



ORIGINAL ARTICLE

A descriptive study of Measles outbreak in Lahore, Pakistan in 2013

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Abstract

Measles outbreak in Pakistan resulted in huge number of deaths. The purpose of study was to determine the prevalence of measles in Lahore city during the measles outbreak in 2013, the risk factors of vaccine failure and to find out the reasons of measles outbreak. The study was descriptive type and all the data was collected from the patients. Patients were divided into different categories on the basis of their gender, age, out/in patient, vaccination status and the different complications which are developed by patients along with measles. All the results were analyzed by unpaired t-test and one way ANOVA. All the results are significantly different from each other ($p < 0.05$). Non-immunization is the major cause of this outbreak and leads to measles infection and its complications. Vaccination and treatment facilities should be equal for both genders and children of different age groups should be vaccinated so that the measles outbreaks can be avoided in future.

Keywords

Lahore
Measles
Outbreak
Pakistan
Vaccination

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Introduction

Measles is an extremely contagious, pervasive, seasonal infection, affecting nearly every human being by adolescence in the community where immunization program is not present (Berggren et al., 2005). Measles virus belongs to RNA type virus of paramyxoviridae family and morbillivirus genus is the only human-infecting component of this family (Weisberg, 2007). Measles is transmitted via droplet only through the respiratory tract during the prodromal period (Rahim, 2008).

When a person becomes infected by measles virus, symptoms do not appear immediately. Measles incubation period (MIP) is the duration during which the virus multiplication occurs without the development

of symptoms (Sabella, 2010). When a person develops the symptoms, he become mild contagious. Four days before the onset of measles rash, the infected person becomes highly infectious. A little risk of transmission lasts after 4 days of rash (Yasunaga et al., 2010). Measles is significantly coupled with complications. Frequent complications followed by measles are pneumonia, diarrhea, stomatitis, inability to feed, otitis media and encephalitis (Junejo et al., 2011).

Measles vaccine (contained in MMR, MR, MMRV and Measles vaccines) is the best prevention of measles infection. Second dose and a booster of vaccination are recommended for people (about 5%) who did not develop immunity against measles with first dose of vaccination (Helfand et al., 1997). Although remarkable control of measles have been achieved in some areas of

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the world, due to the availability of useful and effective vaccine, after the vaccine licensure in the 1960s and the school immunization laws in the 1990s, but still measles is the leading cause of death in children (Berggren et al., 2005; Saleem et al., 2009). Natural disasters (flood, earth quack), poor quality control system for vaccines, vaccines unavailability and improper cold chain storage are the main reasons of severe outbreaks of measles (Mishra et al., 2008). In Pakistan, due to the Expanded Program for Immunization (EPI); the recommended immunization for measles is at the age of 9 months, that's why infants younger than 9 months have higher mortality rate (Saleem et al., 2009).

World Health Organization (WHO) estimates that worldwide each year almost 40 million individuals are affected by measles. Approximately 1.6 million (454,000) deaths occur annually due to measles and its complications. Among these 66% deaths take place in developing countries, Pakistan is included among these countries (Rahim, 2008). Annual deaths among children who are under 5 years are 81,000 in Pakistan (Junejo et al., 2011). The outbreaks of measles can be hazardous in countries facing or improving from natural disasters (flood, earth quack, tsunami). Recently a severe outbreak in Lahore is the result of this conflict. Measles and its complications, counting deaths are a great threat for unvaccinated young children, infants as well as adults including pregnant women.

Materials and Methods

This descriptive type of study had been conducted in two main teaching hospitals and different vaccination centers of Lahore, Pakistan from January 2013 to June 2013 during a severe outbreak of measles. The study design was retrospective multi centered.

Inclusion criteria: Children of all age groups including infants and neonates considered for this study as measles infected the whole community of all age groups. Patients suffering from measles and its complications either admitted in hospital or visited hospital. Data sheets, prescribing notes or sheets and vaccination schedule cards of outdoor and hospital admitted patients were used to collect data about the condition of patient, its vaccination status and treatment prescribed for their illness.

Exclusion criteria: Pregnant women were not included. All measles infected patients suffering from other diseases like HIV, HCV were excluded.

All the patients are characterized into different categories like gender, age, ratio of patients suffering from measles and its complications, ratio of vaccinated and unvaccinated patients, different age groups including vaccination status and after which dose

he/she caught measles. Patient inquiry is also helpful in determining the source of vaccination, reason behind no immunization and preference in choosing the source of vaccination. Permission letter from doctors who were on duty was taken to conduct this study. Consent forms have also been signed from patient wherever needed to take information from patients.

