ORIGINAL ARTICLE

INVESTIGATION OF MEASLES OUTBREAK IN A DISTRICT OF BALOCHISTAN PROVINCE, PAKISTAN

Abid Saeed, Zahid Ahmad Butt*, Tabinda Malik

Field Epidemiology & Laboratory Program, Pakistan, *Department of Public Health, Al-Shifa Trust Eye Hospital, Rawalpindi-Pakistan

Background: Measles is a communicable viral disease which is a major public health problem and a leading cause of morbidity and mortality in the developing countries including Pakistan with implications for outbreaks. An outbreak was reported from Ibrahim Khan Village of Manzari union council (UC), Pishin District by medical officer during polio campaign on 15th April 2014. A team was sent to investigate the outbreak and suggest control measures. **Methods:** Rapid assessment of outbreak was done by collecting data from house-to-house from April 16th–20th, 2014. Case was defined as "a person of any age, resident of village Ibrahim Khan village with non-vesicular maculopapular rash and fever along with one of the symptoms of cough, coryza and conjunctivitis from April 4th–20th, 2014". Routine immunization (RI) was assessed through recall and immunization cards and BCG scars were checked. Line list was developed and data was analyzed. **Results:** Fifty-five cases (attack rate =11.27%) including 4 deaths (Case Fatality Rates=7.27%) were found. Mean age of children was 47 months (4-132Months). Age-group 0-5 years was most affected (n=48, 87.27%). Along-with maculopapular rash and fever. Other predominant symptoms were: coryza (n=52, 95%), conjunctivitis (n=51, 92%) and pneumonia (n=42, 77%). RI status assessment showed that none of these children had been immunized. About 56.36% of the respondents were unaware about RI, 16.36% mentioned that vaccinator had not visited their homes, 14.54% reported that health facility is far away and 12.72% reported that even if they could get access to a health facility, the vaccines were not available. **Conclusion:** Functionalization of EPI centre, vaccinations of all children and mass education was strongly recommended. Surveillance system for vaccine preventable diseases (VPDs) should be strengthened to prevent such outbreaks. Outreach activity must be carried out regularly to reach scattered population.

Keywords: Measles, Routine Immunization, Ibrahim Khan Village, Manzari, Pishin

J Ayub Med Coll Abbottabad 2015;27(4):900–3

INTRODUCTION

Measles is an extremely communicable viral disease which is a major public health problem and a leading cause of morbidity and mortality in the developing countries including Pakistan. "Measles causes fever, runny nose, cough and a rash all over the body. About one out of 10 children with measles also gets an ear infection, and up to 1 out of 20 gets pneumonia. Every 1,000 children who get measles, 1or 2 of them die. Adults can also get measles especially if they are not vaccinated. Children under 5 years of age and adults over 20 are at higher risk, for measles complications including pneumonia, and a higher risk of hospitalization and death from measles than school aged children and adolescents".[1] There is no definite cure for measles and the majority of affected people recover within 2 to 3 weeks. It mainly occurs in malnourished children and community with reduced immunity. Measles can cause severe complications as well including blindness, encephalitis, severe diarrhoea, ear infection and pneumonia. Measles can only be prevented by immunization. Vaccine against Measles is the only way to develop immunity in the populations to prevent this disease in children.[2]

Globally there were 145,700 measles deaths reported in 2013, which are about 400 deaths per day and likewise 16 deaths every hour. Vaccinations against Measles brought a 75% decline in deaths due to measles between the years 2000 and 2013 throughout the world. Equally the percentage of children receiving one dose of measles vaccine by their first birthday through routine immunization increased from 73% in 2000 to 84% in 2013. During the same period (2000–2013), measles vaccination prevented an anticipated 15.6 million deaths. Globally, measles deaths have decreased by 75% from an estimated 544,200 in 2000 to 145 700 in 2013. It made measles vaccine one of the best innovations in public health.[3]

But even with such achievement, the measles virus continued to be the cause of various epidemics throughout the different regions of the world.[4,5] Among all the outbreaks reported in various parts of world the maximum number of deaths were reported in outbreaks from Pakistan during the years 2012–2013.[6] This is regrettable that even with the presence of new Global Measles & Rubella Strategic Plan 2012–2020[7], a high number of outbreaks (281) and deaths due to measles were from Pakistan. These outbreaks started in December 2012 in Sukkur, Sindh Province which killed

more than 70 children and affected more than 500 children, and it later spread to the province of Punjab. These outbreaks resulted in around 321 deaths in the year 2013. After August 2013 there was a decline in these outbreaks with almost no reported deaths. However, the situation became worse when the epidemics started in other provinces mainly in Punjab. It caused 94 deaths in the first half of year 2013 as compared to only 16 deaths in 2012. It was also very shocking that a maximum number of these deaths occurred in the capital city of the province, Lahore instead of any of another under developed rural areas.[8]

Behind these repeated outbreaks of measles there are many reasons and factors like mismanagement and corruption in health systems. The major reason being the very low immunization status of routine immunization throughout the country. Other possible reasons may be the illiteracy, unawareness and negligence among parents regarding routine immunization and lack of outreach immunization activity, shortage in number of vaccinators, impact of floods, malnutrition etc.

