

# The Relationship of Hypertension with Epistaxis in Patients Presenting in the ENT Department of Dhaka Medical College Hospital

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## Abstract

**Background:** Epistaxis is a common otorhinolaryngological emergency that can become complex in elderly and hypertensive patients, sometimes requiring invasive interventions. Hypertension has long been linked to epistaxis through mechanisms such as vascular fragility, atherosclerosis, and endothelial dysfunction, with prevalence rates among epistaxis patients ranging from 24% to 64%.

**Aim of the Study:** This study seeks to explore the debated correlation between hypertension and epistaxis, aiming to clarify their pathophysiological interplay and improve clinical management strategies within the setting of Dhaka Medical College Hospital.

**Methods:** This comparative cross-sectional study was conducted over a period of twelve months in the ENT Department of Dhaka Medical College Hospital, enrolling a total of 280 patients presenting with spontaneous epistaxis. Participants were selected using a convenience sampling technique, with only adults above 18 years included. Patients with traumatic epistaxis, those on anticoagulant therapy, or with chronic nasal diseases, liver disease, or coagulation disorders were excluded to ensure homogeneity.

**Results:** The results illustrate that the majority of respondents were middle-aged, with a mean age of  $52 \pm 15$  years, and males slightly predominated at 56.8%. Comorbidities were common, with smoking (37.6%), diabetes (10%), and cardiac disorders (18.6%) standing out, while nearly a quarter had a prior history of epistaxis. Hypertension was present in 27% of participants with an average duration of  $12.7 \pm 3.8$  years, only 16.1% were on antihypertensive medication, and 22.1% had a positive family history. Medications with bleeding risk, such as aspirin (11.4%), clopidogrel (4.6%), and anticoagulants (15%), were used by a significant subset. Hemodynamic assessment showed raised systolic pressures ( $144 \pm 6$  mmHg) with stable diastolic values and a mean pulse of  $97 \pm 1.15$ , while correlation analysis confirmed a strong, statistically significant association between hypertension and epistaxis, with a probability of 26.8% and  $p < 0.001$ .

**Conclusion:** This study shows a significant association between hypertension and epistaxis, suggesting that elevated blood pressure should be regarded as more than a coincidental finding in such patients. While limited by its cross-sectional design, the findings highlight the value of routine blood pressure screening in epistaxis cases.

**Keywords:** Epistaxis; Hypertension; Nasal bleeding; Blood pressure; Risk factors.

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## I. INTRODUCTION

Epistaxis, commonly known as nosebleeds, is a prevalent condition that ranks as one of the leading reasons for hospital visits [1]. While it is generally not life-threatening, epistaxis does warrant attention and requires appropriate management, particularly in elderly individuals with cardiovascular disease [2]. The approaches to managing this condition vary, contingent upon the severity of bleeding [3]. Minor hemorrhages can often be alleviated through simple compression or cauterization, while severe or recurrent cases with unidentified sources demand more invasive procedures, such as nasal packing, surgical ligation of vessels, or even endovascular interventions [2]. Epistaxis is a multifaceted ailment, with numerous potential causative factors,

including dry air, infection, allergies, trauma, alcohol abuse, and the use of anticoagulants [4]. Among these risk factors, hypertension has emerged as a significant condition in association with the development of epistaxis, as indicated by clinical impressions [2]. Hypertension, characterized by elevated blood pressure, is a grave public health challenge, affecting around 30% of adults in the United States [5]. This condition substantially elevates the risk of heart disease and stroke, which are the leading and third-leading causes of mortality [6]. The intriguing relationship between blood pressure levels and the occurrence of epistaxis, particularly in hypertensive patients, has long piqued the interest of clinicians [7]. Epistaxis is a common otorhinolaryngological problem with reports suggesting that between 8% and 60% of individuals will experience at least one episode of epistaxis in their lifetime [5]. The cause of epistaxis remains unidentified in roughly 85% of cases, and its incidence rises with age, being more prevalent in males. Notably, while approximately 80% of cases involve anterior nosebleeds, which are relatively manageable, the remaining 15–20% is posterior nosebleeds, which are more common in elderly patients and often necessitate hospital admission and invasive treatments such as arterial ligation or embolization [5]. One striking observation made in clinical practice is that patients who present with epistaxis in the emergency department often simultaneously present with elevated blood pressure [8]. The prevalence of hypertension in patients with epistaxis has been reported to range from 24% to 64%, and the link between these two conditions remains a topic of long-standing debate [7]. Chronic vascular conditions induced by hypertension may play a significant role in the pathogenesis of epistaxis, potentially due to the well-established vasculopathic effects of hypertension, including atherosclerosis, endothelial dysfunction, and vascular fragility [9]. Patients with a history of both hypertension and epistaxis may exhibit more severe vascular injuries in the nasal cavity compared to those with epistaxis alone. These effects may include degenerative fibrous changes and vascular fragility, potentially exacerbated by the anxiety induced by bleeding and the associated adrenergic response, which can further elevate blood pressure, exacerbating epistaxis [10]. Epistaxis is a common and multifaceted condition that often occurs in conjunction with hypertension, a prevalent cardiovascular disorder [11]. The study aimed to find out the relationship of hypertension among patients presenting with epistaxis.

