

# Seasonal Variation in Epistaxis in Districts of Upper Assam: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Epistaxis whether spontaneous or acquired is one of the most common Ear, Nose, Throat (ENT) emergencies. Its management can be challenging depending on the origin of bleeding and presence of precipitating factors.

**Aim:** To find out the seasonal variation in epistaxis according to age, gender, region and aetiological factor.

**Materials and Methods:** This cross-sectional study was conducted from June 2019 to June 2020 in a tertiary care centre in Upper Assam, India. In this study, the seasons were divided according to weather atlas as follows: Winter- December, January, and February; Spring- March and April; Summer- May and June; Monsoon- July, August and September; and Autumn-

October and November. The data collected was tabulated in Microsoft Excel worksheet and the categorical variables were summarised as proportions and percentages.

**Results:** Out of 313 patients, 221 (70.6%) were males and 92 (29.4%) were females. High male preponderance with male to female ratio of 2.4:1 was noticed. Maximum number of patients were seen in month of October, 66 cases (21%). Minimum male patients were seen in month of June 2020 2 cases (0.6%) and minimum number of female patients were seen in the month of February and April (0.3%).

**Conclusion:** The major cause of epistaxis in this region is hypertension, therefore peripheral health facility should be ready for treatment.

**Keywords:** Aetiology, Demography, Epidemiology, Hypertensive epistaxis, Incidence

## INTRODUCTION

Epistaxis is a common occurrence accounting for 1 in 200 emergency patients. Sixty percent of individuals will have an episode of epistaxis in their lifetime while 6% among them will need medical treatment [1]. Epistaxis is of two types i.e., posterior and anterior. This division is based upon the blood supply and location of affected vessel. A majority (90-95%) of them are located anteriorly while a minority (5-10%) are located posteriorly. The anterior epistaxis can be treated with chemical or electrocautery after visualisation through an anterior rhinoscopy while the posterior epistaxis requires rather belligerent measures [2].

There has been a consensus that physical factors like the temperature and sultriness of the surrounding air have an effect on the incidence of epistaxis. During winters, the occurrence of epistaxis is maximum while it is minimum during the summer months [3]. It is difficult to precisely determine their frequency because most episodes resolve spontaneously or with self-treatment [4]. Majority of epistaxis incidents are anterior in origin, arising from Kiessel-bachs plexus in little area of nasal septum. In around 5-10% of cases, epistaxis originates posteriorly, mostly from a branch of sphenopalatine artery. These bleeds occur very rarely but are severe in nature [5].

Epistaxis most commonly occurs in colder and dryer months. Due to climatic changes in Assam, there is significant variability in temperature and humidity in the year. Summers are usually humid as compared to winters which are generally drier and colder, this dryness makes the nasal mucosa more redundant to micro-abrasions which in turn leads to epistaxis [6]. It is hypothesised that epistaxis patients will most commonly present in winter months, when the weather is cold and significantly less humid.

The Outpatient Department (OPD) in ENT department of Assam medical college has approximately 150 cases per day out of which 2-3 cases per day are diagnosed with epistaxis. It was generally noticed that there is a seasonal variation. Hence it was decided to objectively study any variation in the incidence of epistaxis in relation to seasons.

## MATERIALS AND METHODS

This was a cross-sectional study in which the retrospective data of 313 patients diagnosed with epistaxis in OPD of Otorhinolaryngology, Assam Medical College, Dibrugarh, Assam, India from June 2019 to June 2020 were studied. The data was compiled and analysed in July-August 2020. The study has been carried out with institutional ethical clearance from Assam Medical College Ethical Committee (IEC/636). The written and informed consent were taken from all patient participating in this study and from the parents/guardians of children.

**Inclusion criteria:** The age group of study population was from 1 year to 90 years. Any individual aged  $\geq 1$  year with a nosebleed or history of nosebleed who needed medical treatment or sought medical advice in ENT department were included.

**Exclusion criteria:** Epistaxis associated with road traffic accidents or physical assault and epistaxis following any surgical procedure.

The study seasons were divided as follows: Winter was defined as December, January, and February; Spring was defined as March and April; Summer was defined as May and June, Rainy season- July, August and September; and Autumn was defined as October and November according to weather atlas [6]. Outcome was to find the seasonal variation in epistaxis according to age, gender, region and aetiological factor.

## STATISTICAL ANALYSIS

The data collected was tabulated in Microsoft Excel worksheet and computer-based analysis was performed using the Statistical Product and Service Solutions (SPSS) 20.0 software (SPSS, Chicago, Illinois, USA) and Microsoft Excel 2019. The categorical variables were summarised as proportions and percentages.

