estimate the burden of the disease due to CRS. This area of gap in knowledge is recently filled up by the WHO-funded study on CRS surveillance in Yangon, covering a 25 month-period from 1 December 2000 to 31 December 2002. This study estimates the annual incidence of CRS in Central Yangon to be 0.5 suspected CRS cases per 1000 live births and 0.1 confirmed CRS cases per 1000 live births [11].

In 1976-1978, Kyaw Wynn carried out a study on rubella to fulfill the Diploma in Pathology. The first part of his dissertation entitled "Rubella antibody survey in Burmese pregnant women" consisted of a rubella serosurvey on serum specimens obtained from 100 women attending antenatal clinics at Central Women's Hospital, Rangoon. The Haemagglutination-Inhibition (HI) method was used, with a cut-off value of 1:8 serum dilution. Twenty-five women were tested for each age group, 15-19, 20-24, 25-34 and 35-45. The HI antibody positive rates were 92%, 92%, 100% and 100%, respectively, for these age groups [9]. This study showed that 100% of pregnant women above the age of 25 years are immune to rubella infection.

Rubella vaccine is usually given at early childhood and/or early reproductive age. The most rapid method for preventing CRS is to provide rubella vaccine to women of childbearing age (e.g. postpartum women and/or schoolgirls).

In the WHO South-East Asia Region, two

countries have incorporated rubella vaccine in their national programmes. Thailand is now using a dose of MMR vaccine at age 15 months. Sri Lanka, which suffered a very large outbreak of rubella with several hundred CRS cases in 1994, has added a dose of rubella vaccine for schoolgirls.

On this background, this study has been designed to explore the rubella-specific IgG positive rate among schoolgirls at two ages, between 11-12 years and between 15-16 years. Aims and Objectives of the study was to identify the rubella-specific IgG status among adolescent schoolgirls in Pinyinmana area as a representative rural setting in Central Myanmar. In fact, this study is the maiden research of the Department of Medical Research (Central Myanmar) located in Pinyinmana.

MATERIALS AND METHODS

Study design

Community-based, cross-sectional descriptive and exploratory study

Subjects of the study

Total of 100 subjects, 50 middle-school girls at age 11-12 years and 50 high-school girls at age 15-16 years.

Inclusion criteria

- apparently healthy school girls
- age 11-12 years and 15-16 years
- those who gave their written informed consent to participate in the study

Exclusion criteria

- those who were febrile at the time of blood collection
- those with a known history of bleeding disorders

Methods

During the month of August, 2003, a total of 100 schoolgirls attending No. (2), Basic

Education High School, Oo-Yin-Su, Pyinmana, consisting of two groups, 50 girls at age 11-12 years and 50 girls at age 15-16 years, were chosen by simple random sampling. They had to meet the inclusion criteria as well as free from exclusion criteria. The nature of the study was explained clearly to the subjects and written informed consent was taken prior to the blood collection.

After obtaining informed consent, 5 ml of blood was withdrawn from each subject using disposable syringes and needles and vacutainer tubes. Sera were then separated, and stored in a -80°C deep freezer until further procedures. Sera were tested by ELISA using a commercially available IgG test kit (Rubenostika® IgG II Microclisa system, Biomerieux bv, The Netherlands), according to the manufacturer's instructions.

RESULTS

Fig.1 shows the percentage of rubella IgG positivity among schoolgirls in Pyinmana, in two groups. Forty-two out of 50 girls (84%) at 11-12 years age group and 41 out of 50 girls (82%) at 15-16 years age group showed a positive IgG for rubella infection.

All schoolgirls at 11-12 years age group belonged to the sixth standard of the school representing the middle schoolgirls whereas those at 15-16 years age group belonged to ninth and tenth standards of the same school representing the high school girls.

With regards to the birth place, the majority of the girls at 11-12 years age group (46 out of 50) and those at 15-16 years age group (36 out of 50) were born in Pyinmana township, indicating that most of the girls are native girls of the Pyinmana region.

Fig.2 shows the places of delivery of two study groups of schoolgirls in Pyinmana. About 88% of schoolgirls at 11-12 years age group and 68% of schoolgirls at 15-16 years age group were delivered at home. On the other hand, 12% and 22% respectively, of

schoolgirls of the above mentioned two age groups were delivered at health facilities (either hospitals or clinics).

