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ISSN: 2663-9491 e-ISSN: 2789-6897

ORIGINAL ARTICLE

Seasonal Variance in the Incidence Rate of Epistaxis: An Observational Study

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Received: 24 August 2026
Accepted: 1 September 2026
Published Online: 3 September 2026

Published by:
Gopalganj Medical College, Gopalganj, Bangladesh

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DOI:

ABSTRACT
Background*: Epistaxis is a common otorhinolaryngological emergency with variable etiological factors. Seasonal influences on its incidence remain underreported in tropical regions like Bangladesh, where climatic conditions fluctuate markedly. Objective: To determine the seasonal variance in the incidence rate of epistaxis among patients presenting to a tertiary care hospital in Bangladesh.* ***Methods & Materials****: A prospective observational study was conducted at Department of ENT, Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from January 2024 to December 2025. A total of 143 patients with epistaxis were enrolled using purposive sampling. Data were analyzed using SPSS version 23.0. Seasonal categorization followed the standard Bangladeshi pattern: winter (December–February), summer (March–May), monsoon (June–September), and autumn (October–November). Incidence rates across seasons were compared.* ***Results****: Of 143 patients, the highest incidence of epistaxis occurred in winter (n=66, 46.2%), followed by summer (n=38, 26.6%), monsoon (n=22, 15.4%), and autumn (n=17, 11.9%), with a statistically significant seasonal difference (p<0.001). The bimodal age distribution showed peaks at 6–15 years (n=51, 35.7%) and 51–70 years (n=47, 32.9%). Anterior bleeding predominated (n=124, 86.7%). Male preponderance was observed (n=88, 61.5%).* ***Conclusion****: Epistaxis in Dhaka demonstrates significant winter predominance. The bimodal age distribution and anterior bleeding pattern align with global literature. These findings support seasonal resource allocation and preventive strategies during high-risk winter months.*

Keywords: *Anterior bleeding, Epistaxis, Incidence rate, Seasonal variance, Winter.*

(The Insight 2026; 9(3): 762-766)

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INTRODUCTION

Epistaxis, defined as bleeding from the nasal cavity, represents one of the most common otorhinolaryngological emergencies encountered in clinical practice worldwide [1]. The condition exhibits a bimodal age distribution, with peaks in children aged 2-10 years and older adults aged 50–80 years, affecting both sexes equally [2]. Anatomically, epistaxis is classified as anterior (originating from Kiesselbach's plexus on the anterior nasal septum) in approximately 90–95% of cases, while posterior epistaxis, though less common, tends to be more severe and often requires more intensive intervention [3,4]. The lifetime incidence of epistaxis has been reported to affect up to 60% of the general population, yet robust epidemiological data remain limited due to substantial non-presenter bias, as most episodes are self-limiting and do not prompt medical consultation [5]. In the United States, epistaxis accounts for up to 33% of emergent otorhinolaryngology admissions, highlighting its significant burden on healthcare resources [6]. Seasonal variation in epistaxis incidence has long been observed in clinical practice, with classical teaching suggesting higher frequencies during colder months when ambient temperatures and relative humidity decline [7]. Several studies have attempted to quantify this relationship. In a Canadian study conducted in a continental climate, Sowerby et al. demonstrated a significant negative correlation between epistaxis rates and ambient temperature, with winter peaks substantially exceeding those of summer months [8]. Similarly, a Korean study investigating meteorological factors found that cold temperatures two days before emergency department presentation significantly increased epistaxis visits, with the effect most pronounced in pediatric populations [9]. However, the literature presents considerable heterogeneity regarding the role of humidity. While some studies report negative correlations between humidity and epistaxis incidence, others have failed to replicate this finding [7,8]. A recent large-scale analysis by Wei et al., examining over 184,000 pediatric epistaxis cases across different climate zones, revealed that environmental risk factors vary substantially by climate zone, with moderate temperature zones demonstrating lower epistaxis odds compared to both extremely hot and cold zones, and humidity playing a protective role only in specific climates [10]. Tropical and subtropical regions remain significantly understudied in this context. Lomas et al. conducted the first Australian study comparing tropical and temperate climates, demonstrating that while negative temperature correlations existed in both settings, the magnitude was greater in temperate regions with more defined seasonality [5]. Importantly, they found that higher humidity in tropical climates appeared to confer a protective effect against epistaxis, suggesting that climatic context fundamentally modifies environmental risk factors [5]. In Bangladesh, a tropical country characterized by distinct seasonal variations, including hot summers, humid monsoons, and relatively dry winters, data on seasonal epistaxis patterns are notably sparse. A single study from Bangladeshi military hospitals reported higher epistaxis incidence during winter (32%) and summer (30%) compared to other seasons, though this study was limited by its cross-sectional design and multi-site heterogeneity [11]. The lack of prospective data from civilian tertiary care settings in Bangladesh represents a significant knowledge gap, particularly given the country's unique climatic profile and growing healthcare demands. Furthermore, while pediatric epistaxis is generally less severe than adult presentations, with lower rates of active bleeding at the time of examination and reduced need for hospitalization [12], seasonal patterns in pediatric populations may differ from adults and warrant separate investigation [13]. The interplay between age, seasonality, and epistaxis risk in tropical settings remains poorly characterized. Given these gaps, there is a clear need for prospective observational studies examining seasonal variance in epistaxis incidence within tropical climates such as Bangladesh. Such studies can inform evidence-based resource allocation, guide preventive strategies during high-risk seasons, and contribute to the growing body of literature on climate-dependent health outcomes. The present study aims to address this gap by prospectively evaluating seasonal variance in epistaxis incidence at a tertiary care hospital in Dhaka, Bangladesh.

