International Journal of Community Medicine and Public Health
Al-Abdullah NA. Int J Community Med Public Health. 2018 Jul;5(7):2657-2660
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20182420

Original Research Article

Measles outbreak amongst Manymar population of Jeddah City, Saudi Arabia

Nabeela Abdullah Al-Abdullah*

Department of Public Health, College of Nursing, King Abdulaziz University, Jeddah, Saudi Arabia

Received: 11 May 2018
Revised: 28 May 2018
Accepted: 29 May 2018

***Correspondence:**
Dr. Nabeela Abdullah Al-Abdullah,
E-mail: nabdullah@kau.edu.sa

ABSTRACT

Background: Worldwide efforts for measles elimination are made possible due to the availability of a highly effective measles vaccine. In spite of a highly vaccinated population, an outbreak of measles has occurred in Jeddah province of Saudi Arabia, from January to February 2018.
Methods: An outbreak investigation was conducted to describe the epidemiology of the outbreak. A performance audit of the control measures taken by the primary healthcare team was carried out in accordance with the World Health Organization (WHO) standards.
Results: Of the 31 cases reported, the patient's ages range from 1–9 years with an average age of 6 (±2) years. The index case was a 9 year old male. The performance indicator target for outbreak control measures was achieved. Ninety percent of the cases were investigated within 48 hours. Specimens such as serum blood and nasopharyngeal swabs were collected within the optimal period to test for measles IgG and IgM antibody.
Conclusions: This outbreak demonstrates the increased susceptibility of unvaccinated children aged 6–11 months. To prevent possible future outbreaks, community awareness through educational campaigns, a review of children's vaccination records, enhanced community surveillance and a measles 'catch-up' mass immunization campaign to interrupt chains of transmission are necessary.

Keywords: Epidemiology, Measles, Outbreak, Vaccination, Jeddah

INTRODUCTION

Measles is a highly contagious, endemic childhood disease. Untreated, morbidity and mortality are high, often in epidemics over a 2-3 year cycle.[1] The Saudi Healthcare System (SHS) has made vaccination mandatory for birth certification. These arrangements have been effective and reduced the incidence of disease with one study noting a reduction in cases from 46,115 to less than 1,000 per year in 2001.[2] Starting in 1974, the Saudi Arabia Ministry of Health (MOH), with support from the World Health Organization (WHO), established a mandatory immunization program for all the susceptible population which led to a decrease in the number of outbreaks among children. Measles vaccination using the combined MMR vaccine is currently offered free of charge with two doses of MMR starting at 1 year with the second dose at preschool age.[3] Today, very few adult cases are reported, which speaks to the success of the Saudi immunization program and surveillance system.

The Saudi Arabia MOH established a surveillance system to identify cases rapidly, especially for those target groups who had not been vaccinated before the immunization program, which included those who were children at that time, between years 1998-2000. The

measles elimination program was successful with few adult cases being reported. Between 1st January to 28th February 2018 an increased number of measles cases came to King Abdulaziz University Hospital (KAUH) at Jeddah city and the 31 cases were children from one area in Jeddah known as the "Kilo14" district, which was inhabited by a population of about fifteen thousand refugees from Myanmar. The hospital conducted an outbreak investigation to describe the epidemiology of the outbreak. All cases were reported to the MOH as measles cases. The infection prevention and control unit at KAUH traced all cases, interviewed the parents, and asked questions to identify risk factors and the index case. We found the environment and district crowded by people from Myanmar with congested houses, children mingling and playing on the street, family and neighbors living close together and frequently visiting each other.

METHODS

Jeddah is located in the western part of the center of the Kingdom of Saudi Arabia. KAUH is a tertiary care hospital located in the southeast of Jeddah city with an 845-bed capacity serving all nationalities. The Infection Control Unit received notification of the first case on 1st of January 2018 followed by receiving more cases aged between 1-9 years old. All cases were investigated using the MOH notifiable measles standard which is based on the WHO definitions. Two sets of serum blood were extracted from the patient within the defined period of 24 hours from admission, one set was sent to the hospital's laboratory while the second set was sent to the MOH regional laboratory. The epidemiologist of the Infection Control Unit collected information such as patient's name, place of residence, age, gender, date of symptoms, onset date of the rash, vaccination status, and other epidemiological linkages to known cases. Vaccination information was taken from the patient's medical history or immunization card, if available.

