

Assessment of Awareness of First-Aid Epistaxis Management Amongst Surgical Staff at a Tertiary Surgical Centre in Khartoum, Sudan

Eiman Elmusharaf*

General Surgery Junior Clinical Fellow, Omdurman Teaching Hospital, Khartoum, Sudan.

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Abstract

Background: Epistaxis is the most common ENT emergency seen in A&E and inpatient settings. Efficient first-aid management is crucial to reduce morbidity, prevent complications and minimize inappropriate specialist referrals. In hospitals without an on-site ENT department, the general surgery team is often the first point of contact for patients presenting with epistaxis. Data on surgical staff awareness towards its initial management remains limited.

Methods: This was a cross-sectional study conducted in Omdurman Teaching Hospital in Khartoum, Sudan, from January 2023 to April 2023. A structured self-administered questionnaire was distributed to all surgical doctors across 6 different units assessing the awareness of first-aid epistaxis management principles. Data were analysed descriptively, presenting results as frequencies and percentages.

Results: A total of 105 surgical doctors were surveyed in this study, with 32 registrars and 73 middle-grade doctors. The overall mean knowledge score among all participants was 2.53 out of a maximum score of 5. Just below half of participants (49.5%) achieved a score of $\geq 3/5$, while only four participants (3.8%) achieved full marks. No participant scored zero. Surgical registrars demonstrated higher knowledge scores compared with middle-grade doctors, with mean scores of 3.38/5 and 2.16/5, respectively.

Conclusion: The study demonstrated significant gaps in knowledge regarding the first aid management of epistaxis amongst surgical staff at Omdurman Teaching Hospital. Local educational initiatives dedicated towards increasing knowledge and awareness of this common clinical presentation are imperative to reduce the risk of complications.

Keywords: ENT; Nasal fracture; Epistaxis; Nasal bone

1. Introduction

Epistaxis is the most common ENT emergency seen in A&E and represents a significant amount of hospital presentations overall [1]. It is defined as bleeding that arises from the nasal cavity, with several causes, including local ones such as nasal trauma and systemic ones such as hypertension and anticoagulant medication [2]. Epistaxis is usually divided into anterior and posterior in the clinical setting, pertaining to the vascular anatomy of the nose [3]. The most common culprit of epistaxis is the Keisselbach's plexus (also termed Little's area), resulting in bleeding from the anterior portion of the nasal cavity [4]. The extent of bleeding from both areas can range from self-limiting to life-threatening [5].

Most cases of epistaxis are self-limiting in nature and do not require attendance at hospital; however, it is estimated that 60% of the general population will develop epistaxis in their lifetime, and 6% of these cases will require inpatient intervention [6]. In most cases presenting to hospital, using simple evidence-based manoeuvres such as appropriate

* Corresponding author: Eiman Elmusharaf

nasal compression at the cartilaginous part of the nose and patient positioning with the head tilting forward for 10-15 minutes will arrest the bleeding [7]. Inappropriate technique, such as nasal compression of the incorrect site, may lead to delayed haemostasis and its subsequent events, including aspiration of blood if coupled with improper head position [8].

It is therefore imperative that first responders amongst healthcare providers are familiar with epistaxis first-aid techniques; however, many non-ENT clinicians are unaware of the appropriate management of epistaxis [9]. In Sudanese hospitals, where most centers lack an on-site ENT department, the general surgery team is often the first point of contact for A&E and inpatients who develop epistaxis.

Data evaluating surgical staff awareness towards the initial management of epistaxis remains limited, particularly in low-resource settings. This study was aimed at assessing the level of awareness of first-aid epistaxis management amongst surgical staff at Omdurman Teaching Hospital in Khartoum, Sudan.

2. Materials and methods:

2.1. Methods

This was a cross-sectional study conducted at a major tertiary center in Khartoum, Sudan, from April to May 2024. A structured self-administered questionnaire was distributed to all surgical doctors across 6 different units assessing the awareness of first-aid epistaxis management principles. Data were analysed descriptively, presenting results as frequencies and percentages.

2.2. Inclusion and exclusion criteria:

The inclusion criteria for this study were doctors in the general surgery department at Omdurman Teaching Hospital. The exclusion criteria were clinical grades above registrar level and below middle-grade.