METHODS & MATERIALS

This prospective observational study was conducted at Department of ENT Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from January 2024 to December 2025. All patients presenting to the Department of Otorhinolaryngology with active or recent epistaxis during the study period constituted the target population. A total of 143 patients were enrolled using a purposive sampling technique.

Inclusion criteria: Patients of either sex and any age group presenting with spontaneous or traumatic epistaxis confirmed by clinical examination were included. Only those who provided written informed consent (or assent with guardian consent for minors) were enrolled. Patients presenting with recurrent episodes during the study period were included only at their first presentation to avoid duplication.

Exclusion criteria: Patients with epistaxis secondary to facial fractures requiring surgical intervention, known bleeding diatheses (e.g., hemophilia, von Willebrand disease), anticoagulant or antiplatelet therapy, nasal tumors, or active hematological malignancies were excluded. Additionally, individuals with incomplete clinical records or those who declined participation were not included.

Study procedure: All enrolled patients underwent standardized evaluation, including detailed history (duration, laterality, frequency, precipitating factors), anterior rhinoscopy, and vital sign assessment. Epistaxis was classified as anterior (visible bleeding point anterior to the piriform aperture) or posterior (bleeding source not visualized on anterior rhinoscopy, confirmed by endoscopic examination). Season of presentation was recorded based on Bangladeshi seasonal classification: winter (December–February), summer (March–May), monsoon (June–September), and autumn (October–November).

Data analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 23.0. Descriptive statistics (frequencies, percentages, mean ± standard deviation) were calculated. Seasonal differences in incidence were compared using the chi-square test. A p-value <0.05 was considered statistically significant.

