ORIGINAL ARTICLE

RUBELLA AND SCARLET FEVER OUTBREAK AMONG TRAINEES AT A TRAINING CAMP IN MERSING, JOHOR

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ABSTRACT

Rubella is an acute and contagious disease which is mainly characterized by fever, rash, and cervical lymphadenopathy. This contagious disease spreads easily through nasopharyngeal secretions, droplet or direct contact with patients. Meanwhile clinical features of scarlet fever include a sore throat, skin rash and strawberry tongue. A descriptive study was conducted to describe the epidemiological characteristic of diseases at a Training Camp in Mersing. Data obtained on demographic details, onset and time of fever and rash or contact with ill person 14 to 21 days prior to symptoms. Screening and interview conducted for all suspected cases of Rubella. 47.4% of the cases presented on 5th June 2012 followed by 15.8% on 11th June 2012 and 13.5% on 12th June 2012. Maculo papular rash was the predominant presenting symptom among students with acute infection in this outbreak (100%) followed by fever (36.8%). Measles specific IgM was not detected in the serum taken but rubella specific IgM was detected in 66.7% (6/19) of samples. 55% (11/20) were positive for ASOT. 4 trainees had Rubella and Scarlet Fever co-infection. It was found out that the outbreak occurred among 391 residents in the camp who shared common places for activities such as lecture, physical activity and meal. Rapid dissemination was due to overcrowded environment and close contact during common activities of the residents. Theoretically co-infection would be presented with severe clinical symptoms but not in this outbreak where all affected trainees only presented with mild fever and rashes.

Keywords: rubella, scarlet fever, outbreak, national service trainee.

INTRODUCTION

Rubella is an acute and contagious disease which is mainly characterized by fever, rash, and cervical lymphadenopathy. It spreads easily by nasopharyngeal secretions and droplets of infected people or direct contact with patients[1]. Meanwhile Scarlet fever is one of the most common infections caused by group A streptococci in school children. Clinical features of scarlet fever include a sore throat, skin rash and strawberry tongue. The prevalence rates of scarlet fever as normal asymptomatic inhabitants of the nasopharynx can vary from 15-20%. The Ministry of Health has introduced Rubella immunization program in Malaysia which was started in 1987. The vaccine given to all females aged 15 years old throughout the country.

Rubella outbreaks had been reported few times since 2008 in Johor State. Since 2008 there were about six reported outbreaks. Two outbreaks occurred in 2008, involving 81 cases at Training Camp A in which 18 cases were positive for Rubella IgM but negative for Scarlet Fever, and three cases of rubella at a Secondary School A in Mersing. In 2009 similar cases occurred at another Training Camp B in Muar involving 100 cases where 26 cases were detected positive for Rubella IgM. In 2010 similar outbreak occurred at Training Camp B in Mersing but only 5 cases isolated. In the same year, 4 cases detected at Secondary School B in Kota Tinggi. In 2011 Rubella outbreak occurred at Secondary School C in Batu Pahat where 4 cases where detected[2,3]

On 6th of June 2012, the Mersing District Health Office was notified by assistant medical officer in charge of measles / rubella outbreak had occurred among participants in a training camp in Mersing . Many trainees presented with fever and rash. This camp is located nine km from Mersing Town along the South China Sea.

This camp was operated since 2009 with three sessions of training per year. The current session involved 329 trainees, 37 trainers and 25 general workers.

A Medical and Health Officer and an Assistant Environmental Health Officer were mobilized to investigate the possible outbreak immediately after receiving a notification from the camp's commandant. An investigation was conducted to confirm the occurrence of outbreak, to identify risk factors and to formulate recommendations to control the outbreak. The objectives were to describe the epidemiological characteristics of the outbreak, to assess the extent of the outbreak and to initiate appropriate control measures.

