

## Investigation of an outbreak of varicella in a village of Goalpara District, India

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### ABSTRACT

**Background:** Chickenpox or varicella is a viral disease caused by varicella-zoster virus (VZV) with different complications. Due to traditional belief peoples/villagers avoids treatment and follows some traditional remedies and folk medicine. To change this thinking of villager's health awareness is mandatory. The main aim of the study was control the outbreak and minimizes the future transmission.

**Methods:** An outbreak was investigated in a village of Goalpara district of Assam, India after getting the permission from DHS (District Health Society). Total 42 (Forty two) numbers of patients affected out of 953 (Nine hundred fifty three) numbers of villagers. Blood samples were collected and serum obtained from the samples.

**Results:** The serum samples were tested for VZV IgM ELISA and found 88.09 % patients positive for VZV. Hygiene was observed very poor during our investigation.

**Conclusions:** Health awareness given to the all villagers and patients were treated symptomatically. Immunization, Proper nutrition, Improve living behavior etc can reduce the rate of outbreak.

**Keywords:** Awareness, ELISA, Hygiene, Remedies, VZV

### INTRODUCTION

Chickenpox or varicella is a contagious disease caused by varicella-zoster virus (VZV). VZV is belongs to herpes virus family. The main constraint of this disease is it is an

air borne disease spreads human to human by cough or sneeze.<sup>1</sup> Human are the primary host during early infection. The main symptoms of this disease are fever, body aches, fatigue, skin rash, irritability etc.<sup>2</sup> The rash may spread to other internal parts of the body too in

severe cases. Men are the main host for VZV. During the primary infection, VZV act on the upper respiratory tract and followed by reticuloendothelial system and finally caused viraemia, where both cell mediate immunity and humoral immunity fight against the virus.<sup>3</sup> The most common mode transmission VZV is believed to be person to person from infected respiratory tract secretions. Transmission may also occur by respiratory contact with airborne droplets or by direct contact or inhalation of aerosols from vesicular fluid of skin lesion of acute varicella zoster. There are various factors impact on human of this disease are immunity, climate/environment, population density etc. In this condition various factors shows their impact on human. Pregnant women and children are prone to this disease.

The incidence rate in temperate climate of this disease showed 13-16 cases of VZV per 1000 people in each year and maximum of them is children which are below 9 years but in tropical countries like India maximum cases are from adult groups.<sup>4</sup> Though the mortality rate of this disease is not so high but peoples became panic due to its communicability, lack of awareness, traditional believes etc. Health awareness and immunization is the main preventive measure of chicken pox. Assam government already having the routine immunization facilities for the children to control the disease but sometimes vaccinated children may also get this disease. Some of the research report as vaccine is more than 95% effective.<sup>5</sup> In 1974, Takashi of Japan introduced the vaccine of Oka strain.<sup>6</sup> The VZV vaccine was introduced by different countries in their routine immunization, in 1996; Singapore introduced opr licensed vaccine.<sup>7</sup> Time to time outbreaks of VZV reported from different countries. Between 2003 and 2007 a large outbreak was reported from Colombia where both adults and children were affected.<sup>8</sup> In the month of December 2007 an outbreak reported from India (Ambala). From the studies it was observed that out of one lakh VZV patient's 4-9 numbers of patients dies and out of this 4-9 numbers 81-85% adults.<sup>9,10</sup> This indicates that Chicken pox is also an important disease for public health.

## METHODS

### Study area

The study carried out in a village of Goalpara district. Goalpara district is the border district of Assam with Meghalaya. The other sides of the districts from Assam covered by are Dhubri, Bongaigaon, Barpeta and Kamrup (R). This is placed in the bay of river Brahmaputra, which is the main river of Assam and peoples of Assam having religious belief on it. The main communication of this district with outer is by bus or rail.

### Investigation and observation

After getting the telephonic information about suspected varicella cases in a village called "Pazabandha" of

Goalpara district under Mornai BPHC, the rapid response team (RRT) investigated the outbreak. Total 42 (Forty two) numbers of patients were suspected as varicella (VZV) infection by the team. All patients were found with varicella typical rash. The total population of the village was 953 (nine hundred fifty three) i.e. the incidence rate of the disease was 4.407. All the affected patients were from Muslim community. It was observed that hygiene of the village areas were very poor as well as all the patients were non-vaccinated. Maximum affected patients were children, 16 (sixteen) numbers of patients were above 15 years and 26 (twenty six) numbers of patients were between 0-14 Years.

The patients were treated symptomatically. Health awareness was given to the villagers to improve their hygiene or living behaviour.

