AN OUTBREAK OF RUBELLA AMONG MALAYSIAN AIR FORCE RECRUITS, 1979

V. SUPRAMANIAM[1]

DORA S. K. TAN[2]

INTRODUCTION

Outbreaks of disease in military recruits is a common occurrence due to the accumulation and close community living in barracks of many susceptible recruits. In the Malaysian armed forces, outbreaks of measles, mumps, rubella, acute respiratory diseases, conjunctivities and typhoid have been documented (Malaysian Armed Forces, 1973, 1974). This paper describes an outbreak of rubella among Royal Malaysian Air Force (RMAF) recruits at the RMAF School and suggests recommendations for the protection of hospital staff and patients against the infection.

BACKGROUND

The RMAF School at Kinrara, Selangor, conducts regular training for recruits of the Air Force. The affected batch of recruits totalling 495 underwent training from 5 June to the end of October 1979. All the recruits were males made up of Malays, Chinese and Indians from both urban and rural areas of Malaysia and were aged between 18 to 24 years. They were housed in barracks. The Kinrara Military Hospital, located next door, provided medical care for the recruits as well as personnel belonging to the School. No routine immunization against rubella was performed for the military personnel or the hospital staff.

PATIENTS AND METHODS

A total of 86 recruits suffering from fever with rash, some with lymphadenopathy, was examined at the Kinrara Hospital from mid-July to mid-September 1979.

Paired (acute and convalescent) sera of 18 of these recruits were sent to the Institute for Medical Research (IMR) for confirmation of rubella. Rubella Haemagglutinins were estimated using antigens purchased from Behringweke AG. The sera were treated by manganous chloride-heparin for the removal of non-specific inhibitors (Cooper *et al.*, 1969). A 4-fold or greater rise in antibody titre in the paired sera was the criterion for positivity.

1. W. Tetirry Director of Medical Services (Health) Medical Directorate, Ministry of Defence, Kuala Lumpur.

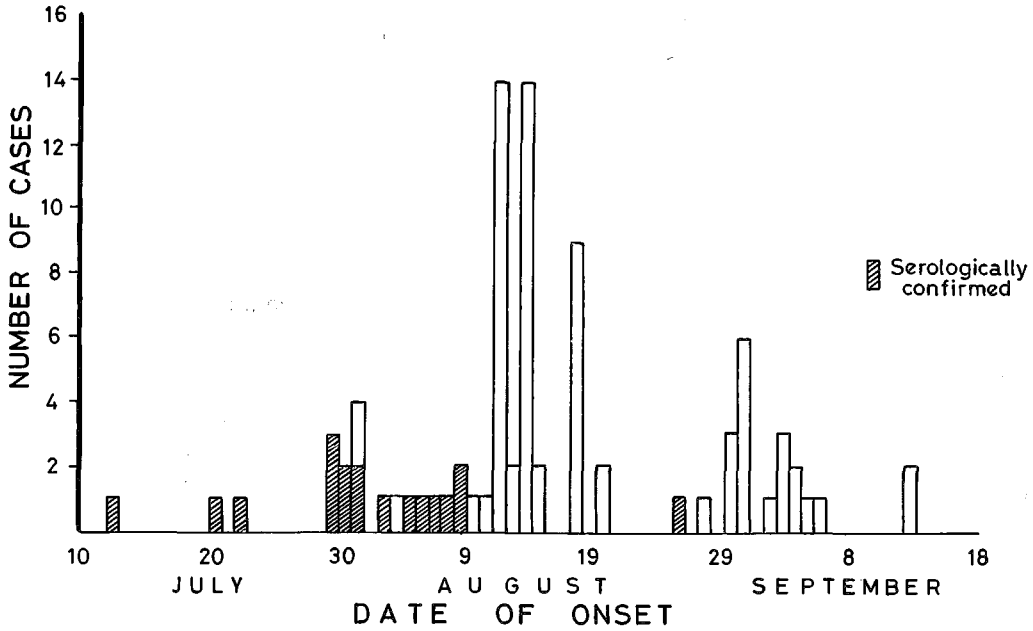
2. Senior Virus in Research Officer, Institute for Medical Research, K.L.

RESULTS

All the 18 cases investigated for rubella by serology at the IMR, showed evidence of rubella infection (Figure). It was therefore assumed that the other clinically similar cases were also rubella. All the positive cases were recruits. None of the regular service personnel serving in the School or the Kinrara Hospital were affected.