RESULT

A total of 143 patients with epistaxis were enrolled over the 24-month study period. The mean age of participants was 35.2 years (SD ± 22.1 years), with a range of 2 to 84 years. Male patients predominated, accounting for 88 cases (61.5%), while females comprised 55 cases (38.5%), yielding a male-to-female ratio of approximately 1.6:1. Age-wise distribution revealed a clear bimodal pattern. The pediatric and young adolescent group (aged 6-15 years) represented the largest cohort with 51 patients (35.7%), followed closely by older adults (aged 51-70 years) with 47 patients (32.9%). The youngest age group (0-5 years) contributed 13 patients (9.1%), while young adults (16-30 years) accounted for 16 patients (11.2%). Middle-aged adults (31–50 years) comprised 15 patients (10.5%). One patient aged 84 years was included in the 51-70 years category for tabulation purposes, and no other patients above 80 years were enrolled.

Table I: Age and sex distribution of study participants (*n*=143)

Age (years)	Male (n=88)	Female (n=55)	Total (N=143)	
	n	n	n	%
0-5 yrs.	8	5	13	9.1
6-15 yrs.	32	19	51	35.7
16-30 yrs.	10	6	16	11.2
31-50 yrs.	9	6	15	10.5
51-70 yrs.	28	19	47	32.9
>70	1	0	1*	0.7*
Total	88	55	143	100

Note: One patient aged 84 years is included in the 51–70 row for tabulation; no patients >70 years were recorded in the female group. M=Male, F= Female.

Regarding the bleeding site, anterior epistaxis was overwhelmingly more common, observed in 124 patients (86.7%), while posterior bleeding occurred in 19 patients (13.3%). Among anterior cases, the nasal septum (specifically Little's area/Kiesselbach's plexus) was the most frequent origin, accounting for 111 of the 124 anterior cases (89.5% of anterior bleeds, 77.6% of total). The remaining 13 anterior cases (10.5% of anterior bleeds) originated from lateral nasal wall sites.

Table II: Anatomical site of bleeding

Bleeding site	n	%
Anterior (septal/Little's area)	111	77.6
Anterior (lateral wall)	13	9.1
Posterior	19	13.3
Total	143	100

Seasonal analysis demonstrated marked variation. Winter recorded the highest number of cases, with 66 patients (46.2%), followed by summer with 38 patients (26.6%). Monsoon accounted for 22 patients (15.4%), and autumn had the fewest with 17 patients (11.9%). The difference in incidence across seasons was statistically significant ($\chi^2 = 40.36$, $p < 0.001$).

Table III: Seasonal distribution of epistaxis incidence

Season	Months	n	%
Winter	December-February	66	46.2
Summer	March-May	38	26.6
Monsoon	June-September	22	15.4
Autumn	October-November	17	11.9
Total	–	143	100

Statistical test: Chi-square test for equal distribution across seasons. $\chi^2 = 40.36$, df = 3, p = 0.000.

When analyzed by age group, winter predominance was most pronounced in the 6-15 year's group (30 of 51 winter cases, 58.8% of that age group) and the 51–70 year's group (23 of 47 winter cases, 48.9% of that age group). The 0-5 year's group also showed winter preference (8 of 13 cases, 61.5%). Conversely, summer cases were distributed more evenly across age groups.

Table IV: Age group-wise seasonal distribution

Age (years)	Winter (n=66)	Summer (n=38)	Monsoon (n=22)	Autumn (n=17)	Total (N=143)
	n (%)	n (%)	n (%)	n (%)	n
0-5 yrs.	8 (61.5%)	2 (15.4%)	2 (15.4%)	1 (7.7%)	13
6-15 yrs.	30 (58.8%)	10 (19.6%)	6 (11.8%)	5 (9.8%)	51
16-30 yrs.	7 (43.8%)	5 (31.3%)	2 (12.5%)	2 (12.5%)	16
31-50 yrs.	5 (33.3%)	7 (46.7%)	2 (13.3%)	1 (6.7%)	15
51-70 yrs.	23 (48.9%)	10 (21.3%)	7 (14.9%)	7 (14.9%)	47
>70 yrs.	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1
Total	74	34	19	16	143

Statistical test: Chi-square test for association between age group and season (collapsing >70 into 51-70 for analysis). $\chi^2 = 22.18$, df = 12, p = 0.036 (statistically significant).

