

# Epidemiological Survey of Varicella-Zoster Infection in Faisalabad city v/s various adjoining Areas of Faisalabad in 2017

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## ABSTRACT

**Objective:** To study the distribution and frequency of Varicella infection and the influence of socioeconomic status or facility of better health care on the outcome of infection in Faisalabad city and its periphery. **Study Design:** An Epidemiological Survey. **Setting:** It was carried out at Allied Hospital Faisalabad. **Period:** Cases presented from Faisalabad city and its peripheral areas, from January to October 2017 were included. **Sample Size:** Overall 323 patients, irrespective of the time of their presentation since the appearance of varicella rash, were included in this survey. **Methodology:** Data was analyzed and concluded in Statistical Package for the Social Sciences (SPSS) version 17. **Result:** Total of 323 cases was reported all over the district Faisalabad in 2017, out of which 206 (64%) cases were from Faisalabad city and remaining 117 (36%) were from adjoining areas (Tehsil) of Faisalabad. They were then distributed according to the day of their presentation in Teaching Hospital, which reveals that among 44 late presenters only 18 (41%) cases were reported from Faisalabad city while remaining 26 (59%) cases were from peripheral areas (Tehsils) of Faisalabad. Out of 279, those who presented to the hospital early, only 5 (1.8%) cases were expired, as compared to 4 (9.1%) cases among 44 late presenters. **Conclusion:** Varicella infection is more common in urban areas, which are more densely populated. While the proportion of deaths among infected people is higher among those who dwell in peripheries, away from the better healthcare facilities.

**Keywords:** Varicella, Faisalabad, Periphery, Hospital, Deaths.

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## INTRODUCTION

Chickenpox or varicella is a rash appears in three phases; firstly appears as raised red colored bumps may be itchy, which then converted to small vesicles, followed by ruptured blisters and crust or scab formation, this whole process takes about 5-10 days.<sup>1</sup> The rash may lit up on the face firstly, then spread to the chest, back and finally to the rest of the body, including inside the oral cavity, eyelids, or groin area.<sup>2</sup> Chickenpox is a highly contagious viral infection specifically to those who haven't had the disease before or been vaccinated against it.<sup>1,2</sup> It takes 10-21 days to appear after being exposed to the patient. Fever, headache, malaise, and anorexia are other non-specific symptoms related to infection, appear 1-2 days before the rash.<sup>2</sup> Varicella is usually a mild disease but spectrum of its complications starts from simple skin infection to pneumonia, encephalitis, sepsis, toxic shock syndrome or even death.<sup>1</sup> Death may occur in healthy, unvaccinated children and adults, and many of have contracted the virus from their unvaccinated kids.<sup>2</sup> Those who are specifically at risk of having complicated varicella infection include; exposed newborns or infants, immune-compromised, and pregnant females. It is often seen that children have milder disease than that in adults.<sup>1</sup>

It has been said, 'Reye syndrome is usually associated with viral infections, especially influenza B and varicella when these are treated with salicylates'. According to surveys, it is declared that concomitant diarrhea along with this illness increases case

fatality rate. It is most commonly presented in 4-12 years old children dwelling in rural and suburban areas. Pathophysiology of Reye syndrome involves mitochondrial dysfunction. It starts within 5-7 days of viral infection, with delirium preceded by sudden onset vomiting and followed by seizures, coma or even death.<sup>3</sup>

A single dose Chickenpox vaccine which contains live attenuated varicella virus is enough to give long-term immunity against the infection.<sup>4,5</sup> According to the surveys, two doses are even better. It can be given within 5 days post exposure, to prevent the disease. The principle of herd immunity is also applicable in case of varicella vaccine. Route of its administration is subcutaneous.<sup>5</sup>

Taking composition of varicella vaccine into account, it can't be given to those who are immune-compromised or are at risk of severe varicella infection. This group of people includes those children having leukemia/lymphomas, those having chemotherapeutic agents and steroids, HIV (with decreased CD4 count), or other immune deficiencies, premature babies, and pregnant females with no evidence of varicella immunity.<sup>2,4</sup> Varicella immune globulin product is now licensed to be used in people of the above-mentioned group, which is labeled as VariZIG™. For its maximum effect to happen, it should be administered within 10 days after being in contact with the sick. American Academy of Pediatrics also recommends oral acyclovir to people who at higher risk of having moderate to

severe illness. This group includes; person older than 12 years who is healthy otherwise, the patient with the chronic pulmonary disease, person having salicylates or aerosolized or intermittent steroids therapy. An oral antiviral drug should be given within 24 hours after the rash appears.<sup>2</sup>

## METHODOLOGY

**Study Design:** An Epidemiological Survey.

**Setting:** It was carried out at Allied Hospital Faisalabad.

**Period:** Case presented by Faisalabad city and its peripheral areas, in the months of January-October 2017 were included.

**Sample Size:** Overall 323 patients, irrespective of the time of their presentation since the appearance of varicella rash, were included in this survey.

