

Influence of air temperature variations on incidence of epistaxis

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ABSTRACT

Objective: Epistaxis is the most common ear, nose, and throat emergency observed in the emergency department (ED). An increased frequency of this condition has been observed during cooler months, but the results of available studies are controversial. The aim of this study was to investigate the seasonality and association of epistaxis presentations to a large urban ED with variations of air temperature and humidity.

Methods: This study was a retrospective case series. Information on all the patients who presented for epistaxis in the ED of the Academic Hospital of Parma during the years 2003–2012 and ages ≥ 14 years were retrieved from the hospital data base, excluding those attributable to trauma. The chronologic data of all visits were associated with climate data (air temperature and humidity) by univariate linear regression analysis.

Results: Among the 819,596 ED patients seen throughout the observational period, 5404 were admitted for epistaxis. Of these, 5220 were discharged from the ED, whereas 184 (3.4%) needed hospital admission. A strong seasonality of epistaxis was observed, with a peak during winter. A strong negative correlation was also found between the daily number of epistaxes and the mean daily temperature in the whole population as well as in patient subgroups (those undergoing anticoagulant or antiplatelet therapy, or those with hypertension, inherited bleeding disorders, liver cirrhosis, or advanced malignancy). A weaker correlation was also found between air humidity and epistaxis but only in certain subgroups.

Conclusions: The results of this study provided a contribution to improve our understanding of the epidemiology of epistaxis and for specific health policies that should also be planned by considering the seasonality of nosebleed.

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Seasonal changes in climate are associated with a number of consequences for animal and vegetal biology. Several studies, with different strengths of evidence, demonstrated that some associations may exist between meteorologic variables and different clinical conditions, such as stroke,¹ myocardial infarction,² renal colic,³ atrial fibrillation,⁴ asthma,⁵ and arthritic pain.⁶ Psychiatric emergencies are also subjected to climatic influences, although with variable degrees of strength and evidence.^{7,8}

Epistaxis, conventionally defined as acute bleeding from the nostril, nasal cavity, or nasopharynx, is a frequent clinical condition, which also represents the most common ear, nose and throat (ENT) emergency that requires hospital admission.⁹ Approximately 90% of episodes of nosebleeds emerge from the anterior nasal septum at a site called the Kiesselbach area, and the remaining 10% occur in the posterior region, along the nasal septum or lateral nasal wall.¹⁰ Patients with epistaxis usually refer to the emergency department (ED) where they can be treated by either emergency physicians or otolaryngologists, depending on the local organization and the severity of the case. The empiric observation of an increased frequency of epistaxis during cooler months^{11–16} paved the way to a series of studies aimed to elucidate the influence of meteorologic factors on epistaxis. Interestingly, the results of studies were controversial, with some trials postulating the existence of a positive correlation between epistaxis and atmospheric pressure or relative humidity,¹⁷ whereas other studies concluded that the combination of low temperature and

changes in atmospheric pressure was the main determinant of epistaxis.^{18–20} Other epidemiologic trials reported that relative humidity may be a determinant of epistaxis,^{21,22} whereas a single study conducted in Canada demonstrated the existence of a significant correlation between air temperature, but not air humidity, and epistaxis episodes that led the patients to the local ED.²³ Finally, a limited number of studies failed to find any significant correlation between epistaxis and climate variables.^{24,25} Surprisingly, the vast majority of published studies only included hospitalized patients, so that the significance of these findings is limited to severe cases. Only one small study investigated the seasonality of epistaxis in an ED of northern Italy, and it showed a peak of frequency in January.¹² Another important drawback is represented by the fact that some studies included all cases of epistaxis, whereas other studies excluded patients on anticoagulant therapy or those with hematologic disorders.