## RESULTS

Out of 313 patients, 221 (70.6%) were males and 92 (29.4%) were females. High male preponderance with male to female ratio of 2.4:1 was noticed as shown in [Table/Fig-1].

Month	Number of males	Number of females
June 2019	30	3
July 2019	23	11
August 2019	16	15
September 2019	18	9
October 2019	42	24
November 2019	31	12
December 2019	22	8
January 2020	10	2
February 2020	11	1
March 2020	6	2
April 2020	4	1
May 2020	6	2
June 2020	2	2
<b>Total cases</b>	<b>221</b>	<b>92</b>

[Table/Fig-1]: Sex wise distribution of cases.

Maximum number of patients were seen in month of October, 66 cases (21%). Minimum male patients were seen in month of June 2020 2 cases (0.6%) and minimum number of female patients were seen in month of February and April (0.3%) 1 case as shown in the [Table/Fig-1].

The age group of study population was from one year to 90 years. The maximum patients were seen in age group 1-10 years 83 cases (26.5%) and mean age was  $7 \pm 1.5$  as shown in [Table/Fig-2]. In age group 1-10 years maximum number of patients were seen in month of July, 21 cases (25.3%). In age group 81-90 years, minimum number of patients were seen, 1 case (0.3%) as shown in [Table/Fig-2].

Month/Age (years)	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	Total
June 2019	4	8	3	9	3	3	1	2		33
July 2019	21	6	1		2	2	2			34
August 2019	16	6	4	4	1					31
September 2019	12	7	3	2	2			1		27
October 2019	20	15	10	3	7	5	2	4		66
November 2019		2	14	18	2	5	2			43
December 2019	3	4	3	4	7	6	3			30
January 2020				4	4	1	2	1		12
February 2020				5	3		3		1	12
March 2020	1	1		1	2	1	1	1		8
April 2020	2		3							5
May 2020	4	1	3							8
June 2020					3		1			4
<b>Total</b>	<b>83</b>	<b>50</b>	<b>44</b>	<b>50</b>	<b>36</b>	<b>23</b>	<b>17</b>	<b>9</b>	<b>1</b>	<b>313</b>

[Table/Fig-2]: Age wise distribution of cases.

Maximum patients were from Dibrugarh District 177 cases (56.5%). Maximum number of cases in Dibrugarh came in month of October 37 cases (20.9%) is shown in [Table/Fig-3].

Aetiological factor of epistaxis is listed in [Table/Fig-4]. Maximum number of cases in winter season were diagnosed with epistaxis due to hypertension 22 (40.7%), in spring season 8 (61.5%) cases of epistaxis were reported due to chronic fungal rhinosininitis, in summer season 11 (24.4%) cases were reported due to malignancy, in rainy season maximum number of cases were 20 (21.7%) due to hypertension and in autumn season maximum number of cases were with idiopathic cause 30 (27).

## DISCUSSION

There can be various local as well as systemic variables that cause epistaxis. Local inflammation, trauma, infection, anatomy (spur and deviation of septum), chemical composition, changes in atmospheric climate, tumour and foreign bodies are the various local variables. While coagulation disorders, CVS diseases, hepatic disorders, haematological diseases, kidney failure and drugs are the systemic variables. Nevertheless, around 90% cases are idiopathic. Various identifiable aggravating factors for epistaxis are weight lifting, straining during defaecation, nose blowing, coughing, etc., [7].

Mgbor NC et al., mentioned in their study that males were affected more often than females with a ratio of 1:6 [8]. This may be because the males are more frequently involved in outdoor activities such as sports and interpersonal violence. Kiesselbach plexus injury in children is fairly common due to their habit of nose picking and it causes anterior epistaxis. In elderly population the higher prevalence of hypertension leads to arteriosclerosis which in turn increases the fragility and results in epistaxis during conditions that increase the intra-abdominal pressure like straining and weight lifting [8].

In this study of 313 (N) patients, 212 (70.6%) were males and 92 (29.3%) were females. High male preponderance with male to female ratio of 2.4:1 was noticed. The present study results were similar to Mgbor NC et al., male preponderance could be due to higher propensity for chronic liver disease due to chronic alcoholism, hypertension, staying outdoor in dry dusty weather, more prone for road traffic accidents and physical assault [8]. Cruz AA et al., in their study concluded that in patients who were sensitive to dry and cold weather, a challenge of cold and dry air leads to shedding away of epithelial layer which was statistically significant as compared to other population [9].