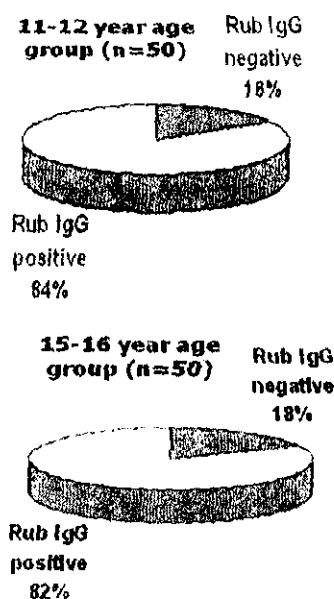


Fig.1. Pie diagram showing the percentage of Rubella IgG positives among schoolgirls in Pyinmana, at two particular age groups

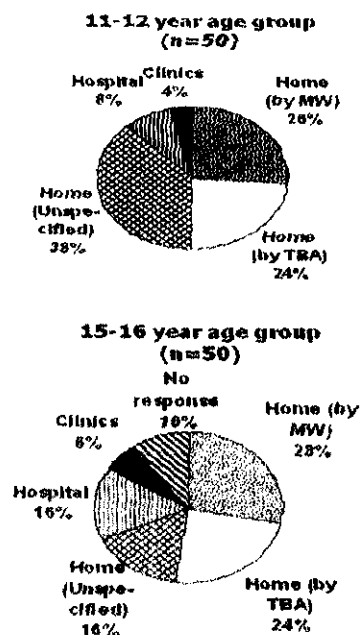


Fig.2. Pie diagram showing the places of delivery among two study groups of schoolgirls in Pyinmana

Table 1 shows the past history of rash illness, family history of congenital defects and vaccination history among two study groups of schoolgirls in Pyinmana. Only a

Table 1. Past history of rash illness, family history of congenital defects and vaccination history among two study groups of schoolgirls in Pyinmana

	11-12 years age group (n=50)			15-16 years age group (n=50)		
	Yes	No	No response	Yes	No	No response
Past history of rash illness	28%	72%	-	24%	76%	-
Family history of congenital defects	-	100%	-	4%	96%	-
Vaccination history	88%	6%	6%	94%	4%	2%

quarter of the subjects gave past history of rash illness. In general, family history of congenital defects was not given except by 2 subjects in the 15-16 year age group. Vaccination coverage (including measles vaccine) was high in both study groups (88% and 94%, respectively).

All subjects in 11-12 years age group were at pre-pubertal age as no history of menarche was reported among them. In contrast, all subjects except two in the 15-16 year age group were at their pubertal age.

DISCUSSION

This study highlighted the immune status, particularly rubella IgG status, of the adolescent schoolgirls attending at the Basic Education High School in Pyinmana. The results revealed that rubella-specific IgG positive rate of schoolgirls aged 11-12 years and 15-16 years were 84% and 82%, respectively. In other words, 16% to 18% of the adolescent schoolgirls were susceptible to rubella infection in this area. This finding could be used as crude indicator for rubella susceptibility among adolescent schoolgirls at a representative rural setting in Central Myanmar, which in turn will be utilized by the health administrators in selecting appropriate vaccine strategy, if there is a real need to combat the rubella infection and CRS in Myanmar.

The present study is the first of its kind in Myanmar, to explore the rubella IgG profile among adolescent schoolgirls. Only a single study has been conducted 25 years ago to

identify the rubella antibody status of the women of childbearing age, using the haemagglutination-inhibition (HI) assay. The HI antibody positive rate for 15-19 years age group in that particular study was 92% [9]. Given an account of the data resulted from above-mentioned studies into consideration, one could roughly estimate that 10% to 20% of the target populations (women of childbearing age and schoolgirls) under the age of 20 in Myanmar would be susceptible to rubella infection. This study also indicates that EPI vaccine coverage in Pyinmana area was quite high (over 80%) although no one has received rubella vaccine due to its unavailability.

Reliable statistics on CRS are rare in developing countries, but the incidence rate of CRS in developed and developing countries before the introduction of rubella vaccine appeared to vary during endemic periods from 0.1-0.2 per 1000 live births. Epidemic rates varied from 1-4 per 1000 live births without marked difference between industrialized and developing countries.

The burden of CRS is estimated that more than 100,000 cases occur each year in developing countries alone. Caring for CRS cases is costly because of the permanent disabilities caused by this condition. WHO recommended the regular serological screening for rubella antibodies among representative samples of young women as a sensitive tool to monitor the risk for CRS in a population.

The primary purpose of rubella vaccination is to prevent the occurrence of congenital

rubella infection including CRS. Two approaches are recommended: (a) prevention of CRS only, through immunization of adolescent girls and/or women of childbearing age; or (b) elimination of rubella as well as CRS through universal vaccination of infants and young children (with/without mass campaign), surveillance and assuring immunity in women of childbearing age [12].

Decisions on which approach is taken should be based on the level of susceptibility in women of childbearing age, the burden of disease due to CRS, strength of the basic immunization programme as indicated by routine measles coverage, infrastructure and resources for child and adult immunization programmes, assurance of injection safety, and other disease priorities.

Nowadays, children in Myanmar have been receiving 7 vaccines through the EPI programme, namely diphtheria, pertussis, tetanus, BCG, polio, measles and more recently hepatitis B. In fact, recently estimated annual incidence of CRS in Central Yangon, 0.1 confirmed CRS cases per 1000 live births, is more likely to be endemic pattern.

Based upon the current available data, introduction of rubella vaccine into the existing EPI programme in Myanmar is not an urgent need. However, regular serological screening for rubella antibodies among representative population of young women needs to be carried out to monitor the disease trend.

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