EPIDEMIOLOGICAL INVESTIGATION OF MUMPS OUTBREAK IN
PUGA RESIDENTIAL HOSTEL, LEH LADAKH

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ABSTRACT
BACKGROUND
Mumps is a vaccine preventable acute viral illness that can affect both children and adult and is endemic in most part of World. Vaccination is the best strategy for prevention of mumps infection. The study was an epidemiological investigation of mumps outbreak in a residential hostel.

OBJECTIVE
To study the time, place and person distribution of mumps in a residential hostel and source of infection for timely intervention.

MATERIALS AND METHODS
It was a descriptive study for epidemiological investigation of mumps outbreak in a residential hostel Puga, Leh Ladakh. School children were interviewed and clinical examinations were done using pre-designed semi-structured proforma. Case definition criteria stated by the Center for Disease Control and prevention was used. Blood samples 7-10 ml serology testing was taken randomly in a red top tube and ship on wet ice pack for confirmation of mumps. Data collected by investigating team was compiled and presented into frequency and percentage. RESULTS: Overcrowding and lack of proper ventilation in all dormitories was the main cause of mumps outbreak in the residential hostel. Lack of hand washing area and warm water. Improper isolation of cases and none of children were vaccinated against Mumps. Total roll of hostel was 123 students, boys – 60, girls -63 and total of 71 mumps cases, among them 42 children were having swelling and other symptoms. Attack rate comes out to be 58%. Majority of cases were in age group 8yrs followed by 13 and 14 years. Earache was the main symptoms followed by fever and headache among those having parotitis. No complicated cases were seen. Other symptoms like vomiting were present in 4 cases, diarrhea in 2 cases and dysentery in one case. Serological test done randomly among 10 cases and had shown positive for mumps infection

KEYWORDS: Mumps, Unimmunized, Vaccine Preventable Disease, Outbreak

INTRODUCTION
Mumps is a vaccine preventable acute viral illness that can affect both children and adult especially in the late winter and spring. It is endemic in most part of world¹. Historically, mumps was a frequent cause of illness in young children. Since the mumps vaccine was licensed in 1967 and recommended for routine immunization in 1977, mumps incidence has declined to very low levels in the U.S ². In absence of immunization the annual
incidence of mumps in most part of world is 100-1000 cases / 100,000 populations with epidemic peak every 2-5 years \(^3\).

It has been seen that many countries where they do not routinely vaccinate against mumps witnessed several outbreak, on other hand country like Finland which was declared be free of mumps with use of national two doses of trivalent MMR vaccination program \(^4\). Vaccination is the best strategy for prevention of mumps infection, but even after vaccination there is no 100% protection against mumps, but attack rate and complications due to mumps among vaccinated cases are lower compared to unvaccinated cases as it has been seen in many recent outbreaks.

In 2009, an outbreak started in close-knit religious communities and schools in the Northeast, resulting in more than 3,000 cases. These outbreaks have shown that when people who are sick with mumps have close contact with a lot of other people (such as among students living in dormitories and students and families in close-knit communities) mumps can spread even among vaccinated people. However, outbreaks are much larger in areas where vaccine coverage rates are lower.

For prevention of mumps, two doses of MMR vaccine are recommended routinely for children with the first dose at 12-15 months of age and the second dose at 4-6 years of age \(^2\). Two doses of mumps vaccine are also recommended for adult of high risk. Mumps vaccine can also be administered as a combined vaccine with measles, rubella, and varicella vaccines. For adult anyone 18 years of age or older who was born during or after 1957 should get at least one dose of mumps-containing vaccine. However, persons who can show that they have been vaccinated against measles, mumps, and rubella or that they have had these diseases do not need MMR vaccine.

**OBJECTIVE**

To study the time, place and person distribution of mumps in a residential hostel and source of infection for timely intervention.

**MATERIALS AND METHODS**

It was a descriptive study for epidemiological investigation of mumps outbreak in a residential hostel Puga, Leh Ladakh. Leh district is rural area and remotest district of Kashmir Division with a population of 1.2 lakhs. Leh has a cold desert climate with long, harsh winters from October to early March, with minimum temperatures fall below freezing point for most of the winter. Puga is a nomadic area in Nyoma block of Leh district having very cold and windy weather. This residential hostel cum school is especially for nomadic people of changthang, so that they can give education to their children.