METHODOLOGY

A case of measles / rubella was defined as a person who had rash and/or fever starting form 1st June 2012 at a national training camp in Mersing. Screening of the entire residents in the camp was done with the cooperation of medical team at the training camp. Trainees who fulfilled the case definition was identified and isolated for further evaluation. A total of 63 cases were presented with fever and/or rashes consisting 48 males and 15 females. The working diagnosis at that point of time was measles / rubella. All suspected cases were interviewed and examined for signs and complications of the illness. Information's obtained were demographic details, onset and time of fever and rash and history of contact with ill person 14 to 21 days prior to the illness. Finally, an outbreak was declared on the same day after all data were reviewed. Index case was identified as a male trainee who came back from Malacca a week earlier during camp break from 30th May - 3rd Jun 2012. The onset of the illness was on 1st June 2012 where he presented with fever and rashes. He sought treatment at one of the private clinic in Malacca. He came back to the camp on 4th June 2012 and stayed in Dorm A1.

It was found that the outbreak occurred among 391 residents in the Camp of the session who shared common places for activities such as lecture, physical activity and meal. The exposure easily disseminated because of the overcrowded environment and close contact during common activities of the trainees[4]. Another possible exposure could be due to a weekend visit by family members which is allowed by camp rules. Several general workers and trainers who were staying outside the camp and the camp food supplier, who entered the camp twice a week could also be the possible source.

During investigation, blood samples and throat swab samples were randomly collected from trainees who fulfilled the case definition[5]. All specimens were sent to National Public Health Laboratory Sungai Buloh for measles/rubella serology testing. The reported result on 11th June 2012 was all negative for measles and rubella. Following the negative result, investigating teams began to look for a differential diagnosis of rashes[6]. Second blood samples for measles, rubella, scarlet fever and Epstein Barr Virus (EBV) were suggested. Nineteen blood and urine samples were taken for serology. Twenty samples for *Anti-Streptococcal Antibody Titres* (ASOT) sent to Hospital Sultanah Aminah Johor Bharu. Full Blood Count (FBC) and Erythrocyte Sedimentation Rate (ESR) were also collected for baseline investigation of EBV.

Appropriate control measures were taken. All suspected cases were put under quarantine[5]. All buildings in the camp were disinfected with Lysol and Dettol[7]. Health educations were given to all trainees and staffs in the camp especially on the usage of Personal Protective Equipment (PPE) such as face mask, glove

and proper hand washing. Hand sanitizer, surgical mask and glove were given to food handlers and cleaners. Pregnant staffs were isolated from cases and referred to the Medical Officer for further assessment[8]. All collected data were analyzed using Statistical Package for Social Science (SPSS) software version 19.0 and Epi Info 7.0.

RESULTS

This study found that 47.4% (63) of the onset illness presented on 5th June 2012 followed by 15.8% (21) on 11th June 2012 and 13.5% (18) on 12th June 2012 as shown in Figure 1. Only about 9.8% (13) presented on 8th June 2012 and 5.3% (7) on 18th June 2012. Table 1 shows that maculo-papular rash was the predominant presenting symptom among all 133 cases in this outbreak (100.0%) followed by fever 49 (36.8%). Other presenting symptoms were rhinorrhea 31 (23.3%), cough 20 (15%), headache 19 (14.3%), sore throat 15 (11.3%) and conjunctivitis 14(10.5%).

Table 1: Presenting symptoms among infected trainees (n=133)

Symptoms	Frequency n(%)
Rashes	133 (100)
Fever	49 (36.8)
Rhinorrhea	31 (23.3)
Cough	20 (15.0)
Headache	19 (14.3)
Sore throat	15 (11.3)
Conjunctivitis	14 (10.5)

All nine samples which were taken on the second day (6th June 2012) of outbreak were negative. Twenty repeat blood samples were taken from the trainees on 14th June 2012 who reported a history of rashes. Measles specific IgM was not detected. However, Rubella specific IgM were detected in 31.6% (6/19) of the cases. Surprisingly about 55% (11/20) were positive for ASOT (Table 2). Even though sore throat is one of symptom for scarlet fever, only one out of eleven who revealed positive for ASOT complained of sore throat. Four cases had Rubella and Scarlet Fever co- infection. Only one of them was female.

