

# Onset of Adult Varicella in Relation to Rural or Urban Origin and its Complications

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## ABSTRACT

**Objectives:** To determine area of origin of adult varicella patients, whether rural or urban, to compare the mean interval between leaving the area of origin and onset of varicella in adults of rural origin in comparison with those of urban origin and to observe its complications.

**Study Design:** A cross-sectional study.

**Place and Duration of Study:** Combined Military Hospital, Abbottabad, from January to December 2006.

**Patients and Methods:** All patients over the age of 18 years, presenting with acute illness clinically, suggestive of varicella were included in the study. A specially designed proforma was filled for each patient separately, which included demographic features as well as area of origin, whether rural or urban, and the age at which they left the area of origin. These patients were examined, treated and assessed clinically on regular basis for the progress of the disease as well as for its possible local or systemic complications. Data analysis was done by using statistical programme SPSS-10.

**Results:** Out of 9155 adult patients, 156 (1.70%) had varicella, including 128 (82.1%) males and 28 (17.9%) females. Origin was rural in 125 (80.1%) and urban in 31 (19.9%) patients. Mean interval between leaving area of origin and developing varicella in those of rural origin was  $01.79 \pm 01.78$  years and that in patients of urban origin was  $03.37 \pm 05.72$  years ( $p \pm 0.009$ ). None of the patients developed any complication of the disease.

**Conclusion:** Varicella in adults is generally a benign illness. It is more common among adult males of rural origin and the interval between leaving the area of origin and onset of varicella in these patients is significantly less as compared to that in adults of urban origin.

**Key words:** *Varicella. Chickenpox. Varicella-Zoster virus. Epidemiology. Complications. Adults.*

## INTRODUCTION

Varicella is an acute primary infection caused by Varicella-Zoster Virus (VZV). Varicella is spread by droplets and is a highly contagious disease. It is characterized by a centripetal, polymorphic rash, which resolves in 7-10 days by crusting of the lesions.<sup>1</sup> Although, generally a benign disease, varicella can develop into a more serious illness, resulting in complications like pneumonia, encephalitis and endocarditis.<sup>2</sup> Varicella is predominantly a childhood disease but it is commoner in adults in tropical regions.<sup>3,4</sup> In certain studies, it has been shown that adult susceptibility to varicella is higher in rural than urban areas.<sup>5,6</sup> No study, however, has so far been conducted in Pakistan to determine prevalence of varicella among adult population in relation to their area of origin and to note interval between leaving the area of

origin and development of varicella. Moreover, published data on complications of varicella in Pakistan is scarce.

The objectives of this study were to determine area of origin of adult varicella patients, whether rural or urban, to compare the mean interval between leaving the area of origin and onset of varicella in adults of rural origin in comparison with those of urban origin and to observe its complications.

## PATIENTS AND METHODS

This cross-sectional study was conducted at Dermatology Department of Combined Military Hospital, Abbottabad, over a period of one year from January to December 2006, after approval by research and ethics committee of the hospital.

Inclusion criteria of the study were adults of either gender over the age of 18 years, suffering from varicella and presenting with acute febrile illness, having polymorphic cutaneous eruption in centripetal distribution. They were selected by the non-probability convenience sampling technique. A specially designed proforma was filled separately for all the patients, fulfilling inclusion criteria. The proforma included age, gender, nationality, date of eruption, origin of the patient and the age at which patient left the area of origin. Origin of the patients was taken as rural or urban irrespective

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of the specific place. An urban area was defined as a municipality or town with a population of 100,000 or above.

Patients having profuse eruption with high grade fever, pregnant ladies and all serving soldiers were hospitalized as per the hospital standing operating protocol. All the patients were treated with topical calamine lotion and oral erythromycin 500 mg, 8 hourly for 03-05 days. Oral antipyretics were given on as and when required basis. Oral acyclovir was given to all pregnant ladies and those with profuse eruption and persistent high grade fever. It was given in the dosage of 800 mg, 5 times a day for 05-07 days. The hospitalized patients were examined and assessed clinically on daily basis for the progress of the disease as well as for its possible local or systemic complications. X-rays chest were obtained in all the patients except pregnant ladies. Platelet count was also carried out once in all 3 patients from 07 to 28 days after onset of the cutaneous eruption. These patients were discharged from the hospital as soon as the crusts were formed over the lesions and advised to report back in case of development of physical ill health within subsequent 04 weeks. All those patients not hospitalized were advised to report back after every 3 days for clinical assessment till crust formation over the cutaneous lesions. X-rays chest were obtained in all those patients as well. Platelet count was carried out only in those outdoor patients who were available after 07 days onwards from the onset of cutaneous eruption.

Data analysis was done using statistical programme SPSS version 10. Descriptive analysis was done to describe clinicodemographic features of the patients. Frequencies and percentages were obtained for the variables where applicable. Mean and standard deviation were calculated for continuous variables. Means of interval between leaving the area of origin and development of varicella were compared between those of rural origin and urban origin by using independent samples t-test. A p-value of 0.05 was considered significant.