**Data Collection and Analysis:** Data were gathered from the hospital records and was analyzed in Statistical Package for the Social Sciences (SPSS) version 17.

## RESULTS

### Demographical distribution:

Total of 323 cases, was reported all over the district Faisalabad in 2017, out of which 206 (64%) cases were from Faisalabad city and remaining 117 (36%) were from adjoining areas (Tehsil) of Faisalabad. (Figure 1)

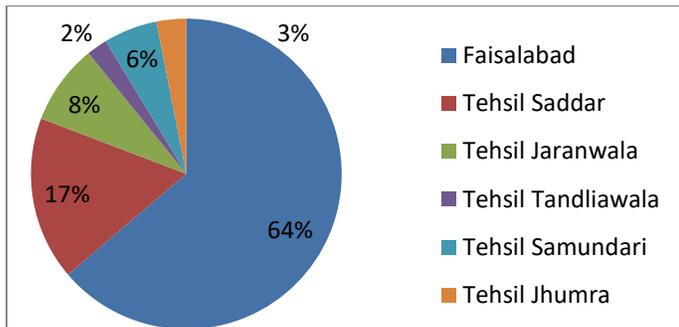


Figure 1: Demographical distribution of patients

### Distribution by age and gender

Out of 323 patients, 114(35.3%) were from the age group of 31-45 years, among them 69 were from Faisalabad city and 45 were from peripheral areas of Faisalabad. (Table # 1)

Table 1: Demographical distribution by Age

	15-30 years	31-45 years	46-60 years	61-75 years	76-90 years
Faisalabad City	47	69	57	25	8
Peripheral Areas	24	45	32	12	4
Total	71	114	89	37	12
Percentage	21.9%	35.3%	27.6%	11.5%	3.7%

As a whole, the number of reported male patients were 155 (48%), remaining were females.

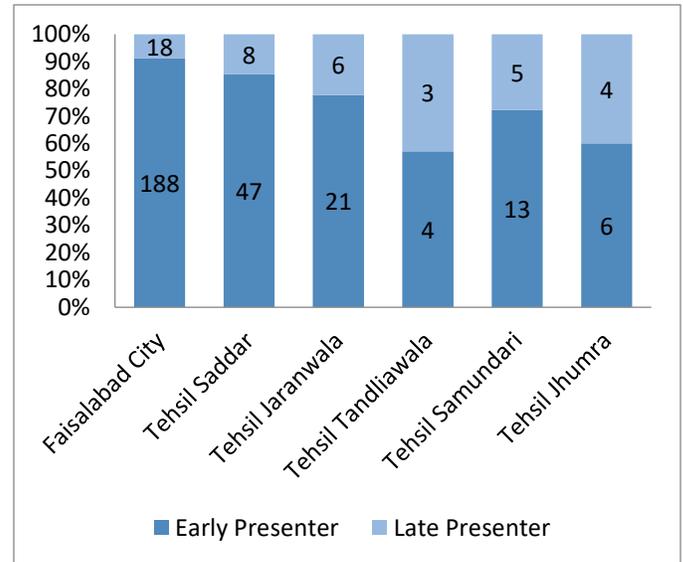


Figure 2: Distribution on the basis of time of presentation

### Distribution by the time of presentation:

Early presenters were defined as, the cases presented within 5 days of the appearance of the rash, while late presenters were those who were presented after 5 days of the appearance of the rash. Among 206 cases presented from Faisalabad city, 188 were early presenters and 18 were late presenters. As per cases from periphery was concerned, the total of 91 cases was presented within 5 days of the appearance of the rash, while 26 cases were those who presented at 6th day or more of the appearance of the rash. Figure 2 shows the distribution in respective areas.

### Distribution by Number of Deaths:

Early and late presented were then sorted by the number of deaths, to show the significance of the time of presentation on the overall outcome. Table 2 shows the total number of expiries among early presenters.

Table 2: No. of Deaths in Early Presenters

	No. of Cases Presented	No. of Deaths
Faisalabad City	188	1
Tehsil Saddar	47	2
Tehsil Jaranwala	21	2
Tehsil Tandliawala	4	0
Tehsil Samundari	13	0
Tehsil Jhumra	6	0
Grand Total	279	5

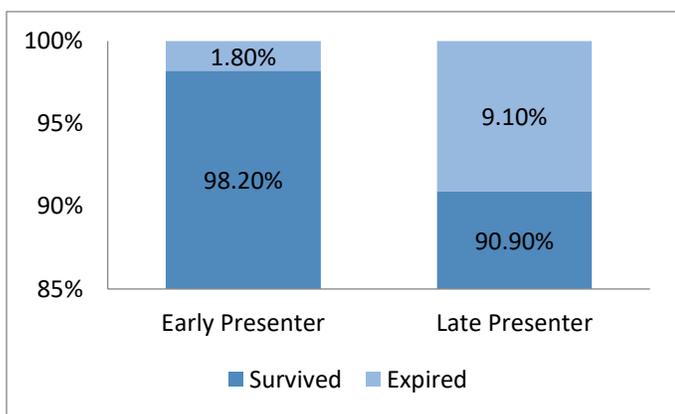
Table 3 depicts the total number of deaths among those who were presented 6<sup>th</sup> day or later, after the appearance of the rash.