### Sample collection

The study was conduct after getting the permission from district health society. Blood samples were collected from the all symptomatic patients in sterile, clean, labelled plain vials and allowed to clot. Clotted blood samples were centrifuged at 3000 rpm for 15 minutes. Clear serums were separated to new vials and labelled to avoid misinterpretation, and stored at -20°C deep freeze (LABOVISION). Separated stored serums were finally sent to RMRC (ICMR), Dibrugarh for confirmation of chicken pox by VZV IgM ELISA test.

## RESULTS

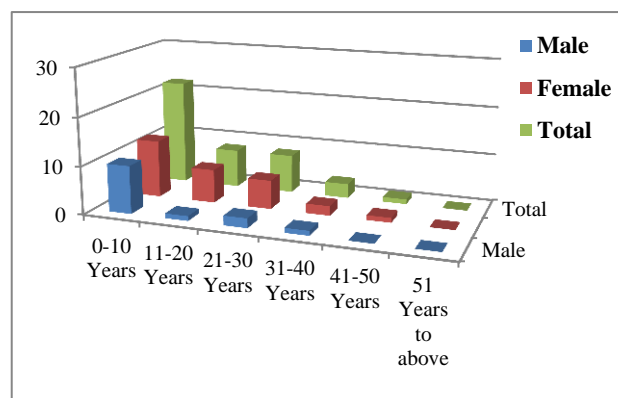


Figure 1: Age and sex wise infected rate.

The varicella-zoster virus (VZV) IgM ELISA test was done. All the reagents and samples were bringing to room temperature before perform the test. Positive control and negative control were used to interpret the result and check test quality. IgM antibody reaction with the anti-VZV was the main principle of the test. Conjugate and HRP changed the colour. The antigen-antibody developed colour reaction was stopped by stopping solution. The test result was readed by ELISA reader against 450 nm and the result showed 88.09 % patients positive for varicella-zoster virus. The results were

discussed with the BPHC in charge and requested to take necessary step to prevent further transmission. It was observed that children below 10 years were more affected in comparison with other age groups and sex wise females were more affected in comparison with males (Figure 1). With the help of BPHC in charge mike announcement, health awareness meetings were done; as this is an airborne disease as well as it cans spreads rapidly or easily. The points which can spread the disease like coughing, sneezing, direct contact etc were clearly informed to villagers and awarded them to take preventive measure.

## DISCUSSION

It was noticed in our study that the village having favorable environment to spread the disease including temperature, climate, living behavior, hygiene etc. The first case was reported in 28<sup>th</sup> April 2016; normally April is the month when temperature neither goes to too high nor to too low. Virus can easily infect, spread and multiply. Some of the articles reported as maximum numbers patients reported in late winter and early spring months in 2012 Harvey Simon wrote in his article Shingles and chickenpox. This was observed in our studies too as first case was in the month of April. In a study of Chakraborty S et al, in March 2016 observed that people refuse to take medicine in chicken pox and prefers to take traditional remedies only.<sup>11</sup> This was recorded in our study too, but after health awareness camp people understood and took medicines as per prescribed.

In Assam, evidence of different seasonal outbreaks observed time to time like encephalitis, acute diarrhea, rubella, measles, basicillary dysentery, viral hepatitis A, cholera, chickenpox etc. These outbreaks are only because of unawareness of the disease transmission, source of infection and lack of immunity. It was also important point that maximum outbreaks were reported from villages in comparison with town area. These were may be because of communication gap, low literacy rate, lack of awareness etc. which was observed in our study too.

The outbreak was investigated by the authors with a medical officer and paramedical workers team. During the investigation it was observed that the first positive patient infected after returning from another place. The patient may get the infection during his visit to that place, and from this patient the infection transmitted to other patients and then patient to patient. In the study it was suspect that as the disease outbreak reported in the month of April-May 2016, which was the favorable month for the VZV, first patient easily got the infection during his visit.

The analysis showed that maximum patients were between 0-10 years it's may be because they are in high risk due to their living strategies and less immunity. In a

study from Japan showed 81.4% chicken pox cases were below 6 years.<sup>12</sup> Again another study by Socan M et al, also reported in 2010 as highest transmission in children.<sup>13</sup> Whereas in another study showed maximum affecting age groups were adults and they were with different complications.<sup>14</sup> Hence it is clear that all age groups may affects and which may leads to different complications. As per our study females were more affected but in a study by Fleming DM et al, in 2003 found maximum affected females age group were 15-24 years and other age groups didn't had difference sex shingles.<sup>15</sup>

## CONCLUSION

Vaccination, health awareness, proper nutrition etc may control or prevent the outbreak. For which all have to works together including government, NGOs, different unions and village's active peoples. Hence, it is important to improve our surveillance system for early detection and control measure to prevent the probable outbreak with collaboration of all governments and non governments' agencies.

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