Statistical analysis: All the data related to patient age, gender, immunization status, hospitalization status and complications. Unpaired t-test and one way ANOVA (analysis of variance) were applied to data by using graph pad prism software. Unpaired t-test was applied to four groups i.e. gender, hospital in patient and OPD patient, vaccination status of the infected patient and ratio of vaccinated persons on the basis of number of administered doses. All groups are significantly different ($p < 0.05$). One way ANOVA was applied to the ratio of measles in different age groups of children, complications of measles acquired by infected people, source of getting vaccination, ratio of persons for the reason why they prefer their source of vaccination, and reason behind unimmunization. All results are significantly different ($p < 0.05$).

Results and Discussion

Patients reported with measles are differentiated according to their gender. The whole study shows the number of male patients came to hospital is higher than the female patients (Figure 1). The reason behind this is the gender differentiation and male dominance of our society (Mohammad et al., 2011).

Second parameter of this study was differentiation of the patients according to their age groups. This category was divided into 6 subgroups as new born and infants that are under 1 year, children with the age group 1 to 3 years, 4-6 years old children, 7 to 10 years individuals, people with the age group of 11 to 15 years and people with the age above 15 years were included in the category of adults (Mohammad et al., 2011). Measles is a childhood disease and affects mostly children (Pickering et al., 2009). Measles affected a significant number of infants and newborns. This may be due to weak maternal antibodies or measles affected mothers during pregnancy (Ent et al., 2009). First dose of measles vaccine is administered at the age of 9 months and MMR vaccine is administered at 12 months of age (Junejo et al., 2011). Second or booster dose of measles vaccination is administered at the age of school admission e.g. 4-5 years of age (Watson et al., 1996). Results showed that ratio of measles infected children at the age of 4 to 6 years was significant although children of this age group had administered 2 doses of vaccination. It might be due to un-immunization or the failure of vaccination (Figure 2).

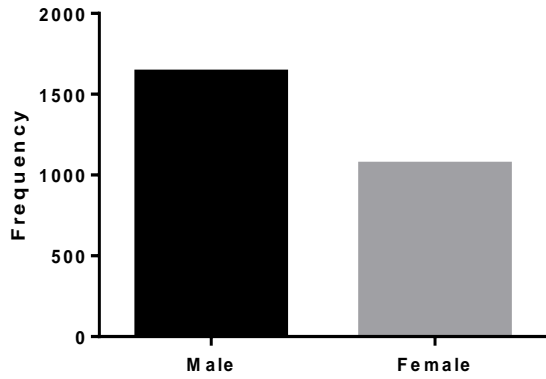


Figure 1: Gender distribution of measles infected persons.

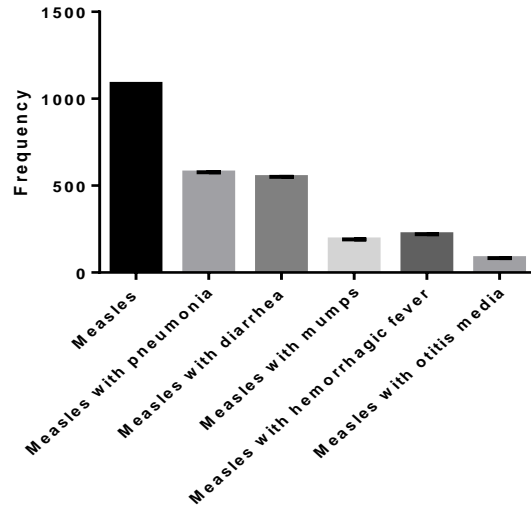


Figure 4: Complications of measles acquired by infected people.

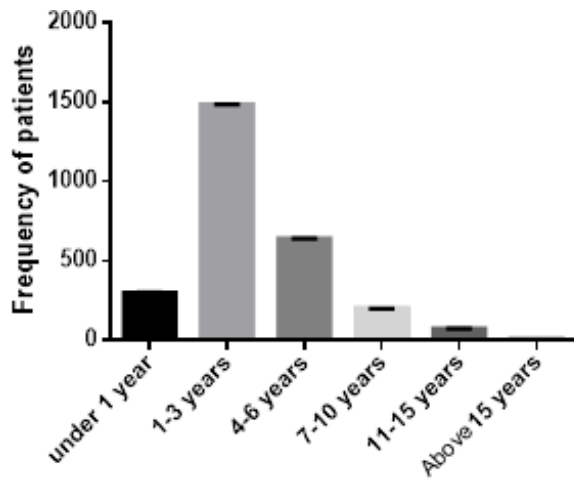


Figure 2: Ratio of measles in different age groups.