The common local factors that cause nosebleeds include direct digital trauma, nasal septal deviation, chemical irritants, inflammation and, less frequently, cancer.²⁶ Besides local conditions, however, some systemic disorders and some therapeutic agents may contribute to trigger or exacerbate epistaxis. For example, the use of widely used drugs, most notably anticoagulants and antiplatelet agents, not only is a strong predisposing factor for epistaxis but also contributes to worsen the bleeding and often makes the treatment more challenging.²⁶ Although both epistaxis and hypertension are frequent in the general population, the biologic interplay between these two conditions is intricate and not completely understood so far.²⁷ Hypertension seems to be a predisposing factor *per se*,²⁸ but it is infrequently considered a direct cause of epistaxis²⁹ because the bleeding episode and the associated anxiety are commonly seen as direct triggers of acute and transient elevation of blood pressure.^{30,31} Liver cirrhosis and hematologic disorders are obvious causes and worsening factors of epistaxis, due to the associated hemostatic impairment.³²

Based on these data, according to the hypothesis that temperature and humidity can directly affect the rate of epistaxis in this community, we planned an epidemiologic study to investigate the seasonality and the correlation between variations in air temperature or humidity with the number of epistaxis presentations to a large urban ED in a region with a temperate climate.

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<u>Average Max Temperature °C (°F)</u>	4 (39)	8 (46)	14 (57)	19 (66)	24 (75)	28 (82)	31 (88)	30 (86)	26 (79)	19 (66)	11 (52)	6 (43)	18 (65)
<u>Average Temperature °C (°F)</u>	1 (34)	4 (39)	9 (48)	14 (56)	18 (64)	22 (72)	25 (76)	24 (74)	21 (69)	15 (58)	8 (46)	4 (38)	14 (56)
<u>Average Min Temperature °C (°F)</u>	-2 (28)	0 (32)	4 (39)	8 (46)	12 (54)	16 (61)	18 (64)	17 (63)	15 (59)	10 (50)	5 (41)	1 (34)	9 (48)
<u>Average Precipitation mm (in)</u>	40 (2)	53 (2)	76 (3)	93 (4)	65 (3)	64 (3)	47 (2)	47 (2)	70 (3)	96 (4)	114 (4)	78 (3)	843 (33)
<u>Number of Wet Days (probability of rain on a day)</u>	6 (19%)	7 (25%)	8 (26%)	9 (30%)	7 (23%)	7 (23%)	5 (16%)	5 (16%)	5 (17%)	8 (26%)	10 (33%)	8 (26%)	85 (23%)
<u>Average Sunlight Hours/ Day</u>	02:29	04:40	04:30	06:32	08:29	10:10	10:54	09:32	08:14	05:11	01:50	01:38	06:11
<u>Average Daylight Hours & Minutes/ Day</u>	09:12	10:20	11:50	13:26	14:48	15:30	15:11	14:00	12:27	10:52	09:30	08:50	12:00
<u>Percentage of Sunny (Cloudy) Daylight Hours</u>	28 (72)	46 (54)	39 (61)	49 (51)	58 (42)	66 (34)	73 (27)	69 (31)	67 (33)	49 (51)	20 (80)	19 (81)	52 (48)

Figure 1. Average weather characteristics of Parma stratified by month (from Ref. 3).

MATERIALS AND METHODS

All information of patients ages ≥ 14 years seen for epistaxis by the emergency physicians in the ED of the Academic Hospital of Parma from January 1, 2003, to December 31, 2012 (3653 days), were retrieved from the hospital data base, excluding those with traumatic epistaxis. The Academic Hospital of Parma is a 1250-bed general and teaching hospital, which serves a population of $\sim 340,000$ inhabitants and is the only hospital in the area. The health care facility is also a level 2 trauma center and a reference hospital for management of patients with stroke and myocardial infarction. The study population included almost all epistaxis episodes that occurred in the community. In fact, except for children < 14 years old, who are seen in the pediatric ED with data registration in a separate data base, the patients cannot urgently access the ENT clinic without having been previously seen in the ED. Therefore, our population study included adolescent and adult patients (*i.e.*, ≥ 14 years old). The vast majority of patients presented to the ED within 24 hours after initiation of epistaxis. The readmission of patients to the ED for the same epistaxis episode was relatively infrequent because the local ENT clinic provides close monitoring and follow-up. Nevertheless, a small group of patients were seen twice in the ED within 3 days of the first episode, mostly during the nights or weekends.

