Assessing Completeness of Emergency Notes Documentation: An Audit and Re-audit to Enhance Quality of Patient Care

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Abstract

Background: Clinical audits are a well-established tool for ensuring adherence to standards and driving improvements in healthcare delivery. Incomplete documentation in emergency departments (EDs) threatens patient safety and continuity of care.

Objective: This study aimed to evaluate and improve documentation completeness through a clinical audit and targeted intervention in a paper-based ED setting.

Methods: This audit was conducted at Chaudhary Muhammad Akram Teaching and Research Hospital, Lahore, Pakistan. A clinical audit was conducted over two cycles involving 1140 and 964 emergency notes, respectively. The initial audit reviewed 1,140 emergency files from January 2025 using a standardized checklist. Targeted interventions were implemented in February 2025. A re-audit of 964 files from March 2025 was then conducted using the same checklist.

Results: Documentation completeness improved significantly for all measured items following the intervention. Notably, the time of consultation documentation nearly doubled, increasing from 51.8% to 94.2% (difference +42.4%, 95% CI: 39.0%, 45.8%), adjusted $p<0.001$). Similarly, medication history recording improved by 42.6% (from 47.9% to 90.5%, 95% CI: 39.2%, 46.0%), adjusted $p<0.001$). Other critical elements, such as the doctor's full name and signature, also showed substantial gains exceeding 20%.

Conclusion: The re-audit reflected a positive trend in completeness of data and time of consultation, physician information, and history documentation, with the checklist items showing improved adherence compared to the original audit. Targeted audit-feedback and visual reminders significantly enhanced documentation completeness in a resource-limited, paper-based ED setting. These findings support the use of structured quality improvement strategies to strengthen clinical documentation in similar contexts.

Keywords: *Audit, emergency notes, patient care, medical documentation, re-audit, hospital records.*

INTRODUCTION

The Emergency Department is a dynamic environment marked by unpredictable patient volumes and varying levels of clinical urgency where physicians often face the challenge of making critical decisions quickly, often with limited information and amid frequent interruptions [1]. A systematic approach to patient assessment is vital in the ED to detect life-threatening conditions early and ensure timely interventions [2]. Taking a focused and efficient medical history is especially crucial, as this information can guide diagnoses and influence outcomes, and can reveal essential details such as chronic conditions or prior medical issues [3, 4]. Medical records serve both clinical and legal purposes, documenting the patient's interaction with healthcare services, facilitating communication among providers, and supporting continuity of care in both hospital and community settings [5, 6]. Clear documentation is especially critical during handovers, where poor-quality notes can lead to delays and errors [5, 7].

Properly maintained records help ensure comprehensive care, provide legal protection, and are often used in research, resource planning, and quality improvement. Essential components of the medical record include the patient's history, examination findings, diagnostic steps, and treatments administered. Entries should be chronological, legible, and include the consultation date, time, physician's name, registration number, and signature [8, 9]. A widely accepted framework for history-taking in emergency settings is the SAMPLE mnemonic: Signs/Symptoms, Allergies, Medications, Past medical history, Last oral intake/menstrual period, and Events leading to the illness [10]. The World Health Organization (WHO) recommends its use, and programs like Advanced Trauma Life Support (ATLS), Pediatric Advanced Life Support (PALS), and Advanced Cardiovascular Life Support (ACLS) emphasize this method to ensure rapid, structured data collection during emergencies [2, 11, 12].