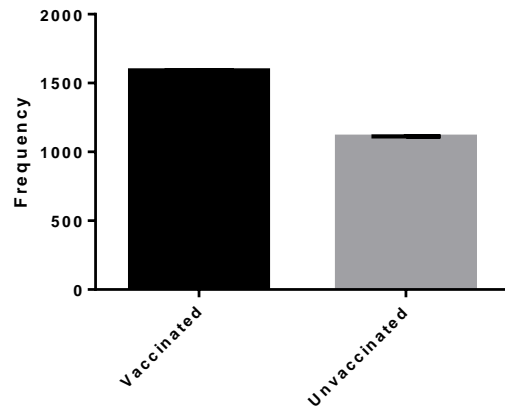


Figure 5: Vaccination status of the infected patient.

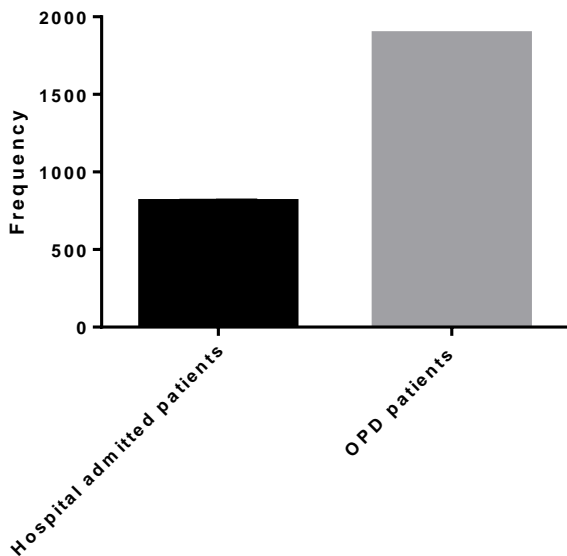


Figure 3: Ratio of hospital admitted and OPD patients.

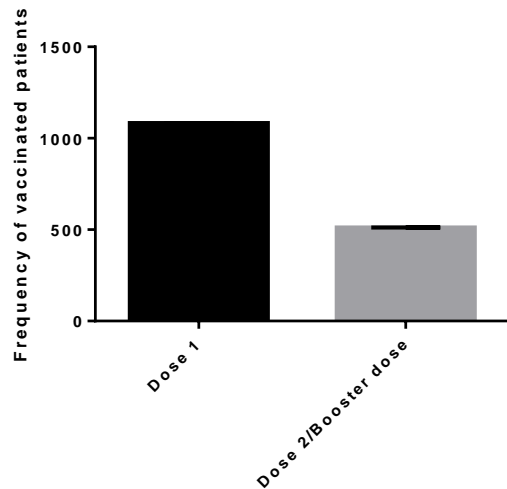


Figure 6: Ratio of vaccinated persons, how many doses of vaccination they administered.

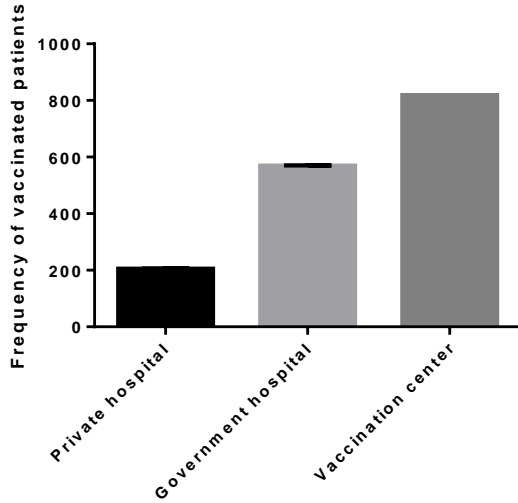


Figure 7: Source of getting vaccination.