In the case of this present study, the outbreak occurred in a village named Ibahrim Khan in union council (UC) Manzari of District Pishin, Balochistan province. Pishin District is located in the north of the Quetta City, the provincial capital of Balochistan, sharing its boundaries in the north-east with Afghanistan and Killa Saifullah in the east. Killa Abdullah on the west and Quetta District is in the south. Area-wise district Pishin ranks 18th in Balochistan and has an area of 7819 square kilometers, consisting of 3 Tehsils and 36 Union Councils. Projected Population on basis of 3.4 annual growth rate (of 1998 census) is 639400. Other than the said local population there resides about 0.15 million Afghan Refugees making total population of district Pishin about one million.[9]

Union Council Manzari is a big area with an estimated 15000 families residing there. The population of this village Ibahrim Khan is around 1800 individuals, with a total of 488 more than 12 years of age children residing over there and out of these 213 children are under 5 years of age. The occupation of most of the people is agriculture and coal mining. The objectives of this study were to carry out a rapid assessment of the measles outbreak so that prevention and control measures could be initiated. Figure-1 shows map of Pishin district with Manzari UC highlighted in it.

MATERIAL AND METHODS

During polio campaign on 15th April 2014 NSTOP (National Stop transmission of polio) officer Pishin was informed about a measles outbreak in Village Ibrahim Khan of union council Manzari of District Pishin. An investigation team was formulated under the direction of the Deputy Commissioner Pishin to investigate the outbreak. The investigation team comprised NSTOP officer Pishin, UC in-charge of Manzari and UNICEF Officer Pishin. The study continued from 16–20th April 2014.

A comprehensive house-to-house survey was conducted for the "active case finding" by using a pre-tested questionnaire. Information was collected on demographics, disease notification, clinical presentation, and vaccination status and disease outcome. Information collected was based on respondents' recall, and vaccination card if present. Apart from active case finding, the deaths were also verified by visiting the addresses of deceased children. A questionnaire was established regarding the "routine immunization status". Data was collected based on the presence of vaccination card and/or recall (or scar in case of BCG vaccination). The reasons for non-uptake of vaccination were also recorded along with socio-demographic factors.

A case of measles was defined as a person of any age, resident of Village Ibrahim Khan, Union Council Manzari , District Pishin , with non -vesicular maculopapular rash with fever and at least one of the following: cough, coryza (i.e. runny nose) and conjunctivitis (i.e., red eyes) presenting between 4–20th April 2014.

Quantitative data was cleaned and coded. Demographic, clinical, epidemiological, and serologic and risk factors were entered and analysed by using Epi Info version 7.0 (CDC, Atlanta, GA). Frequencies were calculated and tables/graphs were generated.

RESULTS

A total of 55 cases including 4 deaths (CFR=7.27%) were verified as having measles from April 1 to 16, 2014. Majority of the Measles cases were detected through the active search in community during house to house survey. The main symptoms of the cases were fever among 100% cases (n=55), followed by rash among 98% cases (n=54), coryza among 95% cases (n=52), and conjunctivitis among 92% cases (n=51) and pneumonia among 77% (n=42) of the cases.

About 51% (n=28) of the cases were female. Mean age of cases was 47 months (range = 4–132 months). Most of the cases (n= 48, 87.27%) were in the age group of 0-5 years. (Table-1). All of the respondent parents were illiterate.

The epidemiological curve of the same outbreak showing a classical pattern of a propagated source of person-to-person transmission, which is very much typical of any measles outbreak. The index cases are shown on 4th April and case counts started increasing from 6th April, 2014 with a maximum number of cases being reported on 11th April, 2014. Since then a visible downward trend can be observed in the number of cases being reported (Figure-2).

A total of four deaths were verified during the investigation. Maximum number of deaths 75% (n=3) were among children in age group 24–60 months followed by 25% (n=1) in the 12–24 months age group. All deaths were due to pneumonia. None of the 4 deceased children were immunized as well.

The routine vaccination coverage survey showed that none of these children had been immunized. The only vaccine they received was oral polio vaccine (OPV) during the anti polio campaigns.

The reasons behind poor vaccination coverage were also assessed in the study. Majority (56.36 %) of the respondents were unaware about routine immunization, whereas 16.36% mentioned that the vaccinator doesn't visit their home. More over 14.54 % people interviewed reported that the health facility is far away from their home and a part of respondents (12.72%) reported that if they got access to a health facility anyhow, the vaccine was not available. There is no functional EPI centre in Union Council Manzari.