In response to the increased number of cases, the hospital infection control team reported to the MOH through the Healthcare Electronic Surveillance Network (HESN), which is the MOH electronic surveillance system, to which they responded right away. Outbreak control measures included isolation of cases in a single room with negative air pressure, use of high filtration N-95 masks by healthcare providers, disease awareness and family education. Susceptible contacts were required to take measles vaccination in the nearest primary healthcare center and those who had been in contact with confirmed cases were advised to enter isolation.

Clinical symptoms and laboratory criteria based on the WHO case definitions and standards were followed. The clinical criteria for measles during the prodromal period are: fever, and cough or coryza (runny nose) or conjunctivitis (red eyes), followed by the appearance of maculopapular rash (i.e. non-vesicular rash), that usually starts from the head and progresses to the toes. On the other hand, the laboratory criteria for measles surveillance case confirmation are: measles immunoglobulin M (IgM) antibody detection or measles virus isolation or measles viral ribonucleic acid (RNA) detection by reverse transcription- (RT)-PCR or a significant rise in measles immunoglobulin G (IgG) antibody in paired sera.[4]

Statistical analysis

Data collected were analyzed using the SPSS (version 22) program. The epidemiology of the outbreak was described using the frequency of occurrence and stratified by age and gender.

RESULTS

Between 1st of January and 28th of February 2018, the 31 cases of measles were reported at KAUH. All cases have clinical symptoms and laboratory results were positive for measles viral ribonucleic acid (RNA) detection by reverse transcription- (RT)-PCR and a significant rise in measles immunoglobulin G (IgG) antibody in paired sera.

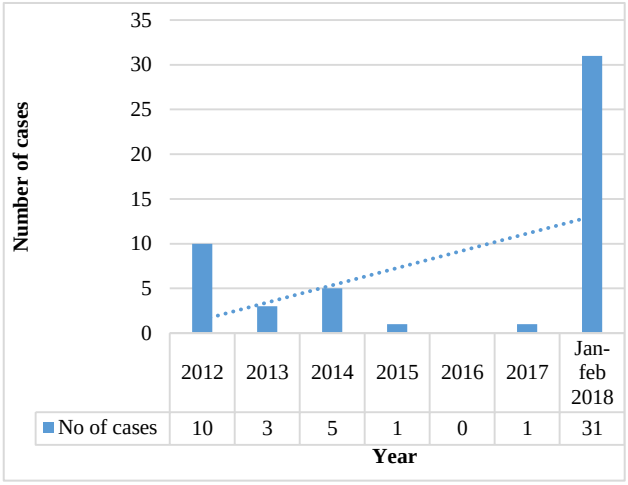

Figure 1: Number of measles cases by year at KAUH from 2012-February 2018.

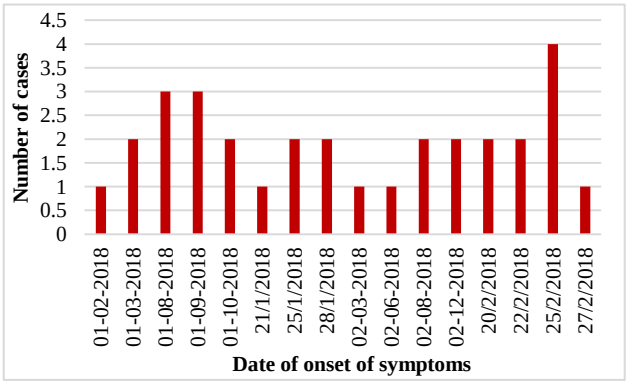

Figure 2: Number of measles cases from January-February 2018.

Figure 1 presents the number of measles cases reported to KAUH since 2012 with the number of cases increasing at the beginning of year 2018 (January - February). This figure indicated that a community outbreak was focussed among the Myanmar population.