Among exposed trainees, the analysis showed that male trainees were more potential to be infected by the illness, RR=1.45 (95% CI= 1.05 – 2.05), $p < 0.017$ and this figure supported by the laboratory confirmation where 50% of male samples were positive for Rubella IgM and only 10% for female samples. A baseline result for EBV blood investigation Full Blood Count and ESR showed no significant findings.

Table 2. Laboratory result details of cases (repeat samples)

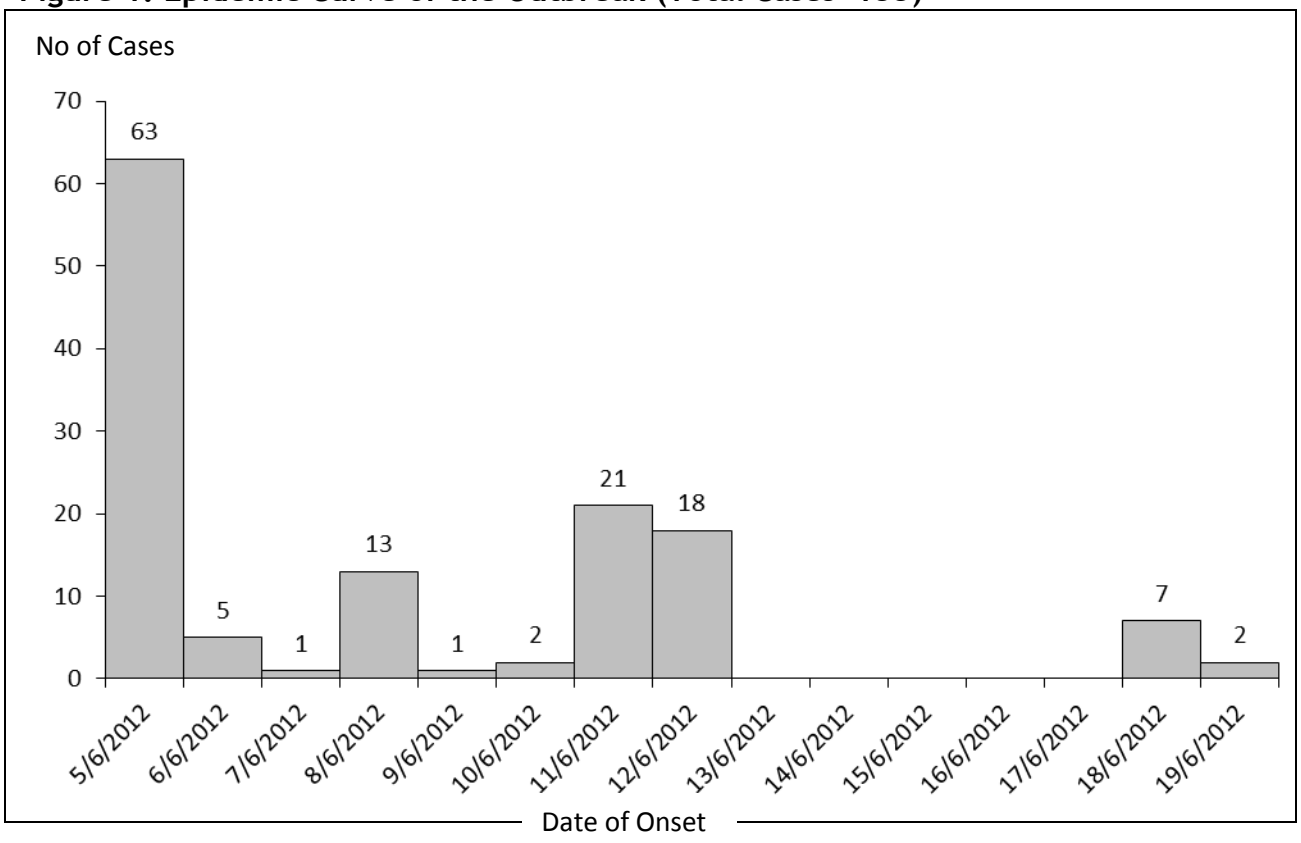
No	Name	Measles IgM	Rubella IgM	ASOT
1	DYHQ	Negative	Negative	Negative
2	FSB	Negative	Negative	Negative
3	AAA	Negative	Negative	Negative
4	MSMS	Negative	Negative	**Positive**
5	NSMJ	Negative	Negative	Negative
6	NFMF	Negative	Negative	Negative
7	AA	Negative	**Positive**	**Positive**
8	KB	Negative	**Positive**	Negative
9	MZK	Negative	**Positive**	**Positive**
10	MNAR	Negative	Negative	**Positive**
11	FSBB	Negative	Negative	Negative
12	MNJJ	Negative	Negative	**Positive**
13	NM	Negative	Negative	**Positive**
14	FZA	Negative	Negative	**Positive**
15	NDA	Negative	**Positive**	**Positive**
16	SKMI	Negative	Negative	Negative
17	NSJ	Negative	Negative	**Positive**
18	MZM	Negative	**Positive**	**Positive**
19	LWB	Negative	**Positive**	Negative
20	CCB	ND	ND	**Positive**