The present study found that maximum patients were seen in autumn season 109 (34.8%) cases followed by rainy season 92 (29.3%) and minimum number of patients were found in spring season 13 (4.1%). This pattern is seen every year in the authors institution where there is increase in number of cases after month of September till month of February. This year (2020) there was sharp fall in cases reporting to OPD after February due to the ongoing COVID-19 pandemic.

Winther B et al., mentioned other factors that might lead to the higher incidence of epistaxis during the winter months which may overstrain the already stressed mucous membrane which includes: (i) changes at the cellular level, such as the disruption of the epithelial cell barrier; (ii) the mechanical effect of increased sneezing or nose blowing when affected by cold [10].

Purkey MR et al., in their study mentioned the influence of age within 10-year age groups was also examined. Multivariate analysis identified the 0-10 years old, 21-30 years old and 31-40 years old groups as having a decreased incidence of epistaxis, while the 11-20 years old group and the 81-90 years old group approached significance for decreased and increased epistaxis incidence, respectively [11].

In age group 1-10 years maximum number of patients were seen in month of July 21 cases (25.3%). There is increase in number of pediatric cases from July to October that is rainy and autumn season. This could be due to the local weather of this region influenced by Brahmaputra river. The rain in this region is almost throughout the year but humidity of this region is less. This place tends to stay cool and dry favouring crusting in nose and producing epistaxis.

Sharma K et al., in their study found that epistaxis is seen in hypertensives with inadequate treatment for hypertension, local trauma, tumours of nose and peripheral nervous system, chronic sinusitis, deviated nasal septum with nasal spur, idiopathic with a frequency of 59.25%, 16.46%, 4.93%, 4.11%, 3.7% and 3.28%, respectively. Another 2.46% patients had chronic kidney failure while 1.23% and 0.42% patients had infected polyp and inverted papilloma respectively. Anaemia was seen in 73.25% patients [12].

Liu DT et al., concluded that there is need for additional clinical and experimental studies to explore causalities dependent on meteorological variables [13].

Month/Districts	Dibrugarh	Sivsagar	Golaghat	Lakhimpur	Dhemaji	Tinsukia	Arunachal	Tezpur	Charaideo	Majuli	Jorhat	Sonitpur	Total
June 2019	18	3	2	1	5	3						1	33
July	26	2		2		2	1	1					34
August	18	5		2	4	1			1				31
September	11	6		2	3	3			1	1			27
October	37	4		10	12	1					2		66
November	21	5	1	6	5	4						1	43
December	16	7	1	1	2	2	1						30
January	9	1		2									12
February	8	2		1		1							12
March	5	1		1		1							8
April	3		1		1								5
May	2	1	1	4									8
June 2020	3								1				4
Total cases	177	37	6	32	32	18	2	1	3	1	2	2	313

**[Table/Fig-3]:** Region wise distribution of cases (Districts of Upper Assam).

Aetiology/Seasons	Winter	Spring	Summer	Monsoon	Autumn	Total
Hypertension	22	1	5	20	21	69
Idiopathic	3		10	5	30	48
Chronic fungal rhinosinusitis	7	8	10	15	8	48
Malignancy	10	1	11	9	11	42
Self inflicted trauma	1	1	9	8	15	34
Bleeding disorders	9			6	10	25
Benign nasal mass	1	1		13	7	22
Chronic renal failure	1			9	1	11
Drug induced				3	4	7
DNS with spur		1		2	2	5
Hereditary haemorrhagic telangiectasia				2		2
Total cases						313

**[Table/Fig-4]:** Distribution of cases according to aetiology of epistaxis.  
DNS: Deviated nasal septum

There is a need to conduct a cross-sectional study across India and to compare it with different region and their weather to establish a clear relationship between epistaxis and season.

### Limitation(s)

Limitations of present study were sudden decrease in case load due to COVID-19 pandemic and the study was carried out in limited area with no difference in weather as such.

### CONCLUSION(S)

The peak season for epistaxis is autumn and the major cause for epistaxis is hypertension throughout the year in adults and elderly. Although

during the autumn season the major cause for epistaxis was idiopathic. In children of 1-10 years group, epistaxis was most common in rainy season and the most common cause of epistaxis is trauma in children.

More comparative studies are needed to establish the seasonal variation of epistaxis in different parts of India. There is a need to conduct a prospective study with wider objectives such as management, follow-up and prognosis of treatment given.

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