

## ORIGINAL ARTICLE

## EFFECT OF TEMPERATURE AND HUMIDITY ON EPISTAXIS IN HAZARA DIVISION

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**Background:** Epistaxis is one of the commonest ENT emergencies and is experienced by up to 60% of people in their lifetime, with 6% requiring medical attention. The objective of the study was to determine the frequency of primary epistaxis and its relationship with temperature and relative humidity. **Methods:** This cross sectional study included 460 patients with epistaxis attending the ENT Department of Ayub Medical College, Abbottabad. Daily temperature and humidity record was obtained from the department of Hydrology and Meteorology of Hazara Division. The results of four hundred and sixty patients were analyzed for the effect of temperature and humidity on the frequency of epistaxis. Data was analysed using SPSS-11. Pearson's *r* was calculated to determine correlation between different variables. **Results:** A total of 460 patients were included, out of which 206 (44.8%) had primary epistaxis. The frequency of primary epistaxis was seen to be higher during the cold period from October to March. Statistical analysis showed good negative correlation between temperature and primary epistaxis ( $r=-0.948$ ) while average correlation with humidity ( $r=-0.445$ ). **Conclusion:** The relationship between temperature and primary epistaxis was good while that with relative humidity was average.

**Keywords:** Temperature, Epistaxis, Relative humidity.

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## INTRODUCTION

Epistaxis is defined as bleeding of the nasal mucosa, and represents the most common emergency in Otorhinolaryngology; with prevalence of about 10–12%.<sup>1</sup> Statistics show that among 60% of the people that experience at least one episode of epistaxis in their life time, only 6% avail medical services.<sup>2</sup> Although various factors are responsible for nasal bleed, the climatic conditions are considered one of the important factors that influence its frequency. Increased incidence has been reported during the winter owing to climatic conditions of low moisture and temperature.<sup>3,4</sup> The increased incidence of epistaxis especially during the dry and cold seasons affects its hospital admission rates; being greatest during the autumn and winter months. This seasonal variation correlates with fluctuations in the environmental temperature.<sup>2,5</sup> However, there are controversies in the literature about the effects of meteorological elements on the frequency of epistaxis. The nasal bleeding presents a positive correlation with the atmospheric pressure and the low relative humidity. The temperature correlates with epistaxis negatively.<sup>6</sup> Other authors show that the low temperature in association with changes in the atmospheric pressure increases the incidence of epistaxis.<sup>7,3</sup> Statistics of few reports supports that there is a correlation between the frequency of epistaxis and at least one of the meteorological factors, i.e., temperature, humidity and atmospheric pressure.<sup>8</sup>

Epistaxis is clinically classified as primary if

there is no proven cause and secondary if there is a definite identifiable cause. Its other classification labelled as childhood and adult is based on the age of onset. Site of bleeding is another reference for its classification as anterior or posterior in relation to the piriform aperture.<sup>2,8</sup> Causes of epistaxis can be broadly classified as idiopathic, local and systemic. Proper diagnosis demands careful history, physical examination and laboratory investigations.<sup>1,7,8</sup>

Hazara division is mostly hilly with rainy seasons. Aim of the study was to observe the frequency of primary epistaxis at Ayub Teaching Hospital and its correlation between temperature and humidity in the Hazara division.

## MATERIAL AND METHODS

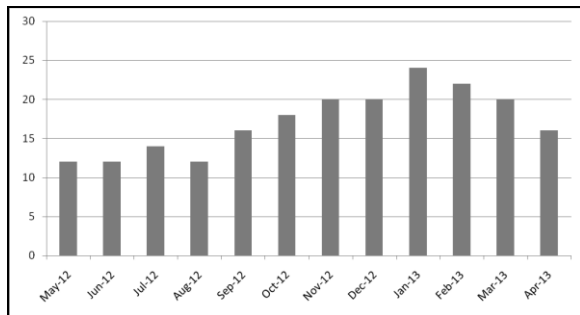
A cross sectional study was conducted at the ENT Department, Ayub Medical College, Abbottabad from May 2012 to April 2013. Four hundred and sixty patients with nose bleed admitted through OPD or casualty or referred from other departments were included in the study. The inclusion criteria were patients of either sex, with a history of epistaxis without any known cause or primary epistaxis. The exclusion criteria were patients with obvious causes for epistaxis, patients with trauma, coagulopathies, tumours and systemic causes. Daily temperature in Celsius (°C) and humidity in percentage as documented by the Department of Hydrology and Meteorology of Hazara division was recorded during the study period. Informed consent was obtained

from the patients or from their caretakers. Data was analysed using SPSS-11. Pearson's  $r$  was calculated to determine correlation between different variables.

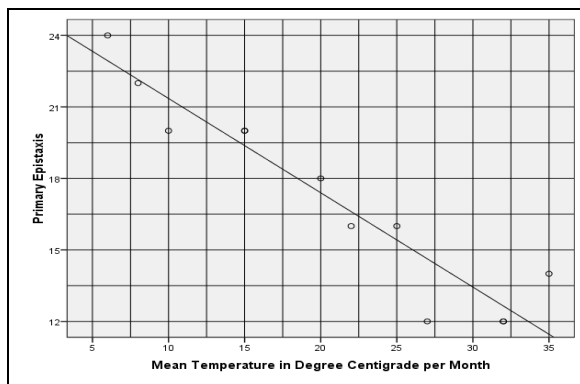
**RESULTS**

A total of 460 cases of epistaxis presented at the ENT department of Ayub Teaching Hospital (ATH) out of which 206 (44.8%) cases were found to be primary. Out of the 206 patients who had primary epistaxis, 130 (63.1%) were male and 76 (36.9%) were female. The male to female ratio was 1.7:1. The age ranged from 3 to 81 years, with the highest number of cases being in the fourth decade with a mean of 34 years. Children below 16 years constituted 28(13.6%) of the primary cases; and 190 (92.2%) presented with anterior epistaxis and the rest with posterior epistaxis.