The patients were divided into subgroups according to the following criteria: undergoing therapy with anticoagulant agents (*i.e.*, vitamin K antagonists) or with low-molecular-weight heparin or with antiplatelet agents, with inherited bleeding disorders, liver cirrhosis, malignancy, history of and/or therapy for arterial hypertension, and mixed subgroups (*e.g.*, antihypertensive drugs plus anticoagulant therapy). Due to the unavailability of direct oral anticoagulants (dabigatran, rivaroxaban, and apixaban) in our area until the year 2013, none of the patients included in this study had taken any of these drugs. With few and negligible exceptions, the vast majority of patients were residents in town or in the immediate neighborhood (within a 20-km radius from the weather monitoring station). Urban and rural populations were represented in a nearly equal frequency according to the distribution of the population in our area.

The meteorologic data of the Parma province were obtained from the Environment and Climate Regional Agency (Agenzia Regionale Prevenzione e Ambiente; Environment and Climate Regional Agency)³³ of the Region Emilia-Romagna for all the 3653 observation days. The site of measurement, located downtown, was at 10.330313 degrees longitude, 44.808064 north latitude; height, 54 m above sea level. The climate is considered typical of the central-southern Pi-

anura Padana area (also known as "Po river valley") and thus continental, with 843 mm precipitation per year, peaking in fall and spring. The summer is hot, with peak temperatures that range from 30 to 35°C, whereas the winter is cold, with minimum temperatures seldom below -10°C . The measurements of air temperature and humidity were performed on an 1-hour basis, and the mean temperature and humidity of each day were then calculated. The chronologic data of all visits for epistaxis were associated with climate data by univariate linear regression analysis by using the program Mathematica9 (Wolfram, Champaign IL). The correlations were calculated in both the whole population sample and in specific subgroups. A linear model was then developed, with assumed independent normally distributed errors, and a formatted analysis of variance table for the model was finally calculated. The *t* statistics are the estimates divided by the standard errors. Each *p* value is the two-sided *p* value for the *t* statistic and can be used to assess whether the parameter estimate is significantly different from zero. In particular, the following statistics analyses were obtained, (i) univariate linear regression analysis between the number of visits for epistaxis and the mean daily temperature ($^{\circ}\text{C}$), and (ii) univariate linear regression analysis between the number of visits for epistaxis and the mean daily humidity (%).

Due to the retrospective nature of the study and the maintenance of anonymity of all the subjects, the consensus of the ethical committee was unnecessary. The study was performed in accordance with the Declaration of Helsinki under the terms of relevant local legislation.

RESULTS

The mean estimated temperature was 13.5°C ($\pm 8.6^{\circ}\text{C}$) throughout the study period. The number of days with temperature comprised within one standard deviation (SD) was 2118 (58%). The mean relative humidity (the ratio of the partial pressure of water vapor to the equilibrium vapor pressure of water at the same temperature) in this area was 71% throughout the study period, with a maximum of 100% and a minimum of 28% (Fig. 1).³³ A total of 819,596 patient visits were recorded in the local ED throughout the observational period, with an average of 224 patients per day. The total amount of visits was 75,575 in 2003 and 88,438 in 2012, thus exhibiting a remarkable incremental trend. Overall, 5404 patients with epistaxis were seen during the same period (mean [SD] age, 63 ± 21 years), including 3011 men (mean [SD] age, 61 ± 21 years) and 2393 women (mean [SD] age, 66 ± 21 years). The average number of epistaxis per day during the observational period was 1.48. The age distribution and the characteristics of the

