ORIGINAL ARTICLE

Rubella Vaccination Programme in Malaysia: Analysis of a Seroprevalence Study in an Antenatal Clinic

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Summary

In many developed countries, the incidence of rubella and congenital rubella syndrome (CRS) is considered to be negligible due to the availability of an effective vaccine. However, in Malaysia, several CRS cases are seen every year. This casts doubt on the effectiveness of the rubella vaccination programme. Very few seroprevalence studies were done over the years, making it difficult to discuss the effectiveness of the vaccination programme. The objective of this study is to determine the prevalence of rubella immunity among pregnant women attending antenatal clinics in a local teaching hospital. The hospital database on rubella immunity was assessed retrospectively from August 2001 to June 2002. A cross-sectional study of interviewed method as well as determination of rubella immunity by laboratory tests were carried out in July 2002. A total of 414 women were included, of whom 134 women were interviewed. The rubella immunity status was 92.3%. Based on this figure, rubella vaccination programme in Malaysia is a success despite the presence of CRS cases. Malaysia must ensure rubella vaccine coverage among target groups is high in order to minimise CRS cases.

Key Words: Rubella, Congenital Rubella Syndrome, Vaccination, Vaccination Programme, Immunisation, Seroprevalence

Introduction

Rubella or German measles is caused by rubella virus, which belongs to the Togaviridae family. Rubella typically presents with mild generalised maculopapular rash associated with 3 days of fever. While rubella itself is mild and self-limiting, the most serious complication is its teratogenicity. It causes congenital rubella syndrome (CRS), which typically presents with congenital eye defects, congenital heart diseases, deafness or central nervous system defects.

With the availability of live attenuated vaccine, rubella has become uncommon in developed countries. Most countries practice routine rubella vaccination with the primary objective to prevent CRS.

There are two types of vaccine strategies practiced worldwide: universal (or childhood) and selective. Universal vaccination strategy involves routine rubella vaccination of young children while selective vaccination strategy involves rubella vaccination of young women who are at risk and/or schoolgirls (teenagers).

Malaysia adopted the selective vaccination strategy in 1987 where schoolgirls are vaccinated at the age of 12

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years, using a monovalent rubella vaccine. In 2002, Malaysia has added a trivalent vaccine into her Expanded Programme on Immunisation (EPI), thus adopting both vaccination strategies.

Despite having a good EPI with regard to vaccine coverage and public support, congenital rubella syndrome continues to be seen in major hospitals in the country. Eighteen cases were reported from 1993 to 1998 in a teaching hospital in Kuala Lumpur. Other bigger general hospitals are believed to have a larger number of CRS cases [1].

This will cast doubt on the effectiveness of rubella vaccination programme in Malaysia.

This study aims to determine the seroprevalence of rubella in the general population by determining the presence of rubella IgG. Pregnant women attending antenatal clinics were selected because the rubella IgG test is routinely done on them.

Objective

The objective is to determine the prevalence of rubella immunity status among pregnant women attending antenatal clinics in Hospital Universiti Kebangsaan Malaysia in Kuala Lumpur, Malaysia.

Materials and Methods

The hospital database on rubella immunity among pregnant women attending antenatal clinics was assessed retrospectively from August 2001 to June 2002. Rubella IgG test was routinely done on these women. This test was done using an enzyme immunoassay method.

Interviews were also conducted on pregnant women attending antenatal clinics in July 2002. A past history of rubella vaccination was specifically asked for to ascertain that rubella vaccination had been given to the interviewee. Rubella IgG test (EIAgen Rubella IgG, Italy) was done in the usual manner. The protective antibody level was taken as 15 IU/ml or greater.

Results

A total of 414 women were included, of whom 134 women were interviewed. The rubella immunity in this population was 92.3%. The breakdown according to age group is shown in Table I.

The interviewed women were divided in three groups according to past history of rubella vaccination (Figure 1). The majority of the women had received vaccination (Group 1). Six percent did not have detectable rubella antibody. In women with no history of rubella vaccination (Group 2), 90.7% had detectable antibody. The antibody levels of immune women in Group 2 are statistically significantly higher than immune women in Group 1.

Table I: Risk factors associated with ureteric perforation

Age group (in years)	No. of patients	Immune to rubella
15 – 26	177	92.7%
27 – 34	183	92.9%
35 – 45	54	88.9%
All	414	92.3%

Table II: Rubella seroprevalence studies in Malaysia

Year	Target group	Percentage	Reference
1972	Women of childbearing age	59.6%	[3]
1976	Women of childbearing age	64%	[4]
1989	Nursing staff	65%	[5]
2002	Pregnant women attending antenatal clinic (current study)	92.3%	-