2.3. Sampling Technique:

A consecutive sampling technique was implemented where all surgical staff at Omdurman Teaching Hospital between the grades of registrar and middle-grade doctor were selected. Middle-grade doctors were doctors who had graduated from medical school, completed foundation year training but had not taken their Sudanese Medical Specialisation Board Exam.

2.3.1. Data Collection:

This was done through the distribution of a questionnaire to all surgical doctors at Omdurman Teaching Hospital (Appendix 1). The questionnaire aimed to gather information about clinical grade and epistaxis management knowledge. The clinical grade was included to determine key factors that may influence awareness. Five questions were designed to gauge understanding of the causes and management of epistaxis. Correct responses were given a score of 1, while incorrect answers were scored 0, resulting in a total knowledge score for each participant. The correct answers were determined to be immediate nasal compression for the first question, sitting with head tilted forward for the second question, cartilaginous part for the third, 10-15 minutes for the fourth and nose-picking for the final question. The answer "Not sure" was considered incorrect in all questions.

2.4. Statistical methods

Data analysis was performed using Statistical Product and Service Solutions (SPSS). Correct responses were given a score of 1, while incorrect answers were scored 0, resulting in a knowledge score for each participant from 0 to 5. The frequency and percentage of answers for each question were determined.

- Outcome Measures: The primary outcome was awareness of surgical staff regarding the first aid management of epistaxis.
- Confounding factors: Possible confounding factors included participants' previous ENT exposure.

2.5. Governance and Ethics:

This study involved an anonymous, non-interventional questionnaire electronically sent to participants and did not contain clinical data or identifiable personal information. Participation was entirely voluntary with no incentives provided. Electronically written informed consent was obtained from all participants after explaining the study's

purpose and procedure, confidentiality, and voluntary nature. Once consent was given, participants were reminded they have the right to withdraw at any time. Institutional Review Board approval was thus waived by the hospital and considered as a service evaluation. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, and all data were anonymised to protect participant privacy.

3. Results

3.1. Participant characteristics:

A total of 105 surgical doctors completed the questionnaire. Of these, 32 (30.5%) were surgical registrars and 73 (69.5%) were middle-grade (trust-grade) doctors. All participants were working within the general surgery department across six surgical units at Omdurman Teaching Hospital in Khartoum, Sudan, at the time of the study.

3.2. Overall knowledge scores:

The overall mean knowledge score among all participants was 2.53 out of a maximum score of 5. Just below half of participants (49.5%) achieved a score of $\geq 3/5$, while only four participants (3.8%) achieved full marks (Table 1). No participant scored zero. Surgical registrars demonstrated higher knowledge scores compared with middle-grade doctors, with mean scores of 3.38/5 and 2.16/5, respectively.

3.3. First-aid management of epistaxis

Marked differences were observed between surgical registrars and middle-grade doctors in their responses regarding initial first-aid management of epistaxis (Table 2). Most surgical registrars correctly identified firm nasal compression as the primary management (30/32, 93.8%), whereas this was selected by fewer than half of middle-grade doctors (30/73, 41.1%). Middle-grade doctors more frequently selected immediate nasal packing (32/73, 43.8%) or urgent referral to ENT (11/73, 15.1%) as initial management options. No participants in either group selected "not sure" for this domain.

3.4. Head position during epistaxis:

Incorrect head positioning was common across both groups. Most surgical registrars selected sitting with the head tilted backward (29/32, 90.6%), while three (9.4%) selected the forward-tilted position. Similarly, most middle-grade doctors selected head tilt backward (56/73, 76.7%), while six (8.2%) selected the correct forward position. A small proportion of middle-grade doctors selected a neutral position (7/73, 9.6%) or were unsure (4/73, 5.5%).

3.5. Site of nasal compression:

Knowledge of the correct site of nasal compression varied between groups. Half of surgical registrars chose the cartilaginous (inferior) part of the nose as the correct site (16/32, 50.0%), while 10 (31.3%) selected the bony part and six (18.8%) selected both sites. The cartilaginous part was more frequently identified amongst middle-grade doctors (53/73, 72.6%), although incorrect responses were still evident, including selection of the bony part (9/73, 12.3%), both sites (6/73, 8.2%), or uncertainty (5/73, 6.8%).