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Incomplete documentation in emergency departments is a widespread issue that can compromise patient safety, continuity of care, and medico-legal accountability. At our institution, preliminary observations revealed frequent omissions in emergency notes, including missing physician identifiers and critical history elements. Addressing these gaps is essential for maintaining clinical standards and improving patient outcomes. To identify deficiencies in our documentation practices, we conducted a clinical audit to assess the quality of emergency notes at our hospital. Clinical audits are a well-established tool for ensuring adherence to standards and driving improvements in healthcare delivery [13, 14]. Structured audits with feedback and visual reminders can significantly enhance documentation practices in paper-based systems. Therefore, this study aimed to assess and improve the completeness of emergency note documentation through a clinical audit and targeted intervention. Our focus was on determining the completeness of emergency notes to identify critical areas for improvement and implement targeted interventions. Accurate and comprehensive emergency documentation is essential for maintaining continuity of care, preventing medical errors, and enhancing patient safety. Incomplete or inaccurate notes can lead to unnecessary re-visits, medication errors, and compromised patient outcomes. The rationale for our study was to transform emergency documentation from a potential liability into a cornerstone of clinical excellence and patient-centered care. This study aimed to evaluate and improve documentation completeness through a clinical audit and targeted intervention in a paper-based ED setting.

METHODS

This audit was conducted in the Department of Accident and Emergency at Chaudhary Muhammad Akram Teaching and Research Hospital, Azra Naheed Medical College, Superior University, Lahore, Pakistan.

An internal audit design was employed to evaluate the completeness of emergency notes documentation. The audit process was carried out in three phases: an initial baseline audit in January 2025, an intervention phase in February 2025, and a subsequent re-audit in March 2025 to assess improvements in documentation completeness following the intervention. Medical records that were incomplete due to missing or physically damaged emergency notes were excluded from the analysis. The study adhered to the ethical principles outlined in the Declaration of Helsinki (1964), as revised in 2000. Patient confidentiality and data privacy were rigorously maintained throughout the audit. No patient-identifiable information was included in the analysis, and all procedures conformed to established ethical standards for healthcare research.

A standardized checklist was used to assess the completeness of various components of the emergency notes, drawing on guidelines from the Islamabad Healthcare Regulatory Authority (IHRA), the Punjab Healthcare Commission (PHC), and the Royal College of Physicians (RCP) [9, 15-17]. The checklist was divided into two domains as shown in Table **1**. The first domain focused on documenting time and physician identification details, including six items: the date and time of consultation, the doctor's full name, the doctor's Pakistan Medical and Dental Council (PMDC) registration number, the doctor's signature, and the official stamp. The second domain assessed the clinical history based on the SAMPLE mnemonic tool, also comprising six items: signs and symptoms, allergies, medications taken before the visit, past medical history, last oral intake or meal (and, for females, the last menstrual period), and events leading to the illness, incident, or injury [1, 10]. Each item was evaluated as either 'documented' (score: 1) or 'not documented' (score: 0) for every emergency note reviewed, as shown in Table **1**. All components of the sample mnemonic were evaluated across all records to maintain consistency, regardless of presenting complaint.

To promote consistency, ambiguous cases during abstraction were discussed jointly among reviewers. Illegible handwriting was classified as 'not documented' unless both reviewers could clearly interpret the content. Partial documentation was also not acceptable. For this audit, all emergency notes were included in the denominator for each checklist item, regardless of patient demographics (*e.g*., gender) or clinical applicability. This means, for example, that the item "last oral intake or last menstrual period" was assessed in all cases, including male patients and pediatric patients, even though the "last menstrual period" component would not apply. Similarly, documentation fields, such as the physician's PMDC registration number, were assessed for completeness across all notes, even when notes were written by junior staff pending final review. This inclusive denominator strategy was chosen to ensure standardization of scoring across all items and to highlight potential areas of routine under-documentation.

Four physician auditors (one external, three internal) conducted the data abstraction. All reviewers attended a structured training session before data collection, which included reviewing the audit checklist, definitions of each item, and a discussion of example records. A written codebook was used to standardize scoring and

Table 1: Checklist used in the audit and re-audit.