Table 1 Characteristics of the sample and the subgroups

	Total No.	%	Mean (SD) age, y
Whole sample	5404	100	63 ± 21.2
Men	3011	55.7	61 ± 21.4
Women	2393	44.3	66 ± 20.6
Hypertension	1898	35.1	71 ± 12.6
No hypertension	3506	64.9	59 ± 23.5
Therapy with VKA	772	14.3	75.7 ± 10.0
Therapy with LMWH	35	0.6	72.0 ± 17.3
Therapy with one single antiplatelet agent	1007	18.6	74.7 ± 12.4
Therapy with two antiplatelet agents	80	1.5	73.0 ± 11.8
Inherited disorders of coagulation	137	0.2	50.8 ± 29.2
Liver cirrhosis	128	2.4	66.7 ± 17.4
Advanced malignancy	184	3.4	71.3 ± 16.4
Hypertension plus VKA or LMWH therapy	237	4.4	76.4 ± 9.0
Hypertension plus antiplatelet agent	476	8.8	75.3 ± 10.3
Age classes			
14–20 y	141	2.6	—
21–30 y	313	5.8	—
31–40 y	311	5.7	—
41–50 y	403	7.5	—
51–60 y	558	10.3	—
61–70 y	1042	19.3	—
71–80 y	1403	26.0	—
81–90 y	1060	19.6	—
91–100 y	171	3.2	—
101–110 y	2	0.1	—

VKA = vitamin K antagonist; LMWH = low-molecular-weight heparin.

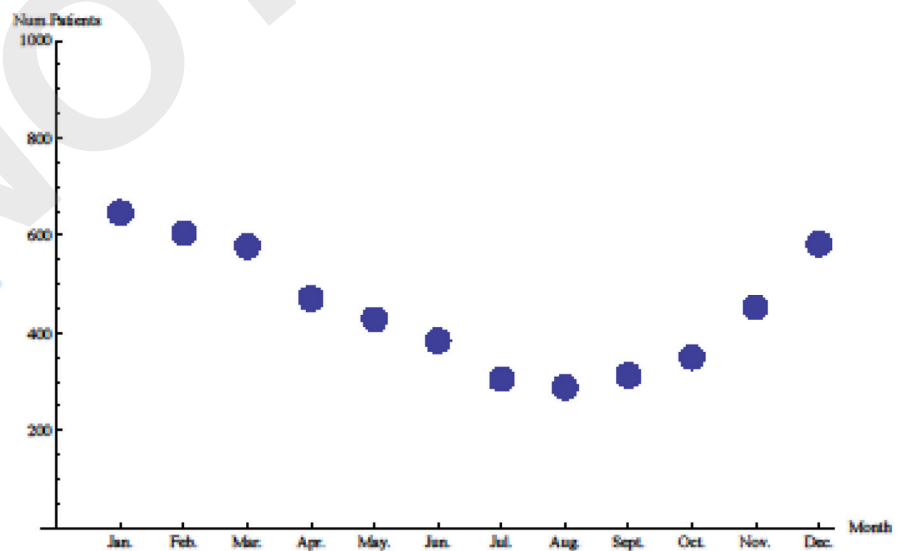


Figure 2. Mean number of patients visited for epistaxis in the different months of the 10 years considered.

patients in the different subgroups are shown in Table 1. Due to the limited sample size, some subgroups were grouped according to the pathophysiologic mechanisms that potentially led to epistaxis: (i) vitamin K antagonists plus low-molecular-weight heparin, (ii) single plus dual antiplatelet therapy, (iii) diagnosis of inherited bleeding disorders plus liver cirrhosis plus a diagnosis of advanced malignancy. The type of therapy and the presence of comorbidities were recorded with accurate anamnesis and clinical visit, and by using standardized clinical criteria.

During the complete observational period, 2949 patients were seen only once for epistaxis, 635 patients were seen twice, and 319 patients were seen three or more times (up to 14 times in one notable case). Among the subjects with multiple visits for epistaxis,

232 patients were seen for the second time within 3 days of the first admission, and 151 were seen within 2 weeks. The remaining 571 patients were readmitted for epistaxis, with intervals between months and years.

A total of 5220 patients were immediately discharged from the ED after management of bleeding, whereas 184 patients (3.4% of the whole cohort) needed to be hospitalized for comorbidities or, less frequently, for severity or recidivism of nosebleed. A specialized ENT evaluation was obtained for almost all of the discharged patients.

Because the ENT clinic of our hospital currently provides a direct follow-up in the first month after surgery, patients with postsurgical epistaxis do not go to the ED but directly to the ENT clinic, and so were systematically excluded from this analysis.