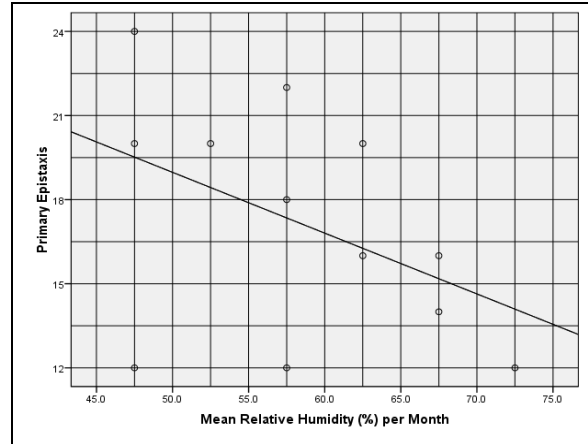
Figure-1 shows that the frequency of epistaxis started rising from October till January, and then the cases started decreasing. The maximum numbers of cases were seen with the start of winter and during the whole winter (November to February). Pearson's coefficient correlation ( $r$ ) between primary epistaxis and temperature was found as linear correlation ( $r = -0.948$ ), which is nearly perfect negative correlation (Figure-2). Similarly correlation coefficient between the primary epistaxis and relative humidity was found to be  $r = -0.445$ ; an average negative correlation between the primary epistaxis and the relative humidity (Figure 3).



**Figure-1: Month wise frequency of Primary Epistaxis (2012-13)**



**Figure-2: Correlation between the temperature and Primary Epistaxis ( $r = -0.948$ )**



**Figure-3: Correlation between the temperature and Primary Epistaxis ( $r = -0.445$ )**

**DISCUSSION**

Epistaxis is one of the commonest emergencies that are managed by the ENT departments almost on daily basis. However, the good thing is that most of the cases are of secondary epistaxis.<sup>2,9</sup> The hospital admissions for epistaxis seem to have an influence of the climatic conditions.<sup>4</sup> The proportion of primary epistaxis in this study was 44.78%, which is comparable with the study of Rijal *et al*<sup>2</sup> who found primary epistaxis in 40.01% of the patients. A study conducted by Razdan *et al*<sup>10</sup> showed primary epistaxis in 42.6% (16.5% indoor and 26.1% outdoor) cases, while Vanarasy S and Saxena RK<sup>11</sup> documented 35.23% of the cases to be of primary epistaxis. Adhikari *et al*<sup>12</sup> found primary epistaxis in 24.7% patients in their study. Male to female ratio of primary epistaxis was 1.7:1 suggestive of male preponderance which is consistent with other studies.<sup>3,5,13,14</sup> Primary epistaxis was more common in the fourth decade of life in our study which is consistent with other studies.<sup>2,3</sup> The less number of children in our study also had similarities in contemporary literature.<sup>2,3,15,16</sup> The most probable reason is that epistaxis in children is self-limited, internment is not common, and severe epistaxis being more frequent in adults.

In our study the frequency of epistaxis was seen to rise during the cold weather like the study of Rijal *et al*.<sup>2</sup> This could be due to the dry air owing to low humidity in cold weather. Apart from this, the humans also face a difference of the temperature and humidity outside and inside of homes during winter season. This may lead to drying of the nasal mucosa, making it fragile and hyperaemic leading to crusting and nasal bleeding.<sup>17</sup> The rising frequency of cases observed during the cold months of the year and low incidence of epistaxis seen from April to September were found consistent with other published studies.<sup>2,6,14</sup> The study conducted by Danielides *et al*<sup>5</sup> showed that daily

number of epistaxis depends mainly on mean, minimum and maximum temperature and water vapour pressure.

Our study showed that there is a strong correlation between epistaxis and ambient temperature and average relation with the relative humidity. Pearson's coefficient correlation between two variables (cases of epistaxis and temperature) was -0.948 and that for humidity was -0.445, which is consistent with the study of Rijal *et al.*<sup>2</sup> Bray *et al.*<sup>4</sup> in their study showed that there is no correlation between ambient temperature, seasonal preponderance, presentation rate or admission rate for patients with primary epistaxis. Though our study demonstrated that there is a correlation of temperature and humidity in the aetiology of primary epistaxis, further studies with large sample sizes are needed to come to a definite conclusion.

## CONCLUSION

Primary epistaxis was common in the fourth decade of life in males and anterior bleeding was more common than posterior. The frequency of primary epistaxis was higher in the cold season, between October and March. A very strong negative correlation was found between primary epistaxis and temperature while a relatively strong negative correlation with humidity. Further national studies are recommended to come to a definite conclusion regarding effects of temperature and humidity on the frequency of primary epistaxis.

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