Team consisting of epidemiologist, pediatrician, pharmacist and laboratory assistant visited the site for outbreak investigation of mumps. After taking permission from school principal, a thorough inspection was done regarding the cleanliness of kitchen, dormitories, toilets, proper ventilation and space per children. School children were interviewed and clinical examinations were done using pre-designed semi-structured proforma. Case definition criteria stated by the Center for Disease Control and prevention was used. A clinical case was defined as a patient with acute onset of unilateral or bilateral tender, self limited swelling of parotid and other salivary glands lasting at least two days without other cause. Blood samples 7-10 ml serology testing was taken randomly in a red top tube and ship on wet ice pack for confirmation of mumps. Data collected by investigating team was compiled and presented into frequency and percentage.
RESULTS

The hostel had three residential room where in all students were accommodated. In first dormitory hall with dimension 504 sq. ft for 40 children. In second dormitory with dimension of 504 sq. ft for 31 children’s and in third dormitory with dimension of 425 sq. ft for 25 children’s, spaces in all dormitories were inadequate.

In all dormitories window were adequate as per floor space but were fixed and could not be opened to provide cross ventilation. Most windows served the purpose of providing light only.

Total roll of hostel was 123 students, boys – 60, girls -63 and total of 71 mumps cases, among them 42 children were having swelling and other symptoms. Attack rate comes out to be 58%.

![Figure 1: Number of Mumps Cases as Per Age](image1)

Majority of cases were in age group 8yrs followed by 13 and 14 years.

![Figure 2: Date of Onset of Illness (Parotitis)](image2)

First symptomatic case was seen on 16th of March and maximum cases were seen on 21st April and gradual decline in cases. From above chart it is clear that first case was seen on 16th March and rest of cases was seen within the incubation period of mumps.
Table 2: Symptoms among those with Parotitis and those without Parotitis

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cases with Parotitis</th>
<th>Cases without Parotitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Headache</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Earache</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Decrease appetite</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Earache was the main symptoms followed by fever and headache among those having parotitis.

DISCUSSIONS

It was an outbreak investigation for mumps in a nomadic residential hostel of Puga village of Leh district and team comprised of a pediatrician, epidemiologist, pharmacist and laboratory assistant. Total roll of children in hostel were 123 (boys – 60 and girls- 63). After taking permission from school principal, a thorough inspection was done regarding the cleanliness of kitchen, dormitories, toilets, proper ventilation and space per children and it was seen that space per children was inadequate and proper ventilation was not there, so definitely overcrowding was main reason for the spread of mumps. Out of 100 children examined by both doctors 71 were cases of mumps, fortunately there was no complicated case. Had it been other communicable diseases with fatal outcome can be dangerous situation especially in hostels. Many children were anemic also.

During the survey it was found that primary case was a student who reached Puga hostel on 16th March 2015, having swelling on side of neck 2-3 days back when she reached hostel giving same problem in her cousin sister at home. On 9th April one of other student got the same problem and cases of mumps increased to 71 till 29th April the day we visit the hostel. As the incubation period of mumps ranges from 2 to 3 weeks and second case developed within that period. Out of 71 children’s 31 students were cured and rest of 41 students were having swelling and other symptoms. Attack rate comes out to be 58%. Majority of cases were in age group of 8 years followed by 13 and 14 years and 41 were females and 31 were males. Among those with swelling neck majority complain of earache followed by fever and headache. Other symptoms like vomiting were present in 4 cases, diarrhea in 2 cases and dysentery in one case. Serological test done randomly among 10 cases and had shown positive for mumps infection.

CONCLUSIONS

Overcrowding and lack of proper ventilation in all dormitories was the main cause of mumps outbreak in the residential hostel. Lack of hand washing area and warm water. Improper isolation of cases and none of children were vaccinated against Mumps. Total roll of hostel was 123 students, boys – 60, girls -63 and total of 71 mumps cases, among them 42 children were having swelling and other symptoms. Attack rate comes out to be 58%. Majority of cases were in age group 8yrs followed by 13 and 14 years. Earache was the main symptoms followed by fever and headache among those having parotitis. No complicated cases were seen. Other symptoms like vomiting were present in 4 cases, diarrhea in 2 cases and dysentery in one case. Serological test done randomly among 10 cases and had shown positive for mumps infection.
RECOMMENDATIONS

- Immunization with MMR must be given to unaffected children. Immunization status should be checked and parents should be advised to keep copy of immunization card with them.
- It has been seen that three dormitory rooms were not enough for number of students that were accommodated. More rooms should be constructed as minimum space required by each child is 50sq.ft (range 50-70 sq.ft).
- In all room facility of cross ventilation should be made. Failure to do so will lead to many more epidemics in future.
- Few hand washing area with warm water should be made available in hostel.
- All boarding school should be ordered to maintain a health card of each student wherein immunization schedule should be mandatory.
- Immediate isolation of cases.
- Health education.

ACKNOWLEDGEMENTS

Source of Support: Nil

Conflict of Interest: None

REFERENCES

2. Local Health Department Guidelines for the Epidemiological Investigation and Control of Mumps. Maryland Department of Health and Mental Hygiene Infectious Disease and Environmental Health Administration Center for Immunization July 2012.