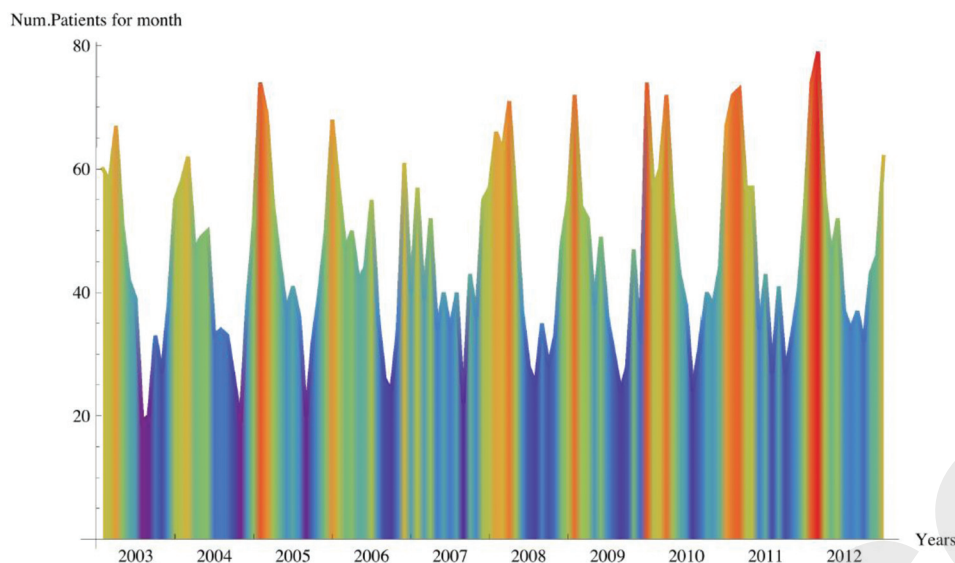


Figure 3. Trend of monthly number of visits for epistaxis during all the observational period.

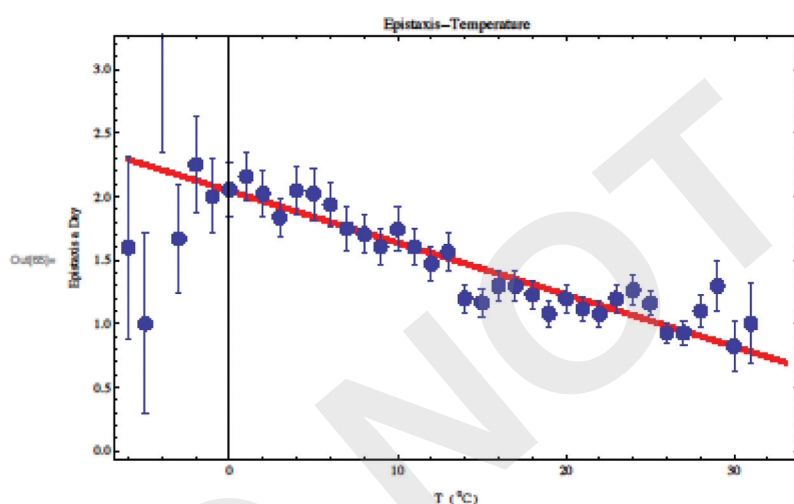


Figure 4. Correlation between episodes of epistaxis and mean daily temperature in the whole sample.

The leading results of this study are shown in Figs. 2 and 3, in which a strong seasonality of epistaxis can be observed, with a peak during winter. A strong, negative correlation was also found between the daily number of visits for epistaxis and the mean daily temperature in all the patient groups. According to these associations, the average number of epistaxis in the whole population sample was 0.82 per day in summer days, with temperature = 30°C; whereas the number of epistaxis was 2.04 in winter days with temperature = 0°C, with a relative increase of ~60% (Fig. 4). A weaker but significant positive correlation was also found between the daily number of visits for epistaxis and the mean daily humidity only in some groups. According to these associations, the average number of epistaxis in the whole population sample was 1.06 per day in days with humidity = 30%, whereas the number of epistaxis cases was 1.77 per day in days with humidity = 100%, with a relative increase of ~67% (Fig. 5). The synthesis of all the correlations found in the whole sample and in the different subgroups is shown in Table 2, and the equations relative to any single correlation are shown in Table 3.

