

## Assessment of Some Haematological and Haemostatic Parameters in Individuals With Epistaxis in Owerri, Nigeria.

Aloy-Amadi Oluchi C.<sup>1</sup>, Anyanwu Martins O.<sup>1</sup>, Chinedu - Madu Jane U.<sup>2</sup>

<sup>1</sup>Department of Medical Laboratory Science, Imo State University, Owerri, Nigeria.

<sup>2</sup>Department of Haematology, Federal University Otueke, Bayelsa State, Nigeria.

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### Abstract

Epistaxis, commonly known as nosebleed, is a frequent clinical condition encountered in emergency settings. While often attributed to local factors such as trauma or environmental influences, systemic conditions, including haematological and haemostatic abnormalities, can predispose individuals to recurrent or severe episodes. This study was aimed at assessing some haematological and haemostatic parameters of individuals with epistaxis at federal medical center, Owerri. A total of 30 patients attending federal medical center, Owerri who presented with epistaxis were recruited for the study, while thirty (30) healthy subjects served as controls. 5 mls of blood samples was collected from each participant, and 3mls was aliquoted into sodium citrate bottle and used to determine prothrombin time and activated partial thromboplastin time, while the remaining 2mls was dispensed into ethylenediaminetetracetic acid (EDTA) bottle and used for packed cell volume (PCV) and platelet count determination. These parameters were determined using standard laboratory procedures. Data generated was analyzed using SPSS version 21, and mean, standard deviation, t-test, and p-value were determined. The mean values of PCV and platelets were significantly reduced in epistaxis patients ( $27.90 \pm 3.52$ ) % and  $(168.87 \pm 62.74) \times 10^9/L$  when compared to controls ( $34.40 \pm 3.88$ )% and  $(296.80 \pm 75.28) \times 10^9/L$  respectively ( $p = 0.000$ ). There was no significant difference in the mean values of PT and APTT in epistaxis patients ( $12.28 \pm 1.10$  and  $31.08 \pm 7.08$ ) secs when compared to controls ( $12.74 \pm 1.24$  and  $32.99 \pm 2.87$ ) secs ( $p = 0.131$  and  $0.176$ ) respectively. There was no significant difference in the mean values of PCV and platelets ( $27.55 \pm 4.19$ ) % and  $(173.90 \pm 70.45) \times 10^9/L$  in male epistaxis patients when compared to females ( $27.73 \pm 2.94$ ) % and  $(192.18 \pm 52.62) \times 10^9/L$  ( $p = 0.902$  and  $0.459$ ), and no significant difference in the mean values of PT and APTT in male epistaxis patients ( $12.00 \pm 1.25$ ;  $28.63 \pm 5.09$ ) secs when compared to females ( $28.63 \pm 5.09$ ;  $28.29 \pm 5.53$ ) secs, respectively ( $p = 0.569$  and  $0.712$ ). The study has shown that epistaxis is associated with a significant decrease in PCV and platelet count, and a non-significant difference in the mean value of PT and APTT. There was no significant difference in the mean values of PCV, platelet count, PT and APTT in male epistaxis patients when compared to female counterparts. Therefore, it is imperative to conduct a comprehensive haematological and haemostatic assessment to identify potential underlying disorders. Management should be tailored based on the identified cause, and patients with significant haematological and haemostatic abnormalities should be referred to a specialist.

**Key words:** Packed Cell Volume, Platelets, Prothrombin Time, Activated Partial Thromboplastin Time, Epistaxis.

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**Corresponding Author:** Aloy-Amadi Oluchi C.; Department of Medical Laboratory Science, Imo State University, Owerri, Nigeria

**E-mail:** oluchialoy@yahoo.com

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## Introduction

Epistaxis, commonly known as nosebleed, refers to bleeding originating from the nose, nasal cavity, or nasopharynx. It results from the rupture of a blood vessel within the highly vascularized nasal mucosa. Such ruptures may occur spontaneously or following trauma. Although nosebleeds are rarely life-threatening, they can present as alarming emergencies or recurrent episodes that require medical attention. Based on the anatomical location of the bleeding, epistaxis is broadly classified into anterior and posterior types<sup>1</sup>.

The term “epistaxis” is derived from Greek and describes a clinical condition that is frequently encountered across all age groups. It may serve as an isolated issue or as a manifestation of systemic diseases<sup>2</sup>. In most cases—over 90%—the bleeding arises anteriorly, typically from Kiesselbach’s plexus, a vascular network located on the anterior nasal septum where branches from the anterior and posterior ethmoid arteries and the sphenopalatine artery converge<sup>3</sup>. Anterior bleeds often present as a mild, persistent ooze, while posterior bleeds, arising deeper within the nasal cavity, may lead to airway compromise and are more difficult to control<sup>4</sup>.