## II. METHODOLOGY & MATERIALS

This observational cross-sectional study was conducted at the ENT department of Dhaka Medical College Hospital, Bangladesh. This study was conducted from April 2024 to September 2025. This study was carried out on 280 patients with epistaxis.

### Inclusion Criteria:

- Age >18 years.
- Patients having spontaneous epistaxis.

### Exclusion Criteria:

- Patients taking anticoagulant drugs.
- Traumatic epistaxis.
- Patients with chronic diseases in the nose.
- Patients with liver disease or any other coagulation factor related disorder and other chronic diseases.

### Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. All participants were informed about the study design and objectives prior to enrollment. Ethical approval was obtained from the Institutional Review Board of Bangladesh Medical University, Dhaka, and permission was taken from the concerned department. Written informed consent was obtained from all respondents after explaining the study procedures, potential risks, and benefits in their preferred language (Bangla or English). Participants had the right to withdraw from the study at any time without any reason. Confidentiality and anonymity were ensured by assigning a unique identification number to each participant. No experimental or new drug was used in this study.

### Data Collection

In unstable patients, an intravenous line was established using a wide-bore cannula, and management was initiated simultaneously with investigations and treatment. Initial evaluation was performed through anterior rhinoscopy to identify the site of bleeding. Patients presenting with recurrent episodes of heavy bleeding but without active bleeding during examination underwent nasal endoscopy to detect possible posterior bleeding sources. All patients underwent routine investigations including complete blood count, haemoglobin level, platelet count, random blood sugar, serum electrolytes, urea, creatinine, urine routine examination, and blood grouping. Coagulation profiles such as prothrombin time, activated partial thromboplastin time, and bleeding and clotting time were also assessed. Computed tomography (CT) scans were performed in selected cases to exclude

neoplasms of the nose, paranasal sinuses, and nasopharynx. Additional investigations were conducted based on patient history and clinical findings. Blood samples were sent for cross-matching when required. For patients requiring procedures under general anaesthesia, further investigations such as chest X-ray, electrocardiogram (ECG), and relevant serological tests were performed.

Treatment of epistaxis included both conservative (nonsurgical) and surgical or interventional approaches. Conservative management consisted of topical vasoconstrictors such as oxymetazoline and xylometazoline nasal drops, chemical or electrical cauterization of the bleeding point, and anterior or posterior nasal packing. Initially, all patients were managed conservatively, and surgical intervention was considered only when conservative methods failed. If the bleeding point was identified on anterior rhinoscopy, treatment was performed using chemical cauterization with 75% silver nitrate or bipolar electrocautery, depending on the surgeon's preference. When the bleeding site was located more posteriorly during nasal endoscopy, bipolar electrocautery was used. In cases of diffuse bleeding or when the bleeding source could not be identified, anterior nasal packing was applied. Patients with bleeding disorders were treated with absorbable gelatin sponge packing, while others received conventional anterior nasal packing with ribbon gauze. Posterior nasal packing was performed in cases of re-bleeding despite anterior nasal packing. Surgical intervention, including endoscopic electrocauterization of the bleeding vessel and endoscopic sphenopalatine artery ligation, was reserved for patients with recurrent bleeding or those whose bleeding could not be controlled with conservative measures.

Medical records of the patients were reviewed to collect demographic information, causes of epistaxis, anatomical location of the bleeding site, and treatment methods. Data were collected using a pre-structured Case Record Form (CRF) completed by the study physician. Patient information such as age, sex, and clinical presentation was recorded through patient interviews and medical records.

### Statistical Analysis

Statistical analysis was performed using SPSS version 29. Continuous variables were expressed as mean  $\pm$  standard deviation (SD) or as median with interquartile range (IQR), depending on the distribution of the data. Categorical variables were presented as numbers and percentages. The study findings were presented in the form of tables.