Figure 2 shows that the community outbreak happened in January and February 2018 with the first case presented to our hospital on the third of January 2018. The patients ranged from 1 to 9 years with an average age of 6 (±2) years.

Figure 1 presents the outbreak curve for patients admitted to KAUH. The highest number of cases came at the end of February 2018 (Figure 2). 16 cases out of 31(52%) were male gender and 48% were female. 13 out of 31 cases (42%) were not vaccinated at all. All of the cases presented with fever, with rash 23 (74%), and with coryza 21 (68%) (as shown in Table 1). During the community outbreak, the 31 cases that came to KAUH had their serum samples tested for specific IgM, with all 31 cases testing positive.

Table 1: Characteristics of hospitalized measles cases.

Characteristics	Frequency (%) (N=31)
Gender	
Male	16 (52)
Female	15 (48)
Vaccine status	
Vaccinated single dose	10 (32)
Not vaccinated	13 (42)
Unknown	8 (26)
Symptoms (yes)	
Rash	23 (74)
Fever	31 (100)
Cough	11 (35)
Sore throat	21 (68)
Conjunctivitis	12 (39)
Coryza	21 (68)
Koplik's spot	16 (52)
Joint pain	14 (45)

The attack rate was 22%, which raised a preventive healthcare alarm about the vaccination status among the Myanmar population. Histories of epidemiological linkage were given by 50 families (60% of patients). All cases had a history of contact with a suspected measles case. The probable site of exposure was from the neighborhood and schools. No deaths were recorded but 50% of cases required hospitalization with one case admitted to ICU because of pneumoniae.

Evaluation of outbreak response

At the termination of the outbreak, an evaluation of the performance of the case investigation and control measures was implemented**.** The data regarding patient history and blood samples were available for the 31 cases. A response team from the MOH visited the district and conducted mass vaccination for all children and for those who were not immune. The analysis of 31 cases showed that 100% of laboratory test results were received within 24 hours from admission. Information could be traced for 333 cases in the community that had already been reported to the MOH by other hospital.

DISCUSSION

In 2011, a study of an outbreak in Tabuk, Saudi Arabia, employed case-based surveillance and found 242 suspected measles cases notified to the MOH with the highest proportion being among the Saudi population despite the country's active immunization program.[4] Contrary to this; the recent measles outbreak in Jeddah was within the Myanmar community. In relatively closed populations such as schools and cultural neighborhoods, e.g. Myanmar nationals, measles can be transmitted despite a high level of immunity. In this situation, an outbreak can only be sustained because of reported exposures.

Outbreak investigations are imperative for successful strategies for measles prevention as they help to understand patterns of measles virus transmission, who is susceptible, and in which settings the disease spreads, particularly in Jeddah city because of its location between the two holy places for Muslims. The Myanmar population has its own community school and area of settlement in Jeddah city. The primary prevention team recommended health education and promotions about the importance of vaccination. The mean age of cases in our study is lower than that reported in other studies.[5] The source of infection for infants could have been school-aged infected siblings as the mean age of cases is 6(±2) years. Schools were also the most common site of exposure to measles infection.[6]

The second possible source is infants with mothers and visiting neighbors, especially among the Myanmar population. Only one case had complications and was admitted to the Pediatric Intensive Care Unit (PICU). No deaths were reported due to measles in our study, which pointed to the rapid intervention and appropriate treatment of all cases. The control measures implemented during this outbreak included increasing the awareness of measles to those of Myanmar nationality. Further, the infection control unit circulated a case definition to all hospital department heads and staff, especially the Emergency Department (ED) and Pediatric Units. Enhanced surveillance of cases was through daily reporting of any case with acute fever and rash, immediate reports to the MOH, and the follow-up and immunization of contacts. Complete measles vaccination according to the Saudi Arabia immunization program now comprises two doses of MMR. Measles outbreaks have been reported from different regions of Saudi

Arabia. In 2007, Qassim city reported 230 cases, with more than one-third (38%) of patients aged 0-4 years.[7]