Checklist Item	Response	
Domain 1: Time and Doctor Information		
Date of consultation	Documented	Not Documented
Time of consultation	Documented	Not Documented
Doctor's full name	Documented	Not Documented
Doctor's PMDC registration number	Documented	Not Documented
Doctor's signature	Documented	Not Documented
Doctor's stamp	Documented	Not Documented
Domain 2: Sample		
S: Signs and symptoms	Documented	Not Documented
A: Allergies	Documented	Not Documented
M: Medications taken before visit	Documented	Not Documented
P: Past medical history	Documented	Not Documented
L: Last oral intake/meal, last menstrual period	Documented	Not Documented
E: Events leading to illness, incident, or injury	Documented	Not Documented

interpretation. Although ambiguous cases were resolved through consensus discussions, formal pilot calibration and quantitative assessment of inter-rater reliability (*e.g.*, Cohen's κ or percent agreement) were not conducted due to time and resource constraints. This is acknowledged as a methodological limitation. Auditors were not involved in intervention delivery and were blinded to previous audit cycle scores during re-audit abstraction to reduce measurement bias. Files were anonymized and presented without date labels to avoid expectancy bias. Auditors used uniform data sheets and reviewed records independently to minimize confirmation bias. The initial audit reviewed all medical records from January 2025 using a non-probability, consecutive sampling technique. A total of 1,187 records were retrieved; however, 47 records were excluded due to missing or damaged emergency notes, as illustrated in **Fig. (1)**. Consequently, the audit was conducted on a sample of 1,140 emergency notes.

Following the initial audit, targeted interventions to improve documentation practices were implemented in February 2025. The training covered key checklist items, common documentation errors, and strategies for improvement. Informal written and verbal feedback was provided to healthcare professionals, particularly

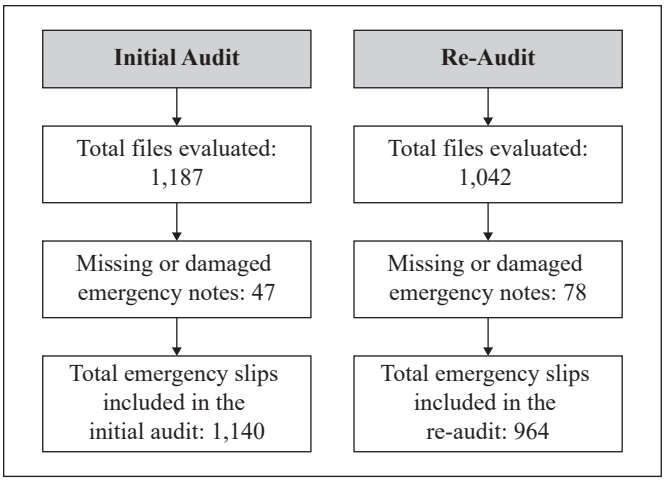

Fig. (1): Audit and re-audit inclusion process.

house officers and postgraduate residents responsible for documentation during daily shift meetings. These sessions highlighted common omissions identified during the initial audit. Specific training sessions were conducted to address the deficiencies identified in the initial audit. Content included a review of the audit checklist items, examples of common documentation gaps, and practical guidance on using the SAMPLE mnemonic and documenting physician identifiers. These interventions focused on improving documentation of missing or incomplete information in emergency notes, especially regarding the time of consultation, the physician's full name, signature and stamp, allergies, events leading to the visit, last oral intake and menstrual period, past medical history, and medications.

Additionally, as illustrated in **Annexure A (Supplementary File 1)**, specially designed educational posters summarizing the 12 audit checklist items and the sample mnemonic were displayed at various locations within the Emergency and Accident Department to serve as visual reminders to enhance documentation practices. Using previous studies as a reference, the poster was designed to include a reminder to document consultation time and date, the physician's information, and history-taking using the SAMPLE mnemonic tool [1, 9]. However, no formal fidelity checklist or independent evaluation of training delivery quality was conducted.