The first case was seen on 12 July 1979 and two subsequent cases, on 20 and 22 July, 8 and 9 days later respectively. This interval was shorter than the minimum incubation period of 14 days (Benenson, 1975). The three initial cases probably caught the infection outside the RMAF School. At that time, there was already a small outbreak among the Royal Military College (RMC) boys and it was very likely that these three cases acquired the infection at the Outpatient Department of the Kinrara Hospital where intermingling with patients from the RMC took place. The outbreak peaked in mid-August and again in late August with the last case seen on 12 September 1979. There were no serious complications. Management consisted of isolation and symptomatic treatment.

The overall clinical attack rate was 17.4 per 100 population of recruits; 24.1% for Chinese, 18.0% for Malays, and 11.1% for Indians. It has been estimated that in outbreaks of rubella, subclinical infections are 2 to 6.5 times that of the clinically reported cases (Lehane *et al.*, 1970). Using the more conservative figure, the incidence of rubella (clinical and sub-clinical) was estimated to be 52% in this outbreak.



FIGURE

RUBELLA IN RMAF RECRUITS BY DATE OF ONSET OF SYMPTOMS 12th JULY TO 12th SEPTEMBER 1979.

DISCUSSION

Although rubella is one of the milder viral exanthems with few, if any, complications its teratogenicity in the early months of pregnancy is well known. As the recruits affected in this outbreak were all males, the question of congenital rubella syndrome did not arise except in connection with the risk of infecting female members of their family and female hospital staff. Transmission of the disease from hospital personnel to patients and vice versa has been documented (McLaughlin 1979; CDC 1977). The only effective way to prevent such spread is by immunizing susceptible hospital staff prior to their employment (US. PHS, 1978). Complications of immunization are minimal and are not likely to disrupt the hospital services in terms of staff absentism (CDC. 1979).

In Malaysia, only about 60% of women of childbearing age have been found positive for rubella antibody (Lam, 1972; Tan *et al,* 1976). These figures are low compared with reports from many western countries. Antibodies have been found in 80% or more of adult women in Europe, the United Kingdom, the United States, Australia and Canada, as well as in Singapore and some South American states (Rawls *et al,* 1967); Dowdle *at al,* (1970). Much lower rates were found in the rural areas of Japan, Trinidad, Jamaica, Panama and rural Peru and Hawaii (Sever *et al,* 1965) and Thailand (Thongcharoen *et al,* 1970). The casual factors suggested for the lower levels of infection in these countries were lower density population and geographical isolation (which, however, do not apply to Bangkok or Kuala Lumpur), and the tropical climate which tends to make respiratory spread of the heat-labile rubella virus more difficult.

Contrary to expectations, populations with low frequency rubella antibody are no more susceptible to rubella outbreaks than those with immunity levels of 80% and above. For example, although an outbreak of rubella occurred in Singapore during the period November 1969 to July 1970 (Tan *et al.* 1970), Malaysia, which is linked to Singapore by a ¾-mile causeway through which free intermingling of people from the two countries occurs, was unaffected. In Japan, rubella immunity levels are also low and although extensive epidemics have been observed since the spring of 1965, the incidence of congenital rubella syndrome has been extremely low. Kono *et al.* (1965) attributed this to infection by strains of rubella virus which are antigenically different from those occurring in the U.S. and which

have been found to be less virulent also for rabbits. However, this observation has yet to be confirmed by other workers. The importance of rubella as a cause of congenital anomalies in Malaysia is currently being investigated in phase II of the TORCHES Programme (Tan *et al.*, 1976).

The outbreak in this study was confined to the recruits and did not spread to the regular service personnel in the area or to the neighbouring civilian community. This seems to support the observation that the potential of the rubella virus to spread in the tropics is limited compared to that in temperate countries. The overall clinical attack rate in this outbreak of 17.4 per 100 recruit population was significant higher than that recorded in the 1972 outbreak in military recruits among marine students of the Naval Air Station in Tennessee, U.S.A. (C.D.C., 1972) which was 12.8% ($p < 0.01$) and in the 1966 outbreak among military recruits at the Naval Training Centre in Greece (Papaevangelou *et al.*, 1969) which was 4.3% ($p < 0.001$). The clinical attack rates for the three racial groups in this study are not significantly different from one another although the serological surveys by Lam (1972) and Tan *et al.* (1976) indicated higher antibody prevalence rates in the Chinese than in the other races.