**Table 3: No. of Deaths in Late Presenters**

	No. of Cases Presented	No. of Deaths
Faisalabad City	18	0
Tehsil Saddar	8	1
Tehsil Jaranwala	6	2
Tehsil Tandliawala	3	0
Tehsil Samundari	5	1
Tehsil Jhumra	4	0
<b>Grand Total</b>	<b>44</b>	<b>4</b>

**Proportion of Patients Survived or Expired while their stay at hospital:**

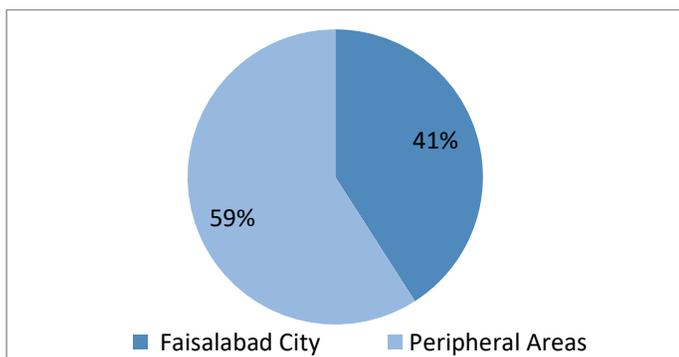
Out of 279, those who presented to the hospital early, only 5 (1.8%) cases were expired, as compared to 4 (9.1%) cases among 44 late presenters who were passed away. (Figure 3)



**Figure 3: Survival of patients on the basis of time of presentation**

**Demographical distribution according to the time of presentation:**

According to the study, among 44 late presenters, only 18 (41%) cases were reported from Faisalabad city, while remaining 26 (59%) cases were from peripheral areas (Tehsils) of Faisalabad. (Figure 4)



**Figure 4: Distribution of Late Presenters according to the area of their residential Address:**

**DISCUSSION**

An epidemiological survey of varicella infection was conducted in Romania in the time period of 10 years. The most inflicted age group was 5-9 years old children. The most of them have just had rash and fever. Among 353 hospitalized patients during 2011-2013, more than half were males. Out of 353, 237 hospitalized patients were from urban areas.<sup>6</sup>

Varicella is a serious infection both in immune-compromised and immune-competent patients. According to various trials and studies, it has been proved that varicella vaccine has not only reduced the incidence of varicella but also has lessened the number of complicated cases of varicella that require hospitalization.<sup>7</sup>

An epidemiological survey was conducted in Spain, in which all hospital admissions were analyzed for the time period of 1995-98. Second most affected age group was between 21 to 50 years old, <10 years old being the most afflicted group. Primary varicella infection causes 6174 days per annum, being hospitalized, which cost about 1.6 million euros. The conclusion deduced was to vaccinate infants and adults who are at risk, to reduce morbidity caused by varicella.<sup>8</sup>

The socioeconomic status of the patients is also effective on the disease outcome and the incidence rate according to a study conducted in Tokyo. It stated poverty, being a child of the single parent, working and educational status of mother and living in underdeveloped areas of cities, as the factors influence the number of infants/adults being immunized.<sup>9</sup> Another study also highlighted that poor urban infants born to a single mother and those living alone with their mothers, should be followed up to make it sure that they have been immunized adequately.<sup>10</sup>

A statistically significant negative correlation has been found between income inequality and the mortality or case fatality rates. The study concluded that variations between different states of the USA in the unequal per capita distribution of income, associated with the variations of their health outcomes. Economic policies thus influence the health of countries.<sup>11</sup>

Varicella-associated hospitalizations peaked in winters especially around the month of November. This study supported the use of varicella vaccine as it will be expected to decrease the disease burden and mortality or morbidity rates. As in the pre-vaccine period, varicella infection has caused significant morbidity and mortality in Brazil. It cannot be considered a benign disease, since it is responsible for almost one death every two days by the disease, generating an average of 34 hospitalizations per day. This study forces one to believe that varicella in developing countries, in conjunction with factors such as lack of money, education, food and access to health care facility, frequently requires hospitalization, possibly resulting in death.<sup>12</sup>

**CONCLUSION**

The incidence of varicella infection is more common in urban areas, which are more densely populated and infected patients are more likely to interact with each other in cities, for example in schools, offices and work places. While the proportion of

deaths among infected people is higher among those who live in peripheries, as they were referred to the teaching hospital later in the course of their disease that in turn led to the higher proportion of deaths among them. This cannot only be overcome by patient education i.e when to consult the doctor and how to avoid spreading the infection but also by improving health care facilities in the peripheries.

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