A measles outbreak in Tunisia: Experience of an Emergency Department in Sousse

Insaf Missaoui, Mariem Khrouf, Houda Ben Soltane, Ines Ouaz,Zied Mezgar, Mehdi Methamem.

Emergency department, Farhat Hached University Hospital, Sousse, Tunisia.

Corresponding author: Houda Ben Soltane; email: bensoltanehouda@yahoo.fr

Abstract

Background: Measles is one of the most contagious diseases of humans. It is caused by the measles virus and occurs as a seasonal disease in endemic areas[1]. We describe the epidemiologic features of a measles outbreak in Tunisia, specifically in the city of Sousse within the Emergency Department (ED) of Farhat Hached.

Methods: We performed descriptive analyses of data on demographic characteristics, clinical and laboratory evaluations, clinical outcomes of all declared measles cases and containment measures in the ED of Farhat Hached in Sousse during the period of two months (March to April 2019).

Results: During the current ongoing measles outbreak in Tunisia, a total of 57 confirmed measles cases have encountered our ED and have been declared. 61.4% of the studied population were men and 31.6% were unvaccinated. The median age of measles patients was35 years [16;55].12.3% of them were health care providers working at the ED of Farhat Hached.

The main clinical presentations were eruptive fever (64.9%), eruptive fever with gastrointestinal disorders (21.1%) and eruptive fever with dyspnea (14%).35.1% of all patients were hospitalized with a mean hospital length of stay of 4.53 days ($\pm$1.92).

The vaccination status of infected patients seemed to their hospitalization rate as 44.4% of the unvaccinated patients were admitted to the infectious diseases ward while only 27% of the vaccinated patients were hospitalized.

Conclusion: Up to this date, measles cases including health care professionals are still being diagnosed in the ED of Farhat Hached in Sousse. Thus, response strategies should provide a better vaccination coverage within the exposed population as well as effective containment measures.

Keywords: Measles; Outcomes; Epidemiology; Emergency

BACKGROUND

Measles is a highly contagious, albeit vaccine-preventable, disease that can lead to serious complications [2]. The average age for acquiring measles depends on biological and epidemiological factors, mainly population immunity and birth rate. As vaccination coverage increases, the average age of measles infection can shift to adolescents and young adults. These older groups remain susceptible because they had not been vaccinated or exposed to the wild-type measles virus due to decreased transmission among younger vaccinated groups. In the absence of efforts to vaccinate the older susceptible populations, measles virus introduction can result in an outbreak, reflecting the immunity gaps among these age cohorts [1]. In Tunisia, measles vaccination was first

introduced in 1979 and since 1981; two doses of measles vaccine were given at 9 and 15 months of age as part of the routine vaccination schedule. Since then, two outbreaks were observed: in 1981 (2870 cases) and in 1985 (4766 cases). From 1987 to 1998, the annual incidence of reported measles cases considerably declined. Only one major outbreak was observed during this period, in 1992, with 11,872 reported cases [3]. Another measles outbreak began in Tunisia in January 2019. We report measles cases confirmed in the Emergency Department (ED) of Farhat Hached in Sousse between March and April 2019.

METHODS

Definitions and diagnostic features: The WHO definition of suspected measles is a case with fever and maculopapular (non-vesicular) rash or a case where a health-care worker suspects measles. Laboratory confirmation of measles is based on the detection of anti-measles virus IgM antibodies by enzyme-linked immunosorbent assay (ELISA), or the detection of measles virus RNA by reverse transcriptase polymerase chain reaction (RT-PCR) in throat swaps, oral fluid, or nasopharyngeal mucus or urine [1].

Data collection: We prospectively obtained, from the 1st of March to April 30th, patients demographic characteristics, medical history, vaccination status, date of symptoms onset, and their clinical outcomes using both face-to-face interviews.

We did not include children aged less than 16 years.

Statistical analysis: We performed descriptive analyses, and reported the results as frequencies and proportions for categorical variables and as median values and ranges for continuous variables. Analyses were performed with the use of SPSS software version 22.