DISCUSSION

Epistaxis is an important clinical symptom and a frequent cause of ED admission, which accounts for ~1 in 200 ED visits in the United States. Some studies, performed in settings other than the ED, con-

cluded that up to 60% of the general population is likely to experience at least one episode of epistaxis throughout one's life span.³⁴ Epidemiologic data on epistaxis in the ED are scarce and even controversial.^{15,16,23} Therefore, the aims of this epidemiologic study, which was supposed to be the largest ever performed in an ED population, to the best of our knowledge, were to establish whether or not the frequency of epistaxis observed in the ED may exhibit a seasonal trend and to address the potential relationship between the frequency of nosebleeds and short-term climate variation (air temperature and relative humidity variations) in a region with a temperate climate.

The first meaningful conclusion of this study was that the age distribution of patients with epistaxis was seemingly similar to that reported in a number of previous epidemiologic investigations settled in different climatic regions,^{9,13,15,16,23,25} with increased frequency from the fourth decade and a peak in the seventh or eighth decade.

We also observed the existence of a strong seasonality of epistaxis, with winter peaks exhibiting a frequency nearly double than that of summer valleys. Understandably, the higher incidence during winter was related to the combined effect of low temperatures and frequent use of indoor heating. The impact of this last factor can hardly be estimated because we could not retrieve information about indoor temperature and humidity for >4000 patients. In regard to relative humidity, it has been indicated that, in heated houses in which

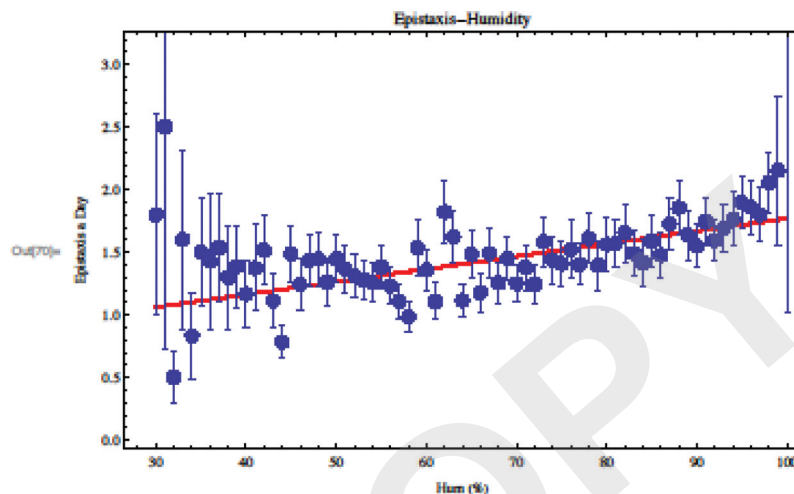


Figure 5. Correlation between episodes of epistaxis and mean daily humidity, whole sample.

Table 2 Correlations between epistaxis episodes and air temperature and humidity in the whole sample and in different subgroups

	% Reduction from T = 0°C to T = 30°C*#	% Increase from H = 30% to H = 100%*§	T		H	
			R¶	p¶	R	p
Whole sample	-59.9	66.7	-0.92	<0.001	0.47	<0.001
Men	-61.3	74.9	-0.92	<0.001	0.44	<0.001
Women	-58.1	57.1	-0.85	<0.001	0.32	<0.001
Hypertensive	-73.1	107.3	-0.91	<0.001	0.17	<0.001
Nonhypertensive	-51.7	49.3	-0.51	<0.001	0.51	0.001
Therapy with VKA or LMWH	-69.6	73.3	-0.81	<0.001	0.29	<0.001
Therapy with one or two antiplatelet agents	-73.2	101	-0.83	<0.001	0.17	0.059
Inherited disorders of coagulation or liver cirrhosis or advanced malignancy	-48.5	-3.63	-0.38	<0.001	-0.01	<0.001
Hypertensive plus VKA or LMWH therapy	-77.3	90.1	-0.78	<0.001	0.21	0.15
Hypertensive plus antiplatelet agents	-77.5	94.7	-0.74	<0.001	-0.02	0.059

T = temperature; H = humidity; VKA = vitamin K antagonist; LMWH = low-molecular-weight heparin.