DISCUSSION

A female trainee with positive Rubella IgM was further investigated. She was from town A Malacca. On further questioning, she received Rubella vaccination during standard 6 at a primary school A in Malacca in year 2006. The School Health Team of the town A District Health Office was responsible for that particular vaccination. However, the status of other students who received the same batch vaccine were unable to be traced for further evaluation. A total of 12 students received the same batch of vaccine at the same time and date. (Batch number: Eu 347 expired 2/2007)[9]. In this outbreak, the vaccine's potency could not be verified in this situation. Although all female trainees already had vaccination but individual resistant could not be ruled out.

Despite appropriate control measures conducted during the outbreak, the number of cases increased from 63 cases on the 6th June to 124 cases on 13th June 2012. This dissemination of cases could be contributed by various factors including: (i) suspected cases were not strictly quarantine; (ii) notice for quarantine was not displayed; (iii) suspected trainers were mixed with all other residents during meal times and (iv) suspected trainers and other residents used one public telephone as they were not allowed use their own mobile phone.

Figure 1: Epidemic Curve of the Outbreak (Total Cases=133)



Since the number of cases kept increasing, the outbreak was monitored closely by an assigned Assistant Environment Health Officer. This was to make sure residents strictly followed the health authority's order until the outbreak is declared over. Affected trainees were discharged from the quarantine 5 days after they were completely resolved from the illness based on period of communicability. Then, although the cases were kept increasing but the trend was become slower[10]. Total cumulative cases detected from 6th till 20th June 2012 were 133 and no new cases were detected later on until the outbreak was declared over on 31st July 2012.

Prevalence rates of group A streptococci as normal asymptomatic inhabitants of the nasopharynx can vary from 15-20%. Prompt treatment by antibiotics is known to inhibit the antibody response[11]. In addition, the degree of inhibition appears to be related to the successful elimination of the organism by therapy. In this study, 11 of trainees had positive ASOT with immediately treated with antibiotic (Oral Penicillin 500 mg QID for 1 week)[12]. All affected trainees had rashes but not all of them had fever and sore throat. Theoretically when co-infection between virus and bacteria occurred, clinical symptoms might present very severe but however in this outbreak, most of them had mild symptoms. The team decided to treat positive ASOT result and gave symptomatic treatment to others. Trainees with positive ASOT who received antibiotic were referred to nearest clinic for further follow-up.

CONCLUSION

Rubella outbreak can easily occurred in the closed environment especially in training camps. The spread of this contagious disease can be easily controlled with a good monitoring and notification system. It is recommended

that all staffs especially the commandant and medical staffs to immediately notify any potential outbreak to the nearest District Health Office to make sure control measures can be carried out as soon as possible. The management of the training camp is also required to identify and designate a special room/block as a quarantine place for future outbreak if it does happen again.

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