3.6. Duration of nasal compression:

Consistent differences were identified in the knowledge of appropriate compression duration. Most surgical registrars selected the recommended duration of 10–15 minutes (28/32, 87.5%), whereas this was selected by only 12 middle-grade doctors (16.4%). More than half of middle-grade doctors selected shorter, incorrect durations of 2–3 minutes (39/73, 53.4%) or 5 minutes (14/73, 19.2%), and eight (11.0%) were unsure.

3.7. Awareness of common etiology of epistaxis:

Awareness of the most common etiology of epistaxis differed notably between groups. Nose-picking was correctly identified by most surgical registrars (23/32, 71.9%), compared with fewer middle-grade doctors (18/73, 24.7%). Middle-grade doctors more frequently selected "not sure" (37/73, 50.7%) compared with surgical registrars (3/32, 9.4%). Nasal fracture and nasal polyps were selected by smaller proportions in both groups.

Table 1 Epistaxis Knowledge Scores Among Surgical Doctors (N = 105)

Total score (out of 5)	Surgical registrars (n = 32), n (%)	Middle-grade doctors (n = 73), n (%)	Total (N=105), n (%)
5/5	4 (12.5%)	0 (0%)	4 (3.8%)
4/5	10 (31.3%)	6 (8.2%)	16 (15.2%)
3/5	12 (37.5%)	20 (27.4%)	32 (30.5%)
2/5	6 (18.8%)	27 (37.0%)	33 (31.4%)
1/5	0 (0%)	20 (27.4%)	20 (19.0%)
0/5	0 (0%)	0 (0%)	0 (0%)

Table 2 Surgical teams' response in questionnaire

Group (105)	First aid management, n (%)	Head position, n (%)	Site of compression, n (%)	Duration of compression, n (%)	Most common aetiology, n (%)
Surgical registrars (32)	Immediate nasal packing 2 (6.3%)	Sitting with head tilted forward 3 (9.4%)	Cartilaginous part (inferior part) 16 (50%)	2-3 minutes 2 (6.3%)	Nose-picking 23 (71.9%)
	Firm nasal compression 30 (93.8%)	Sitting with head tilted backward 29 (90.6%)	Bony part (superior part) 10 (31.3%)	5 minutes 2 (6.3%)	Nasal fracture 4 (12.5%)
	Urgent referral to ENT 0 (0)	Sitting neutral 0 (0)	Both 6 (18.8%)	10-15 minutes 28 (87.5%)	Nasal polyps 2 (6.3%)
	Not sure 0 (0)	Not sure 0 (0)	Not sure 0 (0)	Not sure 0 (%)	Not sure 3 (9.4%)
Surgical middle-grade doctors (73)	Immediate nasal packing 32 (43.8%)	Sitting with head tilted forward 6 (8.2%)	Cartilaginous part (inferior part) 53 (72.6%)	2-3 minutes 39 (53.4%)	Nose-picking 18 (24.7%)
	Firm nasal compression 30 (41.1%)	Sitting with head tilted backward 56 (76.7%)	Bony part (superior part) 9 (12.3%)	5 minutes 14 (19.2%)	Nasal fracture 15 (20.5%)
	Urgent referral to ENT 11 (15.1%)	Sitting neutral 7 (9.6%)	Both 6 (8.2%)	10-15 minutes 12 (16.4%)	Nasal polyps 3 (4.1%)
	Not sure 0 (%)	Not sure 4 (5.5%)	Not sure 5 (6.8%)	Not sure 8 (11%)	Not sure 37 (50.7%)

4. Discussion

Epistaxis is mostly self-limiting in nature but can escalate to require hospital admission [10]. Inappropriate epistaxis cessation techniques can result in catastrophic outcomes, so it is essential that healthcare providers looking after these patients are well-versed in the appropriate nasal compression and head position technique [11].

This audit demonstrates significant gaps in the first aid awareness of epistaxis management among the surgical clinicians at Omdurman Teaching Hospital, highlighting several differences between surgical registrars and middle-grade doctors. While registrars performed better overall, substantial deficiencies were evident within both groups.

The most significant inconsistency was in head positioning during active epistaxis, with most of both groups incorrectly selecting a backward head tilt rather than the evidence-based forward position.