### III. RESULT

Among all respondents, the majority were aged 51–60 years, accounting for 43.93%. A smaller proportion of participants were over 70 years (8.57%) and below 40 years (3.57%). The mean age of the respondents was  $52 \pm 15$  years. In terms of sex distribution, males constituted 56.79% of the participants and females accounted for 43.21%. The mean body mass index (BMI) of the respondents was  $26.14 \pm 4.00$  kg/m<sup>2</sup> (Table 1). 75 patients (26.79%) were found to have hypertension. The average duration of hypertension among these patients was  $12.7 \pm 3.8$  years. Regarding treatment status, 45 respondents (16.07%) reported using anti-hypertensive medications. A positive family history of hypertension was present in 62 participants (22.14%). Furthermore, 127 patients (45.36%) were identified with uncontrolled hypertension at the time of assessment (Table 2). Out of the 280 respondents, 15.00% (n=42) used anticoagulant therapy, 11.43% (n=32) were on aspirin, and 4.64% (n=13) reported clopidogrel use (Table 3). On admission, the mean systolic blood pressure of the respondents was  $144 \pm 6$  mmHg, ranging from 138 to 150 mmHg, while the mean diastolic blood pressure was  $80 \pm 4$  mmHg with a range of 76 to 84 mmHg. Additionally, the mean pulse rate was  $97 \pm 1.15$  beats per minute, ranging from 95 to 99 beats per minute (Table 4). The analysis demonstrated a significant association between hypertension and epistaxis. The log-odds (intercept) was  $-1.0055$  with a standard error of 0.1349 and a z value of  $-7.451$ , which was statistically significant ( $p < 0.001$ ). The odds of hypertension among patients presenting with epistaxis was 0.366, corresponding to a probability of 26.80%. The 95% confidence interval (CI) for the log-odds ranged from  $-1.270$  to  $-0.741$ , while the 95% CI for the odds ranged from 0.281 to 0.477 (Table 5).

**Table 1:** Distribution of respondents according to demographic variables (n=280)

Variables	Frequency (n)	Percentage (%)
Age (in years)		
<40	10	3.57
41-50	40	14.29
51-60	123	43.93
61-70	83	29.64
>70	24	8.57
Mean $\pm$ SD	$52 \pm 15$	
Sex		
Male	159	56.79
Female	121	43.21

BMI, Mean±SD	26.14±4.00
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**Table 2:** Distribution of respondents according to hypertension and its related factors (n=280)

Variables	Frequency (n)	Percentage (%)
Presence of hypertension	75	26.79
Duration of hypertension, Mean±SD	12.7±3.8	
Use of anti-hypertensive drugs	45	16.07
Family history of hypertension	62	22.14
Presence of uncontrolled hypertension	127	45.36

**Table 3:** Distribution of respondents according to medication use (n=280)

Variables	Frequency (n)	Percentage (%)
Use of aspirin therapy	32	11.43
Use of clopidogrel therapy	13	4.64
Use of anticoagulant therapy	42	15.00

**Table 4:** Distribution of respondents according to hemodynamic parameters on admission

Variables	Result
Systolic blood pressure	
Mean ± SD	144±6
Max	150
Min	138
Diastolic blood pressure	
Mean ± SD	80±4
Max	84
Min	76
Pulse rate	
Mean ± SD	97±1.15
Max	99
Min	95

**Table 5:** Correlation of hypertension with epistaxis

Statistics	Value
Log-odds (Intercept)	-1.0055
Standard Error	0.1349
z value	-7.451
p-value	<0.001
Odds of Hypertension	0.366
Probability of Hypertension	26.80%
95% CI for log-odds (Intercept)	-1.270 to -0.741
95% CI for Odds	0.281 to 0.477

#### IV. DISCUSSION

The demographic profile of this study, with a mean age of 52 ± 15 years and the largest proportion of patients falling in the 51–60-year range, aligns closely with findings from international studies, though with slight variations [12]. Byun et al reported a median age of 52 years in their hypertensive cohort [2], while Herkner et al documented a mean age of 57 years among patients with active epistaxis [13]. Khakurel & Mahato found the age range of their population to be 21–82 years, with a mean age of 57.2 ± 16.0 years in another series [11]. In terms of sex distribution, our findings of a slight male predominance (56.8%) were comparable to report of Byun et al showing 57.6% male representation [2], 57% in the study of Henker et al. [13], and 60.1% in study of Kim et al. [14]. Though study of Khakurel & Mahato reported an even higher proportion of men (68.05%) [11]. Regarding nutritional status, our population had a mean BMI of 26.14 ± 4.00, which is slightly lower than values reported elsewhere, such as 29.56 in study of Neeshu & Kashyap [15], 29.56 ± 4.59 in Sarhan & Algamal [16] and 27.7 ± 7.8 kg/m<sup>2</sup> in research of Neto et al [17]. The comorbidity of our participants demonstrated that 37.6% were smokers, a proportion remarkably similar to that reported by Fuchs et al [18], and higher than the frequencies documented in other investigations, such as 28.6% and 40% [15,19]. In our study, hypertension was present in 27% of patients, with an average duration of 12.7 ± 3.8 years, a finding that closely parallels reports where the mean duration of hypertension was noted as 13.4 years [15,16]. The proportion of patients on antihypertensive therapy in our series was 16.1%, which is lower than the 18.6% observed in investigation of Fuchs et al [18], and substantially less than the higher proportions of 36.8%, 48.5%, and 71.1% reported in other accounts [8,20,21]. Uncontrolled hypertension was identified in 45.3% of our participants, a rate that was lower than the 55% and 59% described in other series [22,23], and far below the 79% of sustained arterial hypertension documented in Herkner et al. [8,14]. Our figure was more comparable to the 42.9% reported by research [19]. About 11.4% of patients reported using aspirin therapy, which is slightly lower than the 14–15% documented in different studies