Subsequently, a re-audit was conducted on all medical records from March 2025 using the same non-probability consecutive sampling technique. A total of 1,042 records were retrieved; however, 78 records were excluded due to missing or damaged emergency notes, as shown in **Fig. (1)**. Therefore, a sample of 964 emergency notes was included in the re-audit. The same standardized checklist was applied to evaluate the completeness of documentation in these emergency notes.

The results were analyzed using SPSS version 23 by calculating the percentage completeness for each checklist item. This percentage was determined by dividing the number of emergency notes meeting the documentation criteria by the total number of records (964) included in the re-audit. Data from both the initial audit and re-audit were compared to assess improvement in documentation completeness, and the percentage change between audits was calculated to identify areas of progress or decline in documentation practices. Comparisons were made using the Chi-square test to assess documentation completeness before and after the intervention, with p-values ≤0.05 considered statistically significant. Ninety-five percent confidence intervals for differences were calculated using normal approximation. Benjamini-Hochberg correction was applied to adjust for multiple testing.

RESULTS

A total of 1140 emergency notes were initially audited, with 964 notes evaluated during the re-audit cycle (**Fig. 1**). All patients were included in the denominators for each checklist item, without exclusion based on gender or clinical applicability. The original audit revealed varying levels of completeness in the documentation of time and physician information, as shown in Table **2**. Audit completeness improved significantly across all checklist items from the initial audit to the re-audit. Documentation of consultation details increased, with the date of consultation rising from 1038 (91.1%) to 956 (99.2%), the time of consultation from 590 (51.8%) to 908 (94.2%), and the doctor's full name from 824 (72.3%) to 920 (95.4%). Doctor's PMDC registration number, signature, and stamp completeness also improved notably (all p<0.001, BH adjusted) as demonstrated in Table **2**.

With regard to historical documentation, according to the SAMPLE mnemonic tool, the original audit showed varying levels of completeness, as depicted in Table **3**. Clinical information completeness increased in the re-audit: signs and symptoms from 1018 (89.3%) to 944 (97.9%), allergies from 702 (61.6%) to 844 (87.6%), medications before visit from 546 (47.9%) to 872 (90.5%), past medical history from 650 (57.0%) to 884 (91.7%), last oral intake/meal or last menstrual period from 518 (45.4%) to 860 (89.2%), and events leading to illness/injury from 876 (76.8%) to 884 (91.7%) (p<0.001, BH adjusted) as presented in Table **3**. These improvements demonstrate enhanced adherence to documentation standards in a paper-based emergency department setting, though some items, such as PMDC registration, require ongoing attention.

Table 2: Results of audit and re-audit for completeness of time documentation and physician information.

Checklist Item	Audit Completeness N=1140	Re-Audit Completeness N=964	Difference	95% CI for Difference	Original p-value	BH Adjusted p-value
Date of Consultation	1038 (91.1)	956 (99.2)	+8.1	+5.5 to +10.7	<0.001	0.0005
Time of Consultation	590 (51.8)	908 (94.2)	+42.4	+38.7 to +46.1	<0.001	0.0005
Doctor's Full Name	824 (72.3)	920 (95.4)	+23.1	+19.8 to +26.4	<0.001	0.0005
Doctor's PMDC Registration Number	8 (0.7)	60 (6.2)	+5.5	+3.4 to +7.6	<0.001	0.0005
Doctor's Signature	892 (78.2)	924 (95.9)	+17.7	+14.6 to +20.8	<0.001	0.0005
Doctor's Stamp	846 (74.2)	900 (93.4)	+19.2	+16.0 to +22.4	<0.001	0.0005

Data is presented as n(%), CI: Confidence Interval; BH: Benjamini-Hochberg correction

Table 3: Results of audit and re-audit for completeness of history documentation according to the SAMPLE mnemonic tool.