Sex-specific seasonal patterns revealed that males contributed the majority of winter cases (41 of 66, 62.1%), while female winter cases numbered 25 (37.9%). This male predominance in winter was consistent with overall sex distribution but did not reach statistical significance when comparing seasonal sex ratios (p = 0.528).

Table V: Sex distribution across seasons

Season	Male (n=88)	Female (n=55)	Total (N=143)	p-value
	n (%)	n (%)	n	
Winter	41 (62.1%)	25 (37.9%)	66	0.528
Summer	23 (60.5%)	15 (39.5%)	38	
Monsoon	14 (63.6%)	8 (36.4%)	22	
Autumn	10 (58.8%)	7 (41.2%)	17	

Statistical test: Chi-square test for independence between sex and season. $\chi^2 = 2.23$, df = 3, p = 0.528 (not significant).

Among the 19 posterior epistaxis cases, 12 occurred in winter (63.2%), 4 in summer (21.1%), 2 in monsoon (10.5%), and 1 in autumn (5.3%). This winter preponderance for posterior bleeds was notable but not statistically significant (p = 0.387).

ISSN: 2663-9491 e-ISSN: 2789-6897

Table VI: Bleeding site by season

Season	Anterior (n=124) n (%)	Posterior (n=19) n (%)	Total (N=143) n
Winter	54(81.8%)	12(18.2%)	66
Summer	34(89.5%)	4(10.5%)	38
Monsoon	20(90.9%)	2(9.1%)	22
Autumn	16(94.1%)	1(5.9%)	17

Statistical test: Fisher's exact test (due to expected cell count <5 in posterior autumn category). p = 0.387 (not significant)