A study was conducted by McBrien et al on an outbreak of measles that occurred in Ireland between December 1999 and July 2000.[8] Of the 355 cases, the majority were in North Dublin, the catchment area of The Children's University Hospital (TCUH). This outbreak of measles posed a major challenge to the hospital and the community for the first half of 2000. The national MMR immunization rate before the outbreak was gravely suboptimal at 79%, whereas the rate in North Dublin, the catchment area of TCUH, was <70%. Three children died as a result of a vaccine-preventable illness. Measles outbreaks in areas with high coverage using a single-dose strategy have been reported in Sri Lanka and Romania.[9,10] It is mentioned in the literature that at least 95% coverage with two doses of measles vaccine will achieve sufficient population immunity (Herd immunity) to stop the transmission of the measles virus.

CONCLUSION

The immunization program in Saudi Arabia required a review of measles vaccination among the non-Saudi population. In order to control a measles outbreak, suspected cases must be reported immediately, an accurate diagnosis must be made, and outbreak response measures must be implemented promptly. Evaluation of the recent outbreak showed that it may be a result of decreased awareness of measles vaccination among the Myanmar inhabitants. KAUH followed the WHO standard in reporting cases within 24 hours to the MOH. We need to engage in a partnership with the community to improve the population's awareness of the signs and symptoms of measles- fever and rash and other potentially communicable and vaccine preventable diseases. We need a national initiative to conduct a campaign of measles awareness and vaccination targeting all children from 9 months to 15 years of age.

Recommendations

The recommendation was that this outbreak resulted from the Myanmar population not taking up MMR vaccination. This suggests that they could miss out on the polio vaccine which the WHO and Saudi Arabia MOH are very keen to give to all children aiming at zero cases of polio among children.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Centers for Disease, Measles outbreak--Washington, 1989: failure of delayed postexposure prophylaxis with vaccine. Morb Mortal Wkly Rep. 1990;39(36):617-9.
2. Kuroiwa C, Vongphrachanh P, Xayyavong P, Southalack K, Hashizume M, Nakamura S. Measles Epidemiology and Outbreak Investigation Using IgM Test in Laos. J Epidemiol. 2001;11(6):255-62.
3. Jahan S, Al Saigul AM, Abu Baker MA, Alataya AO, Hamed SA. Measles outbreak in Qassim, Saudi Arabia 2007: Epidemiology and Evaluation of Outbreak Response. J Public Health (Oxf). 2008;30(4):384-90.
4. Al-Arabi Al-Ghamdi AM. Al-Faraj MH, Ibrahim HM, Al Mamun M. Epidemiological analysis of notified measles cases and review of surveillance system during an outbreak in Tabuk, Saudi Arabia. Ann Epidemiol. 2011;21(4):262-71.
5. Rathi P, Narendra V, Sathiya V, Kini S, Kumar A, Sana N, et al. Measles Outbreak in the Adolescent Population - Matter of Concern? J Clinical Diagnosis Res. 2017;11(8):LC20-LC23.
6. George F, Valente J, Augusto GF, Silva AJ, Pereira N, Fernandes T, et al. Measles outbreak after 12 years without endemic transmission, Portugal, February to May 2017. Euro Surveill. 2017;22(23):1-5.
7. Welfare W, McCann R. Measles outbreak in Qassim, Saudi Arabia. J Public Health (Oxf). 2009;31(2):306-7.
8. McBrien J. Murphy J, Gill D, Cronin M, O'Donovan C, Cafferkey MT. Measles outbreak in Dublin, 2000. Pediatr Infect Dis J. 2003;22(7):579-84.
9. Puvimanasinghe JP, Arambepola CK, Abeysinghe NM. Measles outbreak in Sri Lanka, 1999-2000. J Infect Dis. 2003;187:241-5.
10. Stanescu A. Janta D, Lupulescu E, Necula G, Lazar M, Molnar G, et al. Ongoing measles outbreak in Romania, 2011. Euro Surveill. 2011;16(31):1-4.

Cite this article as: Al-Abdullah NA. Measles outbreak amongst Manymar population of Jeddah City, Saudi Arabia. Int J Community Med Public Health 2018;5:2657-60.