*Percentage decrease or increase of the linear T and H dependence obtained from our fitting formulas.

#The % variation for the number of epistaxis when T = 0°C and T = 30°C.

§The % variation of the epistaxis when H = 30% and H = 100%.

¶The R and p values of all the found correlations between the number of epistaxis episodes and mean air temperature.

||The R and p values of all the found correlations between the number of epistaxis episodes and mean air humidity.

humidity is usually lower, water tends to evaporate from airway and nasal surfaces, thus producing mucosal desiccation and frailty, and ultimately predisposing the subject to nosebleeds.³⁵

Interestingly, strong negative correlations were found in all the subgroups between air temperature and frequency of visits for epistaxis (Table 2). A weaker but still significant correlation was also found between air humidity and epistaxis, with some notable exceptions, such as in patients with hypertension also taking anticoagulant or antiplatelet drugs. Moreover, patients affected by inherited bleeding disorders or liver cirrhosis or advanced malignancy exhibited a virtually null correlation ($R = -0.01$), and this would indicate that nosebleeds may not be significantly influenced by air humidity in this patient population. There is a reasonable explanation for this finding because the presence of multiple comorbidities or therapies that impair the hemostatic balance may conceivably increase the risk of generalized or localized bleeding such as epistaxis to a much greater extent than a weak environmental factor such as humidity would do.³⁶

The various climate variables (mostly air temperature and humidity) are strongly interrelated. In particular, air temperature variation carries a change in water evaporation and air saturation, which thus leads to a contextual change in air humidity. The most commonly

used measure of humidity is relative humidity, which can be simply defined as the ratio of vapor pressure to saturation pressure at the incident temperature. As such, the higher the water air vapor is, the greater the relative humidity is at a given temperature.³⁷ Due to such a complex relationship between air temperature and air humidity, it is not surprising that a clear correlation among temperature, relative humidity, and frequency of epistaxis episodes could not be found in multiple regression analysis.

Because up to 65% of cases of epistaxis can be directly managed by the patient through manual compression and oxymetazoline alone,³⁸ many ED visits for this symptom may be prevented with an appropriate medical education within the context of a well-conducted program of health literacy.^{39,40} Indeed, the development of a cost-effective program for educating patients (especially the elderly) and their relatives about effective prevention and simple home treatment of nosebleed seems an attractive means for reducing the frequency and recidivism, which thus contributes to mitigate the burden of this frequent condition in the ED.

A deep knowledge about the epidemiology of ED visits for epistaxis should also be regarded as a prerequisite to evaluate the utility of preventive efforts. In our study, >95% episodes could be managed in the ED, without hospitalization or surgery. Therefore, it seems

Table 3 Each equation relative to all the correlations that were calculated is expressed in detail