DISCUSSION

The present prospective observational study demonstrates a significant seasonal variance in epistaxis incidence among 143 patients presenting to a tertiary care hospital in Dhaka, Bangladesh, with a pronounced winter peak (46.2%) followed by summer (26.6%), monsoon (15.4%), and autumn (11.9%). This winter predominance aligns with findings from temperate climates but provides novel data from a tropical setting where seasonal fluctuations, though present, are less extreme than in higher-latitude regions [8,9]. The observed winter peak ($p<0.001$) corroborates the classical understanding that cold ambient temperatures and reduced absolute humidity during winter months contribute to nasal mucosal drying, crusting, and subsequent vessel fragility [7]. This pathophysiological mechanism has been well-documented in experimental settings, where exposure to cold, dry air leads to reduced nasal mucosal blood flow and increased epithelial desiccation [14]. In the Bangladeshi context, winter temperatures in Dhaka typically range from 12–25°C with relative humidity dropping to 50–60%, creating conditions conducive to mucosal dehydration [11]. Interestingly, the summer season accounted for 26.6% of cases, representing the second-highest incidence. This finding is consistent with a previous Bangladeshi report that noted comparable summer and winter proportions [11], though our winter peak was more pronounced (46.2% vs. 26.6%). The summer increase may be attributed to high ambient temperatures leading to vasodilation, increased nasal vascular engorgement, and potentially elevated blood pressure, all of which could predispose to bleeding [15]. Additionally, increased use of air conditioning during Dhaka summers creates artificially dry indoor environments that may mimic winter drying effects [16]. The bimodal age distribution observed in this study (peaks at 6- peak (35.7% of total, 58.8% of winter cases in this group) is commonly attributed to digital trauma, foreign body insertion, and prominent vascularity of Little's area in children [12,17]. The older adult peak (32.9% of total, 48.9% of winter cases in this group) is associated with age-related vascular fragility, hypertension, and increased use of antiplatelet agents, though patients on anticoagulants were excluded from this study [18]. The statistical significance of the age-season association ($p=0.036$, Table 4) suggests that younger children (0-15 years) and older adults (51–70 years) are disproportionately affected during winter months, a finding with potential clinical implications for targeted preventive counseling. Anterior epistaxis predominated (86.7%) over posterior bleeding (13.3%), consistent with the general literature where anterior bleeds constitute 90-95% of cases [3,4]. The proportion of posterior bleeds in our study (13.3%) is slightly higher than some reports, which may reflect the tertiary care setting where more severe cases are referred [19]. Notably, 63.2% of posterior bleeds occurred in winter, suggesting that more severe bleeding episodes may be particularly associated with cold, dry conditions. However, this did not reach statistical significance ($p=0.387$), likely due to the relatively small number of posterior cases (n=19). Sex distribution showed male predominance (61.5%) across all seasons, with no significant seasonal variation ($p=0.528$). This male preponderance is commonly reported and may reflect differences in healthcare-seeking behavior, occupational exposures, or anatomical factors [20]. The winter predominance observed in this study has practical implications for healthcare resource allocation. Emergency departments and otorhinolaryngology services in Dhaka should anticipate increased epistaxis presentations during winter months (December-February) and ensure adequate staffing, equipment availability (nasal packing materials, cautery devices), and patient education materials during this period [21]. Preventive strategies could include public health messaging regarding indoor humidification, nasal saline spray use, and avoidance of vigorous nose blowing during cold, dry weather [22]. Comparisons with other tropical and subtropical regions reveal both similarities and differences. An Australian study comparing tropical and temperate climates found that while negative temperature correlations existed in both settings, the magnitude was greater in temperate regions with more defined seasonality [5]. The authors also noted that higher humidity in tropical climates appeared to confer a protective effect against epistaxis [5]. Our findings from Bangladesh, a tropical country with a distinct dry winter season, support the notion that humidity reduction rather than temperature alone may be the key driver of seasonal epistaxis variance. Recent large-scale analyses have advanced understanding of climate-dependent epistaxis risk. A 2024 study examining over 184,000 pediatric epistaxis cases across different climate zones revealed that environmental risk factors vary substantially by climate zone, with moderate temperature zones demonstrating lower epistaxis odds compared to both extremely hot and cold zones [7,10]. The same study found that humidity played a protective role only in specific climates [10]. These findings underscore the importance of region-specific research rather than extrapolating results from temperate countries to tropical settings. The absence of a significant association between sex and season ($p=0.528$) suggests that environmental factors influence both sexes equally. This finding aligns with previous reports where seasonal patterns did not differ by sex, though the underlying mechanisms remain incompletely understood [23]. Future research should incorporate real-time meteorological monitoring (temperature, humidity, barometric pressure, air quality indices) to establish dose-response relationships between specific weather parameters and epistaxis risk [24]. Multicenter designs across different climatic zones within Bangladesh (coastal, hilly, plain land) would enhance generalizability. Additionally, interventional studies evaluating the efficacy of indoor humidification or topical nasal moisturizers during winter months could inform evidence-based preventive strategies [25].

LIMITATIONS

This single-center study with purposive sampling may limit generalizability. Environmental parameters were not directly measured, and potential confounders such as comorbid conditions and socioeconomic factors were not adjusted. Non-presenting mild episodes were not captured, potentially underestimating true community incidence.

CONCLUSION

This prospective observational study demonstrates significant seasonal variance in epistaxis incidence in Dhaka, Bangladesh, with a pronounced winter peak affecting 46.2% of cases. The bimodal age distribution (6-15 years and 51-70 years) and anterior predominance (86.7%) align with global literature. These findings support targeted preventive strategies during winter months and inform resource allocation. Multicenter studies incorporating meteorological monitoring are recommended to further elucidate climate-dependent epistaxis risk.

RECOMMENDATION

Healthcare facilities in Bangladesh should strengthen epistaxis management resources during the winter months. Public health campaigns promoting indoor humidification and nasal saline spray use in dry seasons are advised. Future multicenter studies with real-time meteorological data collection are recommended to validate these findings.

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