Further inconsistencies were also observed in the duration and site of nasal compression, with most middle-grade doctors selecting insufficient durations while most registrars chose the incorrect site of compression. These findings are significant, as when combined, these techniques are inappropriate for the effective first aid management of epistaxis.

The first-line management for epistaxis is sustained compression of the cartilaginous part of the nose for 10-15 minutes, which has been documented through the literature [6]. The premature release of nasal compression or pinching the incorrect part of the nose may not efficiently cease the bleeding and subsequently lead to unnecessary escalation to specialists or hospital admission [8].

Furthermore, the tendency towards early ENT escalation was evident in middle-grade doctors, which could be construed as a reflection of their confidence levels. A previous study in the United Kingdom identified that over half of A&E resident doctors had no formal teaching of epistaxis management [12]. While escalation is suitable in complicated cases such as refractory or posterior epistaxis, unnecessary use of nasal packing is associated with patient discomfort and nasal trauma [13]. This demonstrates how gaps in basic first-aid knowledge of epistaxis can lead to easily avoidable interventions that increase the healthcare burden, particularly in low-income settings.

Together, these findings highlight inconsistent understanding of basic epistaxis management principles across surgical grades, with potential implications for patient safety and resource utilisation.

This survey was completed at a single hospital at a single point in time, which may limit the generalisability of its results; however, our outcomes are consistent with previous studies investigating the management of epistaxis amongst non-ENT clinicians, which have illustrated varying degrees of awareness and recurrent deviation from evidence-based first-line management [13].

In hospitals that do not have an on-site ENT on-call team, such as many district general hospitals and most tertiary centers in low-income countries, surgical teams are usually responsible for managing these patients in A&E and the inpatient setting. It is therefore imperative to ensure that these clinicians have a sound understanding of evidence-based first-line management of epistaxis to reduce adverse outcomes such as delayed haemostasis and subsequent patient discomfort, avoidable specialist referrals, and hospital admissions. This can be improved by designing targeted educational sessions, practical demonstrations of epistaxis cessation techniques and implementing management algorithms into induction to support an efficient form of standardised care. Furthermore, while recognising the limited degree of exposure to ENT within undergraduate training, integrating epistaxis management into postgraduate curricula may improve confidence and clinical decision-making.

5. Conclusion

Awareness of epistaxis management was moderate among surgical clinicians, with key aspects requiring refinement. Deficits were most pronounced among trust-grade doctors, although registrars also demonstrated insufficient knowledge of epistaxis management, which includes site of compression, head position and duration of compression. These are low-cost maneuvers that most clinicians should be able to demonstrate, as they may be able to reduce unnecessary patient admission and specialist referral and decrease the healthcare burden. Peer teaching sessions with simulation are recommended to increase engagement, as would incorporating epistaxis management into induction. Finally, conducting a re-audit after the implementation of these teaching sessions is prudent to gauge further knowledge improvement.

Compliance with ethical standards

Statement of ethical approval

This study involved an anonymous, non-interventional questionnaire electronically sent to participants and did not contain clinical data or identifiable personal information. Institutional Review Board approval was thus waived by the hospital and considered as a service evaluation. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, and all data were anonymized to protect participant privacy.

The present research work does not contain any studies performed on animals.

Statement of informed consent

Participation was entirely voluntary with no incentives provided. Electronically written informed consent was obtained from all participants after explaining the study's purpose and procedure, confidentiality, and voluntary nature. Once consent was given, participants were reminded they have the right to withdraw at any time.

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APPENDIX 1: Survey:

- Clinical grade:

- Which of the following is the appropriate first-line treatment for anterior epistaxis in the emergency setting?
 - Immediate nasal packing
 - Firm nasal compression

- Urgent referral to ENT
 - Not sure
- What is the proper position that a patient with epistaxis should take?
 - Sitting with head tilted forward
 - Sitting with head tilted backward
 - Sitting neutral
 - Not sure
- Pinching the nose as a primary measure to stop epistaxis should be at:
 - Cartilaginous part (inferior part)
 - Bony part (superior part)
 - Both
 - Not sure
- For how long should continuous nasal compression be applied initially to control epistaxis?
 - 2–3 minutes
 - 5 minutes
 - 10–15 minutes
 - Not sure
- What is the most common cause of epistaxis?
 - Nose-picking
 - Nasal fracture
 - Nasal polyp
 - Not sure