RESULTS

During the period of the study, 57 cases of measles were confirmed and declared. They were men in 61.4% of the cases. The median age was 35 years [16; 55]. The subjects were in 12.3% of the cases health care providers, working in the ED of Farhat Hached during the outbreak's period. As for the vaccination status of the case patients, 31.6% of them were not vaccinated. Out of 7 infected healthcare providers, only 2 were not vaccinated. The vaccination status of case patients is shown in the figure below (Figure 1).

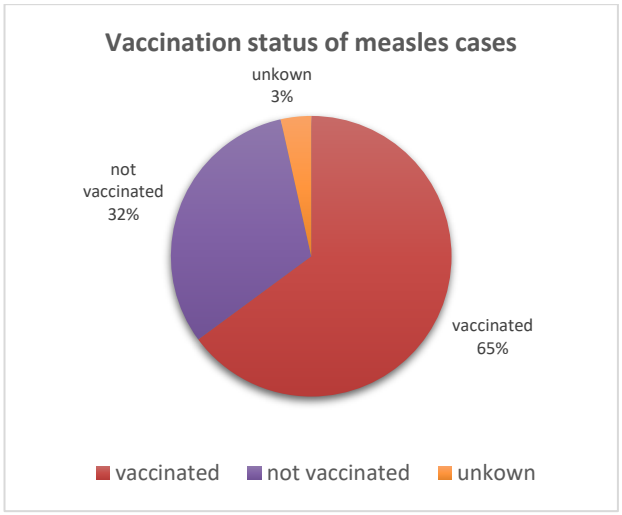

Figure 1: Vaccination status of measles cases

The source patient who was an unvaccinated 40-year-old woman, encountered the ED on March 10th. The chronology of the outbreak is detailed in Figure 2.

Three main clinical presentations were observed during the outbreak period: Eruptive fever in most of the cases, eruptive fever with gastrointestinal disorders, and eruptive fever with dyspnea. More details are shown in the figure below (Figure 3).

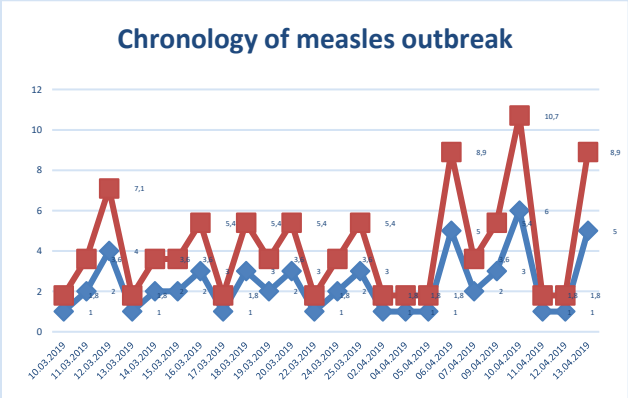

Figure 2: Chronology of measles outbreak

During the study period, 35.1% of the case patients were admitted to the infectious diseases ward. Only one patient who was a 55-year-old doctor working in the outbreak's ED, was admitted to the ICU (Intensive Care Unit) and stayed there for 4 days.

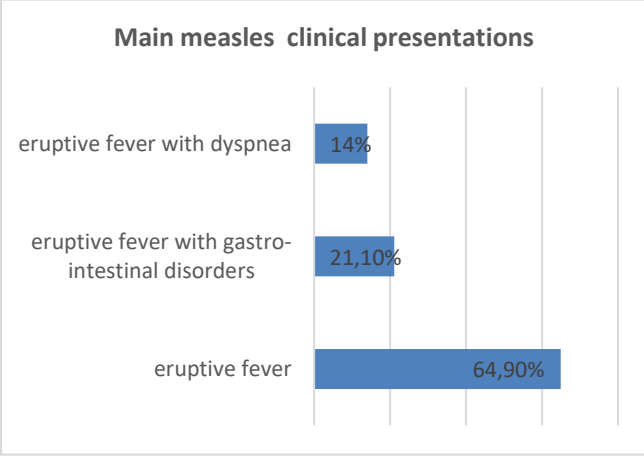

Figure 3: Main measles clinical presentations

The vaccination status of infected patients seemed to have an impact on their hospitalization rate as 44.4% of the unvaccinated patients were admitted to the infectious diseases ward while only 27% of the vaccinated patients were hospitalized. The vaccination status of hospitalized case patients is shown in the figure 4.