Checklist Item	Audit Completeness N=1140	Re-Audit Completeness N=964	Difference	95% CI for Difference	Original p-value	BH Adjusted p-value
S: Signs and symptoms	1018 (89.3)	944 (97.9)	+8.6	+6.4% to +10.8	<0.001	0.0005
A: Allergies	702 (61.6)	844 (87.6)	+26.0	+23.0% to +29.0	<0.001	0.0005
M: Medications taken before visit	546 (47.9)	872 (90.5)	+42.6	+39.3% to +45.9	<0.001	0.0005
P: Past medical history	650 (57.0)	884 (91.7)	+34.7	+31.4% to +38.0	<0.001	0.0005
L: Last oral intake/meal	518 (45.4)	860 (89.2)	+43.8	+40.5% to +47.1	<0.001	0.0005
E: Events leading to illness, incident, or injury	876 (76.8)	884 (91.7)	+14.9	+12.0% to +17.8	<0.001	0.0005

Data is presented as n(%), CI: Confidence Interval; BH: Benjamini-Hochberg correction

DISCUSSION

This audit aimed to evaluate and improve the completeness of emergency documentation by conducting an initial audit, implementing targeted interventions, and subsequently performing a re-audit. Our results reveal significant improvements in the completeness of emergency note documentation across multiple domains, including time and physician information, as well as patient history, following the intervention. The initial audit revealed that while some elements, such as the date of consultation, were well documented (91.1%), other critical details, like the time of consultation, were frequently omitted, with only about half of the records including this information (51.8%). Documentation of physician identifiers, including the doctor's full name, signature, and stamp, was reasonably recorded, but the PMDC registration number was almost entirely neglected (0.7%). These findings highlight common gaps in documentation that could impact clinical communication and medico-legal accountability. Following targeted feedback and training interventions, the re-audit demonstrated marked improvements.

Notably, documentation of the time of consultation improved dramatically to 94.2%, indicating that the interventions were effective in raising awareness and compliance with essential documentation standards. Similarly, improvements in physician identification details reflect better adherence to documentation protocols. However, documentation of the PMDC registration number remained low despite some increase, suggesting that this particular element may require further emphasis or system-level changes to ensure consistent recording. Potential barriers include limited availability of the number on doctors' stamps, the design of the documentation form, which may lack dedicated space for this information, and possible cultural or habitual practices that deprioritize recording registration details [4, 7, 18, 19]. To address these challenges, system-level solutions are needed beyond education alone. These could include making the PMDC number a mandatory field on patient proformas, introducing a pre-printed designated area for the registration number on documentation forms, and integrating linkage with hospital staff rosters to facilitate automatic verification or prompts. Implementing such structural changes may significantly enhance compliance and data completeness.

A few other audits in Pakistan have highlighted the need for systemic changes in medical documentation practices [4, 7, 18, 19]. Our results also align with the findings of previous studies. Lorenzetti *et al*. highlighted audit/feedback, regular reminders, templates, and multi-faceted education as practical strategies to improve emergency documentation, especially where electronic medical records (EMRs) are lacking [20]. The initial audit by Gkiala *et al*. found inadequate documentation, particularly for the medical registration number and the doctor's signature [9]. Post-intervention, the re-audit showed a 40% increase in the recording of medical registration numbers and a 65% increase in the recording of doctors' signatures, though both remained below acceptable levels [9]. In our study, tools such as audits, reminders, and standardized methods (*e.g*., a doctor's stamp) were central to improving practice. Similar audits outside the emergency have found that active approaches, including audit/feedback and templates, are more effective than passive approaches, such as printed materials, in engaging clinicians [21, 22]. Callen *et al*. also emphasized the importance of adaptability, system integration, and stakeholder buy-in for successful implementation [23].