Epistaxis has a bimodal age distribution, with peaks in children aged 2–10 years and older adults aged 50–90 years<sup>4</sup>. Both sexes are equally affected. Predisposing factors include nasal trauma (such as nose picking or forceful blowing), rhinitis, dry air, alcohol consumption, and use of antiplatelet drugs<sup>4</sup>.

From a haematological perspective, certain blood parameters such as platelet count, packed cell volume (PCV), prothrombin time (PT), and activated partial thromboplastin time (APTT) play key roles in bleeding tendencies. Platelets are formed in the bone marrow from megakaryocytes and circulate for approximately 7–10 days. Their structural zones and surface glycoproteins aid in adherence to injured tissues and hemostasis<sup>5</sup>. PCV indicates the proportion of red blood cells in the blood; low values may suggest anemia or bone marrow suppression, while elevated levels may be linked to dehydration<sup>5</sup>. PT and APTT assess different pathways of the coagulation cascade and are useful in evaluating clotting disorders<sup>6</sup>.

This study was therefore conducted to evaluate the levels of platelets, PCV, PT, and APTT in individuals presenting with epistaxis.

## Materials and Methods

### Study Area

The study was conducted at Imo state Teaching Hospital, Owerri, Nigeria. It is a tertiary health institution that serves the entire state.

### Study Design

This research was a cross-sectional study carried out at federal medical centre from September to October, 2021. A total of 30 patients who presented with epistaxis were recruited for the study, and an equivalent no of 30 subjects served as the controls. Initial assessment included type and severity of bleeding. In cases of mild and stable patient history, details were noted. In cases of heavy bleed, history details were noted too. Informed consent was obtained from each patient and all participants gave their informed consent before sample collection.

### Ethical Approval

Ethical approval was obtained from the ethical review committee of Imo State University Teaching Hospital, Owerri, Nigeria (August 18, 2021: ISSHO/AD.116/VOL.1/PG16).

### Method of Recruitment

All subjects between the ages of 7–65yrs who registered with the hospital, those who gave their informed consent and without any other form of disease or infection were recruited for the study. Those excluded were below 7 and above 65 years of age, did not provide their informed consent and had other forms of diseases of infection.

### Specimen Collection

5mls of venous blood (well - taken with minimal stasis) was collected from each patient and 3mls aliquoted into a plastic tube containing 0.25ml of aqueous tri-sodium citrate anticoagulant and used to determine prothrombin time and activated partial thromboplastin time. The remaining 2mls was dispensed into ethylene diaminetetraacetic acid bottle and used for packed cell volume and platelet estimations.

### Laboratory Analysis

The hematological and haemostatic parameters were determined using manual methods.

### Statistical Analysis

The data obtained was analyzed using statistical package for social sciences (SPSS) version 20

(SPSS Inc., Chicago, IL, USA). The result was expressed as mean  $\pm$  standard deviation (SD). Differences between two variables was determined using students' t-test. Level of significance was set at  $P < 0.05$ .

## Results

**Table 1: Mean Values of PCV and Platelets in Epistaxis Patients (Test) Versus Non - Epistaxis Subjects (Controls).**

Parameters	Test n = 30	Control n = 30	t-value	P-value
PCV (%)	27.90 $\pm$ 3.52	34.40 $\pm$ 3.88	6.79	0.000*
Platelets ( $\times 10^9/L$ )	168.87 $\pm$ 62.74	296.80 $\pm$ 75.28	7.15	0.000*

**Key:**

PCV: Packed Cell Volume

\*: Significant p value

Table 1 shows that the mean values of PCV and platelets were significantly lower in epistaxis patients (27.90  $\pm$  3.52) % and (168.87  $\pm$  62.74)  $\times 10^9/L$  when compared to controls (34.40  $\pm$  3.88)% and (296.80  $\pm$  75.28)  $\times 10^9/L$  respectively ( $p = 0.000$ ).

**Table 2: Mean Values of PT and APTT in Epistaxis Patients (Test) Versus Non - Epistaxis Patients (Controls).**

Parameters	Test n = 30	Control n = 30	t-value	P-value
PT (secs)	12.28 $\pm$ 1.10	12.74 $\pm$ 1.24	1.53	0.131
APTT(secs)	31.08 $\pm$ 7.08	32.99 $\pm$ 2.87	1.37	0.176

**Key:**

PT: Prothrombin Time

APTT: Activated Partial Thromboplastin Time

\*: Significant p value

Table 2 shows that there was no significant difference in the mean values of PT and APTT in epistaxis patients (12.28  $\pm$  1.10; 31.08  $\pm$  7.08) secs when compared to controls (12.74  $\pm$  1.24; 32.99  $\pm$  2.87) secs, respectively ( $p = 0.131$  and  $0.176$ ).