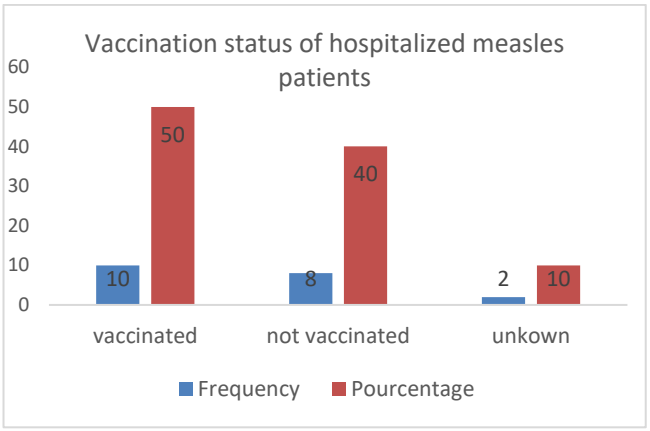

Figure 4: Vaccination status of hospitalized measles patients

DISCUSSION

Despite the increasing vaccination coverage in Tunisia since the introduction of measles vaccination (two doses of measles vaccine at 9 and 15 months of age), this outbreak proves that measles is still endemic in our country. This could be explained by the immunity gaps among older groups of age who had not been vaccinated or exposed to the wild-type measles virus type due to the decreased transmission among younger vaccinated groups [1].

In the last few years, some measles outbreaks around the world have been reported [8-10]. A lot of them occurred in countries where measles is considered to be eradicated [5-7], such as the case of Measles outbreak in a refugee settlement in Calais, France (January to February 2016), where 13 confirmed measles cases were identified among migrants, healthcare workers in

hospital and volunteers working on-site [4]. In the United States (US) as well, a measles outbreak within an under-immunized Amish Community in Ohio was reported in the year of 2014. Even though measles was considered to be eradicated in the US since 2000, an outbreak of measles originated from two unvaccinated Amish men whom measles was incubating at the time of their return to the United States from the Philippines [2].

In this study, the source of the measles outbreak in the ED of Farhat Hached has not been identified.

Measles case patients did include healthcare providers who were infected independently of their vaccination status. The measles spread among health care providers has been limited to 7 case-patients thanks to the containment measures conducted in the ED's outbreak, such as the use of isolation facial masks by the medical and the paramedical staff, the creation of a quarantine unit where all measles case-patients stayed as well as the vaccination campaign conducted in the hospital of Farhat Hached that included all healthcare providers born after 1980.

As for measles case patients' outcomes, the majority of them were admitted to the infectious diseases ward except for one patient who was admitted to the ICU. All of the admitted case patients presented to the ED with complicated clinical presentations (eruptive fever with either gastrointestinal disorders or dyspnea).

The vaccination status of infected patients seemed to have an impact on their hospitalization rate as 44.4% of the unvaccinated patients were admitted to the infectious diseases ward while *only 27%* of the vaccinated patients were hospitalized. This means that unvaccinated patients are more prone to having measles-related complications. Thus, more attention and healthcare resources should be given by health authorities to improve vaccination coverage, especially among susceptible populations such as healthcare providers and other exposed populations.

LIMITATIONS

One of the study's limitations is that it did not discuss the exact origins of the measles outbreak nor its spread on the national level. This may be due to the lack of data available on the national situation of the outbreak.

In this study, we did not cover the measles spread among children aged less than 16 years because they did not encounter the ED of Farhat Hached.

CONCLUSION

Up to this date, measles cases including health care professionals are still being diagnosed in the ED of Farhat Hached in Sousse.

Thus, response strategies should provide better vaccination coverage within the exposed population as well as effective containment measures.

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