[8,13], and less than the 27% prevalence noted in another report [22]. Clopidogrel use was observed in 4.6% of our participants, a figure that aligns closely with the 5% prevalence reported by a journal [22]. Anticoagulant therapy was recorded in 15% of our respondents, mirroring exactly the 15% prevalence cited in earlier work [8], and somewhat higher than the 10% of patients noted elsewhere [13]. Our findings on hemodynamic parameters at admission revealed a mean systolic blood pressure of  $144 \pm 6$  mmHg, which corresponds closely with the values reported in the study of Haq et al [23], and lies between the lower mean of  $135.3 \pm 29.2$  mmHg observed by another research [18] and the higher averages of 161–166 mmHg described in a cohort [13], as well as the  $157.1 \pm 26.4$  mmHg reported by other journals [14]. The diastolic blood pressure in our participants averaged  $80 \pm 4$  mmHg, aligning almost exactly with a paper [23] and similar to the 80–85 mmHg range described by other journals [8,13,18], though slightly lower than the  $91.4 \pm 17.0$  mmHg noted by Kim C [14]. The mean pulse rate of  $97 \pm 1.15$  per minute was consistent with the 97 per minute observed in one report [13], but notably higher than the  $79.19 \pm 11.12$  per minute documented by Theodosis et al [19]. Our analysis demonstrated that the odds of hypertension among patients with epistaxis was 0.366, corresponding to a probability of 26.8%, with a highly significant association ( $p < 0.001$ ) and narrow confidence intervals, highlighting the reliability of this finding. This result complements prior reports which observed that patients with hypertension had a 1.47-fold higher risk of developing epistaxis [2], and the meta-analysis which documented a significant association between hypertension and epistaxis with an odds ratio of 1.532 [7]. Consistent with our findings, several investigations have reported elevated blood pressure at presentation in patients admitted with epistaxis, suggesting an important interplay between these conditions [8,13,14]. The biological plausibility of this relationship is reinforced by experimental and pathological observations that chronic hypertension induces vascular changes such as fibrotic degeneration and atherosclerosis in nasal vessels, increasing their susceptibility to rupture [17,20,24]. Some accounts have also highlighted the duration of hypertension as a contributory factor, emphasizing its role in progressive vascular damage [17,20].

#### **Limitations of the study:**

- The cross-sectional design limits the ability to establish causality between hypertension and epistaxis.
- Data were collected from a single center, which may affect the generalizability of the findings.
- Only patients presenting with epistaxis were included, precluding direct comparison with a non-epistaxis control group.
- Blood pressure measurements were taken at admission, which may be influenced by acute stress or anxiety.

### **V. CONCLUSION**

This study demonstrates a significant relationship between hypertension and epistaxis among adult patients presenting to a tertiary care hospital. More than one-quarter of the respondents had hypertension, and a substantial proportion exhibited uncontrolled blood pressure at the time of presentation. The findings suggest that elevated blood pressure may contribute to the occurrence or severity of nasal bleeding, possibly due to chronic vascular changes and increased vascular fragility associated with long-standing hypertension. The predominance of middle-aged and elderly patients further highlights the importance of cardiovascular risk factors in the pathogenesis of epistaxis. Therefore, careful assessment and control of blood pressure should be considered an integral component in the evaluation and management of patients presenting with epistaxis. Early identification and management of hypertension may help reduce recurrence and improve clinical outcomes.

### **VI. RECOMMENDATIONS**

- Routine blood pressure assessment should be performed for all patients presenting with epistaxis to facilitate early detection of hypertension.
- Clinicians should consider hypertension as a potential contributing factor when managing patients with recurrent or severe epistaxis.
- Future research should include multi-center studies with larger and more diverse populations to enhance generalizability.
- Comparative studies including non-epistaxis control groups are recommended to clarify the true association between hypertension and epistaxis.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee.

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