Schoenbaum *et al.* (1976) showed that the U.S. immunisation programme for rubella was cost-effective, and the Malaysian Medical Association Council (1980) recommends the introduction of rubella mass vaccination for Malaysian girls at the age of menarche. However, more information on the epidemiology of rubella and the congenital rubella syndrome is required before a nation-wide mass immunisation programme against rubella is recommended. Populations at special risk e.g. those working in hospitals and clinics including male staff should, however, be immunised without further delay (McLaughlin, 1979). The rubella vaccine is twice as expensive as the measles vaccine (about M$1.00 per head of vaccinee at concession rate), and as the priority of the measles vaccination campaign is higher in this country where malnutrition still exists in rural areas (Chen, 1979), immunisation against rubella may be left to the individual for the moment.

ACKNOWLEDGEMENTS

The authors thank Brigadier-General D.A. Lopes, Director of Medical Services Ministry of Defence; and Dr. G.F. De Witt, Director of the Institute for Medical Research, Kuala Lumpur, for their kind permission to publish this paper. Our thanks also go to Lt. Col. (Dr) G. Mammen, ex-Co, 3 Field Ambulance, for permission to carry out this study in the Kinrara Hospital.

REFERENCES

Benenson A S (ed.): *Control of Communicable Diseases in Man, Washington D C:* The American Public Health Association, 1975, p. 274.

Center for Disease Control (1977) – Rubella outbreak among marine students, Naval Air Station, Tennessee. *Morbidity and Mortality Weekly Report* **26**: 352.

Center for Disease Control (1979) – Rubella in hospital personnel and patients – Colorado. *Morbidity and Mortality Weekly Report* **28**: 325-327.

Chen S T (1979) – Measles in Peninsular Malaysia. *Med J Malaysia,* **34**, 18-23.

Dowdle W R, Ferreira W, De Salles Gomes L F and King D *et al.* (1970) – WHO collaborative study on sero-epidemiology of rubella in Caribbean and Middle and South American populations in 1968. *Bull Wld Hlth Org.* **42** 419-422.

Lam S K (1972) – The sero-epidemiology of rubella in Kuala Lumpur, West Malaysia. *Bull Wld Hlth Org,* **47**: 127-129.

Lehane D E, Newberg N R, Beam W E (1970) – Evaluation of rubella herd immunity during an epidemic. JAMA, **213**: 2236-2239.

McLaughlin M C & Gold L H (1979) – The New York rubella incident: A case for changing hospital policy regarding rubella testing and immunisation. *Am J Pub Hlth,* **69**: 287-289.

Malaysian Armed Forces Annual Health Report, 1973

Malaysian Armed Forces Annual Health Report, 1974

Malaysian Medical Association, Committee of Council (1980) – The future of Health Services in Malaysia, p. 73

Papaevangelou G, Mendris J and Kyriakidou A (1969). Rubella epidemic in a Naval Training Centre. *Am J Epidemiol.* **89**: 665-668.

Rawls W E, Melnick J L, Bradstreet C M P, Bailey M et al. (1967) – WHO Collaborative study on the sero-epidemiology of rubella. *Bull. Wld Hlth* Org, **37**, 79-88.

Schoembaum S C, Hyde J N, Bartoshesky L, Crampton K (1976) – Benefit-cost analysis of rubella vaccination policy. *N Engl J Med,* **294**: 306-310.

Sever J L, Fabiyi A, McCallin P H, Chu P T *et al.* (1965) – Rubella anti-body among pregnant women in Hawaii. *Am J Obstet Gynecol,* **92**, 1006-1008.

Tan Dora S K, Cheah W, Sukumaran K D, Stern H (1976) – The TORCHES (congenital diseases) Programme – 1. In women of child-bearing age. *Singapore Med J,* **17**: 207-210.

Thongcharoen P (1970) – Rubella antibody in the female population of Bangkok and Dhonburi. *Far East Med J* **6**: 285

U S Public Health Service Advisory Committee (1978) – Immunization practices: Rubella vaccine. *Morbidity and Mortality Weekly Report,* **27**, 451-454, 459.