**Table 3: Mean Values of PCV and Platelets in Male Versus Female Epistaxis Patients.**

Parameters	Male n = 19	Female n = 11	t-value	P-value
PCV (%)	27.55 $\pm$ 4.19	27.73 $\pm$ 2.94	0.12	0.902
Platelets ( $\times 10^9/L$ )	173.90 $\pm$ 70.45	192.18 $\pm$ 52.62	0.75	0.459

**Key:**

PCV: Packed Cell Volume

\*: Significant p value

Table 3 shows that there was no significant difference in the mean values of PCV and platelets in male epistaxis patients ( $27.55 \pm 4.19\%$ ) and  $(173.90 \pm 70.45) \times 10^9/L$  respectively when compared to females ( $27.73 \pm 2.94\%$ ) and  $(192.18 \pm 52.62) \times 10^9/L$ , respectively ( $p = 0.902$  and  $0.459$ ).

**Table 4: Mean Values of PT and APTT in Male Epistaxis Patients Versus Female Epistaxis Patients.**

Parameters	Male n = 30	Female n = 11	t-value	P-value
PT (secs)	$12.24 \pm 1.28$	$12.03 \pm 1.21$	1.24	0.569
APTT(secs)	$29.13 \pm 4.71$	$28.19 \pm 4.51$	1.71	0.712

**Key:**

PT: Prothrombin Time

APTT: Activated Partial Thromboplastin Time

\*: Significant p value

Table 4. shows that there was no significant difference in the mean values of PT and APTT in male epistaxis patients ( $12.24 \pm 1.28$ ;  $29.13 \pm 4.71$ ) secs respectively when compared to female epistaxis patients ( $12.03 \pm 1.21$ ;  $28.19 \pm 4.51$ ) secs respectively ( $p = 0.569$  and  $0.712$ ).

### Discussion

Epistaxis is a common clinical presentation that can range from a benign, self-limiting issue to a symptom of an underlying systemic disorder<sup>7</sup>. The findings from this study showed a significant reduction in PCV among epistaxis patients when compared to healthy controls. This decrease is likely due to spontaneous or recurrent bleeding episodes resulting in blood loss. Notably, most bleeding originates from Kiesselbach's plexus, a vascular area in the anterior nasal septum that is particularly prone to injury<sup>8</sup>. This observation aligns with the findings of Davies et al.<sup>9</sup>, who reported the need for blood transfusions in epistaxis patients exhibiting signs of anemia. Given the nose's rich vascular supply, even minimal trauma can result in considerable blood loss.

The study also showed that platelet counts were significantly lower in epistaxis patients. Although the exact mechanism for this is not fully understood, it has been suggested that sustained bleeding may result in platelet depletion. Furthermore, underlying disorders that impair platelet production or function may also contribute<sup>9</sup>. Manes<sup>10</sup> highlighted platelet dysfunction as a notable contributor to epistaxis. Factors such as drug use, alcohol, and hematologic diseases can impair platelet function, increasing bleeding risk. Krulewitz and Fix<sup>11</sup> reported cases of idiopathic epistaxis where the underlying cause was

only revealed after platelet function tests showed abnormalities.

In contrast, no significant difference was observed in PT and APTT values between epistaxis patients and controls. This suggests that, for many patients, the bleeding is not due to clotting factor deficiencies. This outcome is consistent with findings by Srdjan and Abdul-Kader<sup>12</sup>, who also reported normal coagulation profiles in epistaxis cases. However, Davies et al.<sup>9</sup> documented prolonged PT and APTT in some epistaxis patients, speculating exposure to unknown inhaled chemicals as a potential cause. Interestingly, in the current study, there was no sex-based difference in PT or APTT, indicating that gender does not influence these parameters in the context of epistaxis, a finding that aligns with previous research<sup>12</sup>.

### Conclusion

This study demonstrates that individuals with epistaxis commonly exhibit significantly reduced PCV and platelet counts, indicating blood loss and possible platelet dysfunction. However, PT and APTT values showed no significant differences when compared to healthy controls, and there was no evidence of sex-based differences in these haemostatic parameters. These findings emphasize the need to evaluate platelet levels and red cell indices in epistaxis patients, while

routine coagulation tests may not always reflect abnormalities in these individuals.

### Conflicting Interest

The authors declare that there is no conflicting interest regarding the publication of this paper.

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