Table-1: Age-wise distribution of Attack rates

Age group (years)	Frequency	%age
0– 5	48	87.27%
6-10	5	9.09%
>11	2	3.63%
Total	55	100%

Figure-1: Map of Pishin District Showing the Manzari union council

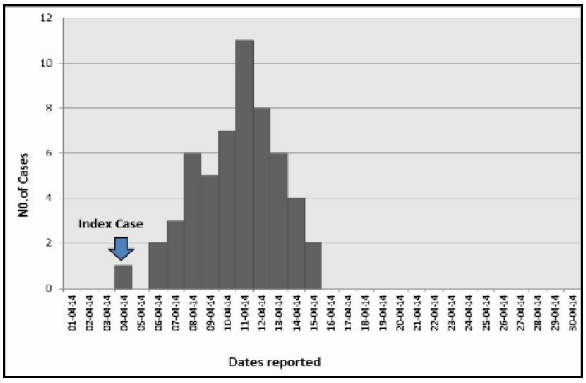

Figure-2: Epidemic Curve

DISCUSSION

The results show that all of the reported cases were unimmunized children. Evidence suggests that measles transmission can be interrupted at the herd immunity level of 93–95%.[10] Epidemics of measles can arise in communities with low immunization coverage and can be a major source of measles outbreaks.[11] The results of this study showed that 100% of the children are without measles or any sort of vaccination. Such low vaccination status is implicated as the chief cause of the said outbreak. The RI status of entire country is very low according to Pakistan Health & Demographic Survey (PDHS) 2012-13 report; it is 47.45% for the country and is just 16.4% in Balochistan.[12] However other causative factors such as malnutrition, vitamin A deficiency and immune suppression may also have a role to play in low socioeconomic conditions as were evident in the communities in UC Manzari.

The deaths recorded in this investigation were reported in children less than 5 years of age. The most common reported complication was found to be pneumonia which can be implicated as the most common cause of death. The overall case fatality rate was calculated to be 7.35% which is not consistent with evidence from developing countries.[13] Undermining routine immunization of measles and additional vaccine preventable diseases is considered as the motive for the low level of vaccination coverage. Routine immunization has not given its due importance.[14]

EPI centre at Manzari is not functional. People have to travel to other areas for seeking health facilities. A plethora of studies have been published on the weaknesses along with suggestions to perk up the infrastructure of health system of Pakistan but no major actions have been taken so far to fix them.[15,16]

This outbreak investigation revealed that none of the children were vaccinated for any routine antigen, and majority 31(56%) were unaware about the RI. Negligence among parents is also one of the main reasons of lower vaccination coverage among children vaccinated.[17] This negligence on part of the parents is in turn due to many reasons like lack of awareness about the importance of vaccination, and inaccessibility to the vaccination centres.[18] Another worrisome situation arose when parents from some religious communities in Sindh refused to vaccinate their children stating that it is no disease and is a test of faith as some soul had entered the children and would exit the body after sometime.

CONCLUSIONS

This measles outbreak investigation at Union council Manzari of District Pishin Balochistan revealed that all the children were non-immunized for measles and rest of the routine vaccines. Moreover all these families belonged to a low socioeconomic status and the

nutritional status and immunity of these children were also not up to the mark. UC Manzari is a far off UC of District Pishin and people had no access to the health facility nor did they have the awareness about the routine immunization and about cure of such diseases. As the results showed that most of the parents of affected children didn't even know about routine immunization, this is really a hallmark, it must be given prompt attention. There is no functional EPI centre in the affected UC and ultimately the outreach activity was not performed. For seeking healthcare they have to travel to far away health facilities. We recommended immediate extensive measles vaccination throughout the district along with this affected UC Manzari. Long term recommendations included: enhancing routine immunization in the overall district along with functionalizing of the EPI centres, starting outreach activities on war footings especially in the poor and illiterate part of the population.

It was also recommended that district government and health department must initiate health education and awareness campaigns among the community. Recommendations were also given regarding issues related to EPI like ensuring timely supply, proper storage and cold chain preservation till vaccine is finally administered to the deserving child. Strong surveillance was recommended for measles and other VPD diseases to prevent outbreaks in the district.

Impact of this Outbreak investigation: District Administration took serious notice and health department carried out mop up of the entire district for measles vaccination with special focus of UC Manzari and this affected village Ibrahim Khan. Provincial government was approached for allocation of resources to carry out regular outreach/mobile activities for routine immunization.

Competing Interests: The authors declare no competing interests.

AUTHORS' CONTRIBUTION

AS conceived and designed the study and collected the data, analyzed the data and analyzed the results. ZAB and TM supervised and helped in preparing, editing and finalizing the manuscript for publication.

ACKNOWLEDGEMENT

We are thankful to the district government Pishin which allowed us to conduct the study and also grateful to the and District health office Pishin district for their cooperation in the study.

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Address for Correspondence:

Dr. Abid Saeed, House No: 12/4 Junior Assistant Colony Whyte Road Quetta-Pakistan
Tel: +92 81 2844338, 03318024449
Email: abidsaeed25@gmail.com