## RESULTS

A total of 9155 adult patients were registered in dermatology department of the hospital during the study period. Out of those, 156 (1.70%) were diagnosed to be suffering from chickenpox. Age of the patients ranged from 19-40 years with a mean of  $24.22 \pm 05.63$  years. Out of those patients, 128 (82.1%) were males and 28 (17.9%) were females. Majority of the patients (n=152, 97.4%) were Pakistani and 04 (02.6%) belonged to Maldives. One hundred and twenty-five (80.1%) were rural in origin. In case of those belonging to rural areas, the interval between leaving the area of origin and development of varicella ranged from one month to ten years with a mean of  $1.79 \pm 1.78$  years. In patients of

urban origin, the mean interval between leaving the area of origin and development of varicella was  $3.37 \pm 5.72$  years (p=0.009) (Table I).

**Table I:** Frequency of rural and urban origin and mean interval between leaving area of origin and onset of varicella (n=156).

Variables	Rural origin	Urban origin	p-value
Number	125 (80.1%)	31 (19.9%)	
Mean interval between leaving origin and onset of varicella	$1.79 \pm 1.78$ years	$3.37 \pm 5.72$ years	0.009

One hundred and thirty-seven (87.8%) patients were hospitalized, whereas 19 (12.2%) were treated in outdoor. Only symptomatic treatment was given to 144 (92.3%) and oral acyclovir along with symptomatic treatment was given to 12 (07.7%) patients. None of the patients developed any local or systemic complications of varicella. Platelet count was carried out in 130 patients at a single occasion between 07 to 28 days after the onset of cutaneous eruption. A low platelet count (between 1,25,000-1,50,000 per deciliter) was found in 03 (01.9%) patients. All other patients had a count between 1,50,000 and 4,50,000 per deciliter.

## DISCUSSION

Varicella is generally considered less common in adults. However, it has been shown in many studies that seroconversion to Varicella-Zoster virus develops at a later age in tropical countries as compared to temperate countries because of seasonal and regional variations.<sup>3,7</sup> O'Grady *et al.*, while reporting varicella as a common occurrence in adults, further suggested that social and cultural factors and population mobility are more important determinant for seroconversion than tropical climate itself.<sup>8</sup>

Like certain other studies,<sup>4</sup> in this study too, the reported frequency in adult males was more as compared to adult females indicating decreased or delayed seroconversion to Varicella-Zoster immunity and hence increased susceptibility to varicella among adult males. The reason for early seroconversion and high seroprevalence in adult females is not known but less reported frequency among adult females is obvious keeping in view the social and cultural values of our society, where majority of females are most of the times confined to household and less exposed to outside world. However, the immunity acquired in females may not be long lasting,<sup>9</sup> as females acquire the immunity earlier than males; this could be the reason for early waning of the immunity. Possible biological reasons for gender disparity in acquisition and maintenance of Varicella-Zoster virus specific immunity remain to be determined.

Majority of patients in this study were rural in origin. Although, the study was conducted at one place, the

patients migrated from different parts of the country either permanently or for a few years. Other studies in the region have also shown preponderance of rural patients.<sup>5,6</sup> Less exposure to VZV during childhood in rural areas accounts for the reported greater frequency of varicella in adults belonging to rural areas. The findings suggest that adults belonging to rural areas, when migrate to urban areas are susceptible to develop varicella infection earlier in comparison with those of urban origin. Should these susceptible individuals, in particular those shifting to institutional settings like military establishments, hostels etc., be immunized? This needs to be analyzed with care for multiple reasons. Firstly, varicella in our region is generally a benign, self-limiting disease without considerable morbidity. Secondly, it may not be cost-effective and finally as vaccination becomes widespread, loss of immunological boosting may cause a decline in vaccine efficacy, a reduced period of immunity and higher incidence of herpes zoster.<sup>10</sup>

Varicella is generally considered a mild illness and recovery takes place without complications.<sup>11</sup> However, a French study carried out by Boelle and Hanslik<sup>12</sup> and a Spanish study<sup>13</sup> have shown a significant mortality rate in adults and elderly. Many other studies have shown varicella patients developing complications, like skin and soft tissue infections,<sup>14</sup> pneumonia,<sup>15-18</sup> bacteremia, central nervous system involvement<sup>15,16</sup> and thrombocytopenia.<sup>19</sup> In this study, out of 130 patients, only 03 (01.9%) developed thrombocytopenia with a platelet count between 125,000-150,000/mm.<sup>3</sup> All the 03 patients were tested for platelets between 07-14 days after onset of the eruption. None of the patients developed skin or soft tissue infection or bacteremia and the reason probably was that all the patients were prescribed oral antibiotics for 03 to 05 days at the first encounter.<sup>14,20</sup> Similarly, none of the patients developed pneumonia or central nervous system involvement in spite of the fact that only 12 (07.7%) patients received oral acyclovir. As X-rays chest were obtained in all the patients, except pregnant ladies, and 137 (87.8%) patients were hospitalized and closely monitored on daily basis, these could be the reasons for almost no complications in our patients.

Majority of patients (n=117, 75.0%) in this study were serving soldiers and military recruits. It was mandatory to hospitalize and isolate them to limit spread of the infection in institutional setting. It can not be suggested to hospitalize majority of the cases of varicella including apparently less severe cases, as was the case in this study, because of the economic reasons.

## CONCLUSION

Varicella in adults is generally a benign illness. It is more common among males of rural origin and the interval between leaving the area of origin and onset of varicella

in these patients is significantly less as compared to that in adults of urban origin.

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