	T	H
Whole sample	$y = 2.046 \pm 0.039 - 0.0409 \pm 0.0024 T; p = 8.2 \times 10^{-64}; R = -0.92$	$y = 0.0101 \pm 0.0013 H + 0.758 \pm 0.093; p = 1.55 \times 10^{-15}; R = 0.47$
Men	$y = 1.150 \pm 0.029 - 0.0235 \pm 0.0018 T; p = 9.7 \times 10^{-40}; R = -0.92$	$y = 0.00612 \pm 0.00092 H + 0.388 \pm 0.068; p = 1.1 \times 10^{-8}; R = 0.44$
Women	$y = 0.896 \pm 0.026 - 0.0174 \pm 0.0016 T; p = 5.0 \times 10^{-28}; R = -0.85$	$y = 0.00400 \pm 0.00082 H + 0.370 \pm 0.060; p = 1.1 \times 10^{-6}; R = 0.32$
Hypertensive	$y = 0.785 \pm 0.023 - 0.0191 \pm 0.0014 T; p = 6.5 \times 10^{-43}; R = -0.91$	$y = 0.00488 \pm 0.00072 H + 0.172 \pm 0.053; p = 0.0012; R = 0.17$
Nonhypertensive	$y = 1.261 \pm 0.032 - 0.0217 \pm 0.0019 T; p = 1.5 \times 10^{-28}; R = -0.79$	$y = 0.0052 \pm 0.0010 H + 0.586 \pm 0.074; p = 2.7 \times 10^{-7}; R = 0.51$
Therapy with VKA or LMWH	$y = 0.326 \pm 0.015 - 0.00756 \pm 0.00092 T; p = 3.1 \times 10^{-16}; R = -0.81$	$y = 0.0016 \pm 0.00048 H + 0.106 \pm 0.035; p = 2.6 \times 10^{-3}; R = 0.30$
Therapy with one or two antiplatelet agents	$y = 0.449 \pm 0.017 - 0.011 \pm 0.0010 T; p = 1.17 \times 10^{-25}; R = -0.83$	$0.00269 \pm 0.00054 H + 0.106 \pm 0.040; p = 8.0 \times 10^{-3}; R = 0.17$
Inherited disorders of coagulation or liver cirrhosis or advanced malignancy	$y = 0.1147 \pm 0.0092 - 0.00186 \pm 0.00056 T; p = 0.00090; R = -0.38$	$y = 0.092 \pm 0.021 - 0.00005 \pm 0.00029 H; p = 0.87; R = -0.01$
Hypertensive plus VKA or LMWH therapy	$y = 0.1009 \pm 0.0080 - 0.00260 \pm 0.00048 T; p = 8.8 \times 10^{-8}; R = -0.78$	$y = 0.00055 \pm 0.00025 H + 0.026 \pm 0.018; p = 0.16; R = 0.21$
Hypertensive plus antiplatelet agents	$y = 0.203 \pm 0.011 - 0.00525 \pm 0.00069 T; p = 4.1 \times 10^{-14}; R = -0.74$	$y = 0.00113 \pm 0.00036 H + 0.050 \pm 0.026; p = 0.059; R = -0.025$

T = temperature; H = humidity; VKA = vitamin K antagonist; LMWH = low-molecular-weight heparin.

reasonable to suggest that subjects at risk (and/or their relatives) may be educated to the application of antibacterial cream to nasal mucosa to prevent epistaxis,⁴¹ or to use oxymetazoline and compression in case of recidivism.³⁸ Intuitively appealing to this perspective, a large part of time usually spent for managing a huge number of epistaxis episodes in the ED could be saved.

It is hoped that the results of this study will provide a contribution to improve our current understanding of the nature of epistaxis, for planning specific health policies that should also consider the seasonality of nosebleeds and, last but not least, for encouraging the development of educational programs aimed to reduce improper utilization of ED resources.

The uncertain generalizability of our findings to geographic regions with a climate different than temperate or continental is one limitation of this study. A second potential limitation may be represented by the potential underestimation of epistaxis episodes that occur during hospitalization for other disorders. Indeed, this study was focalized on patients who sought medical care primarily for epistaxis, and only a few of them were finally hospitalized. Therefore, this aspect may be seen as a strength of the study because we focused our research on patients who used the ED primarily for epistaxis, which thus limited the influence of potential confounding variables related to in-hospital care (e.g., nasal cannula for oxygen delivery, nasal tube for enteral feeding). Interestingly, the percentage of patients with epistaxis who were finally hospitalized was nearly twice in our facility compared with U.S.-based admission data (3.4% versus 6%),¹⁵ but this difference can be at least partially attributable to the fact that, unlike data reported in the previous study, we systematically recorded and included all repeated visits for epistaxis.

Among the possible explanations for the relationships between epistaxis and climate, an increased frequency of upper respiratory tract infections during colder periods may be considered. No data on recent episodes of upper respiratory tract infections in our subjects were available. However, because no data in support of a clear correlation between upper respiratory tract infections and epistaxis are available in the current scientific literature, this should not be regarded as a substantial limitation in our study.

Learning Points

- Epistaxis is the most common ENT emergency observed in the ED.
- An increased frequency of this condition has been observed during cooler months, but the results of available studies are mostly controversial.
- A strong seasonality of epistaxis was observed, with a peak during winter.
- A strong negative correlation was also found between the daily number of epistaxis and the mean daily temperature in the whole population as well as in patient subgroups.
- A weaker correlation was also found between air humidity and epistaxis but only in certain subgroups.

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