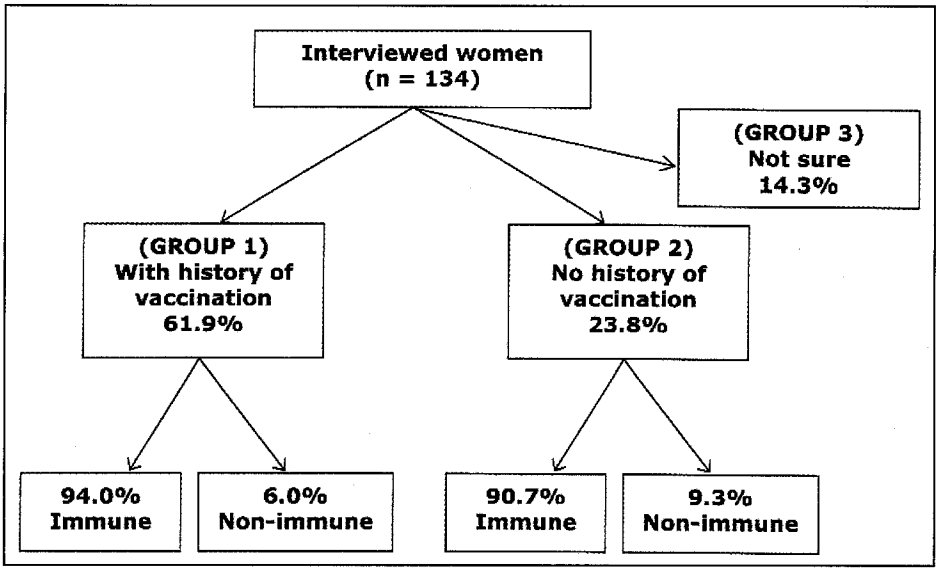

Fig. 1: Rubella immunity of interviewed women

Discussion

A study in 1997 reported about 9% of developing countries adopted the selective vaccination strategy, 31% adopted the universal strategy and the remaining 60% adopted both strategies [2].

Malaysia adopted the selective vaccination strategy in 1987, which immunised schoolgirls. Apart from that, mass campaigns on rubella vaccination was also organised. This involved females between 12 to 44 years at numerous places such as health clinics, factories, offices, markets and shopping malls [2]. In 2002, the universal strategy was incorporated into the Malaysia's Expanded Programme of Immunisation (EPI). Nevertheless, prior to 2002, there were also unscheduled vaccinations of other women of childbearing age as well as vaccination of young children (using the trivalent vaccine, mumps-measles-rubella vaccine) especially in the private healthcare settings.

Previous rubella seroprevalence studies done in Malaysia during the pre-vaccination period showed relatively low levels of rubella immunity among the selected age groups (Table II).

The current prevalence indicates tremendous improvement in rubella seropositivity, which can be attributed to the successful implementation of rubella vaccination programme in Malaysia.

The 15 – 26 age group represented those women who have undergone routine rubella vaccination, and has a very high rubella seropositivity (92.7%). The 27 – 34 age group and the 35 – 45 age group represent those who did not fall under the routine rubella vaccination programme. Women who are seropositive in these age groups acquired rubella antibodies either by natural infection or unscheduled vaccination. Therefore, a history of vaccination is important to differentiate between the two possibilities.

A total number of 134 women were interviewed for any past history of rubella vaccination. Two interesting findings were obtained.

In Group 1 (those with history of vaccination), 6% were seronegative for rubella. This may indicate the possibility of vaccine failure, or waning rubella antibody. With seroconversion upon vaccination approaching 100%, vaccine failure is considered to be not common. Therefore, waning antibody is more likely. Vaccine-induced antibody is assumed to provide lifelong protection. Although the antibody level may decline with time, data from surveillance of rubella and CRS suggest that waning immunity does not lead to increased susceptibility to rubella[6].

In Group 2 (no history of vaccination), 90.7% were immune to rubella. This strongly indicates a high percentage of women who attained natural rubella infection. The fact that antibody levels of immune

women in this group were significantly higher than that of Group 1 strengthens this possibility. About 9% of the women are still susceptible to rubella.

The adaptation of different types of rubella vaccination strategies into national policies differs between countries. Factors to be considered include percentage of susceptibility in women of childbearing age, burden of CRS, infrastructure and resources for child and adult immunisation programmes and other disease priorities[7].

Malaysia's early response to minimise the impact of CRS was to implement selective rubella vaccination (including campaign of mass vaccination of women of childbearing age). This has provided immediate protection against rubella to the vaccinees. However, this strategy has less impact on rubella transmission, as a significant proportion of the population remains susceptible. With the later introduction of universal strategy, the impact of CRS could be further minimised. The implementation of universal strategy alone is not recommended as the average age for rubella infection would increase and eventually gives rise to more CRS cases. In the longer term, this combined strategy can eliminate rubella provided high vaccination coverage is maintained for each target group. To further minimise the impact of rubella, vaccination of the male population is recommended[7].

It is still premature to evaluate the impact of CRS, as the combined strategy has only been recently implemented. It is essential for Malaysia to continue this programme. It is very important that high vaccine coverage be attained and sustained. The coverage should be monitored closely. The inclusion of rubella immunisation into the EPI should hasten the implementation. For schoolgirls, this requires the corporation of school health authorities and the Ministry of Education. It would be more difficult to monitor vaccine coverage to women of childbearing age. This will require proper guidelines and record keeping at all antenatal clinics or general practitioner clinics with antenatal services.

Both clinical surveillance of CRS and rubella as well as seroprevalence of susceptibility are important. Strengthening of laboratory and epidemiological capacity for rubella investigation, as part of EPI surveillance of illnesses with rash is strongly recommended[2]. Continuous seroprevalence is useful to monitor the effect of the programme on susceptibility in different age groups, particularly among women of childbearing age. The simplest method is to monitor women attending antenatal clinics. Ideally, this should be combined with rubella vaccination for seronegative women.

This study has several limitations. The studied population does not reflect the seroprevalence for the whole country. The population in rural areas should be included in order to reflect a truer picture.

Conclusion

Rubella vaccination programme in Malaysia has so far considered successful, as this study has shown high seropositivity among the target groups. While congenital rubella syndrome cases continued to be seen, it means Malaysia must remain vigilant. High vaccine coverage among target groups should be maintained at all time.

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