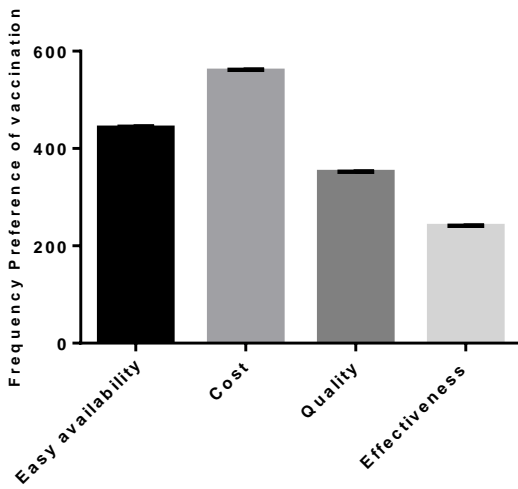


Figure 8: Ratio of persons for the reason why they prefer their source of vaccination.

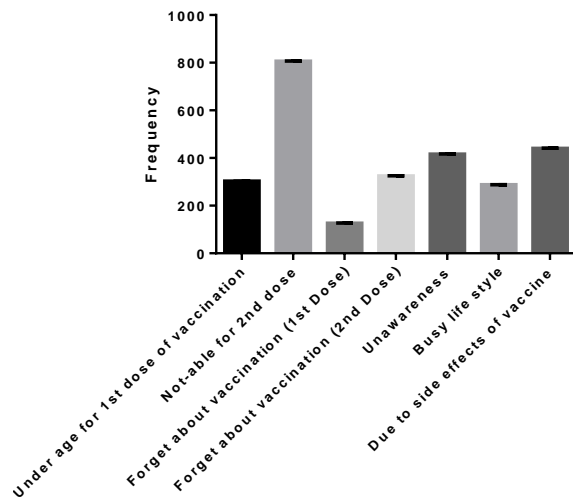


Figure 9: Reasons behind unimmunization.

The next category was the status of the patient as he/she was an OPD patient or hospital in-patient. A large number of patients came to OPD but due to complications, they were recommended to different wards (Figure 3).

Measles complications can be the result of severe disease condition, weak immunity or self-medication. No specific medication is used for the measles treatment as the treatment is generally symptomatic (Yasunaga et al., 2010). Measles complications include measles with pneumonia, diarrhea, mumps, hemorrhagic fever, otitis media and mouth ulcers (Figure 4).

Most of the people came to hospital were vaccinated, however, a small number of patients were non-vaccinated as they had no knowledge about this disease, its vaccination and treatment (Figure 5).

Most of the children got their 1st dose of vaccination at the age of 9 months according to the childhood vaccination schedule before infecting from measles virus. Some of them were those patients who had administered their 1st dose before ½ months of this outbreak. The reason behind catching infection might be the under development of antibodies against measles virus or weak immunity that would not be able to protect the patient from infection. A few of the remaining vaccinated persons took their 2nd/booster dose at the time of their school admission (4-5 years) but still got infected. There might be the same reason as mentioned above behind catching the infection (Figure 6).

The preference for vaccination source is very important. Most of the people belongs to the average families and could not pay for costly vaccination. Most of the people prefer scheduled vaccination centers as they are free of cost while some prefer governmental and private hospitals for vaccination (Figure 7).

Most of the people preferred low cost and easy availability. Government hospitals have proper quality and effectiveness but a little bit compromising as they are stored and travelled from one place to another under un-favorable conditions (Figure 8).

The reasons behind unimmunization are helpful in influencing the spread of measles infection. For the strong immunity of new born baby, mother should be fully vaccinated and has strong immunity to protect her baby from severe infections. A large number of infected persons at their age can't get their 2nd dose of vaccination and catch the infection easily due to weak immunity. Some of them administered their 1st dose of vaccination, but some are unimmunized. Some persons said that they forget about the 1st and 2nd dose of the vaccination. They didn't remember the date and duration after which they get their vaccination. A large number of people have no knowledge about measles and its schedule vaccination. Such people are at high risk of catching the infection due to weak immunity

against that virus. A few of them didn't get their child vaccinated due to their busy life style. Every medicine has its own side effects and vaccines too. These side effects are not severe and last for a short duration of time. These include rash, fever and inflammation at the injection site. Few people are afraid of the side effects of vaccination and don't vaccinate their children due to this fear (Figure 9).

Conclusion: Un-immunization is the major reason behind this outbreak. Vaccination dose and storage also matters as improper storage decreases the efficacy of the vaccine. People from rural areas have no awareness about measles disease and its vaccination. Measles outbreaks can be diminished by educating public about disease, its vaccination, precautionary measures and treatment. Government can play its role through media, different educational programs and by providing door to door service of vaccination. Proper storage (refrigerators) must be provided to the vaccination centers.

Conflict of interest: All authors declare no conflict of interest.

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