While many hospitals now use EMRs with clear benefits [24, 25], paper-based documentation remains common in numerous hospitals, underscoring the relevance of our audit. This study was conducted in a paper-based emergency department (ED) setting, typical of many resource-constrained hospitals in low- and middle-income countries (LMICs), where electronic medical records are often unavailable or inconsistently used. Such environments pose unique challenges for timely, legible, and complete documentation. At baseline, documentation rates for key elements such as time of consultation (51.8%) and medication history (47.9%) were considerably lower than those reported in high-income settings, where structured EMRs often yield compliance rates above 90%. Following targeted interventions, our post-intervention rates (94.2% for time documentation, 90.5% for medication history) approached international benchmarks despite infrastructure limitations. These results demonstrate that low-cost, non-digital strategies, such as audit-feedback cycles, visual reminders, and focused training, can meaningfully improve documentation practices in LMIC EDs. The approach may be transferable to similar settings, particularly where resource constraints preclude digital solutions, provided local context and staff engagement are taken into account.

In terms of patient history, the original audit showed reasonable documentation of signs and symptoms (89.3%), but lower completeness in other SAMPLE components, particularly medications taken before the visit and the last oral intake/meal, including the last menstrual period, both below 50%. This reflects

a common challenge in emergency settings where detailed history-taking can be compromised by time constraints or staff workload. Encouragingly, the re-audit showed substantial improvements across all history elements, with completion rates exceeding 85% in all categories. This suggests that the educational interventions, combined with visual reminders such as posters, effectively enhanced comprehensive history documentation. The allergy documentation rate improved from 61.6% in the initial audit to 87.6% in the re-audit in our study, showing a 26.0% increase. Documenting allergy history has been shown to streamline care, minimize delays, and improve overall healthcare efficiency [26]. Mohamed *et al*. conducted an audit using the SAMPLE tool to find initial documentation rates of 68.2% for signs and symptoms, 50.5% for allergies, 49.7% for past medical history, and 45.7% for medications, with last oral intake (36.3%) and events leading to the incident (24.4%) being the lowest [1]. After interventions, these improved to 96.9%, 92.6%, and 84.7% for signs and symptoms, allergies, and medications, respectively [1].

The improvements observed across both audit cycles in our study are consistent with the existing literature, which highlights the positive impact of audit-feedback cycles and targeted training on clinical documentation quality [27, 28]. An audit in the emergency department of an Italian hospital showed that training interventions effectively improved nurses' documentation of vital signs [29]. Another recent audit in a large Sudanese hospital evaluated inpatient record-keeping [30]. Initially, documentation was rated poor in 55.6% and unsatisfactory in 11.1%, with no records rated excellent and only 33.3% rated good. After interventions, including intern orientation, 44.4% of records were rated excellent and 55.6% good [30]. Ensuring accurate and complete emergency records is critical for patient safety, continuity of care, and legal protection for healthcare providers [31, 32]. The sustained increase in documentation completeness underscores the value of continuous quality improvement initiatives within emergency departments [31, 33]. The main challenges in implementing the SAMPLE mnemonic tool include time constraints (70%), patient reluctance or inability (45%), lack of clarity on its importance (25%), insufficient training (20%), difficulty recalling components (15%), and language barriers (10%) [1]. However, these challenges can be overcome by streamlining assessment workflows, enhancing patient communication, increasing staff training, and providing clear guidelines and language support [1, 31, 32].

LIMITATIONS

This study has several limitations. It was conducted at a single institution, limiting generalizability. The short data-collection period may have limited the detection of broader trends in documentation practices. Additionally, the audit assessed only documentation completeness, not quality or clarity, which are areas for future research. The low post-intervention documentation of PMDC registration numbers suggests some practices are resistant to change, possibly due to a lack of awareness or system barriers. Integrating mandatory fields in electronic health records may help improve compliance. Interventions were introduced between audit cycles, but their impact was not quantitatively measured.

Furthermore, consecutive sampling across different months may have introduced confounding due to unmeasured differences in case mix or seasonal variation. We acknowledge that the inclusive denominator strategy approach may artificially deflate item-level completeness rates for documentation elements that are not universally applicable. As such, observed percentages for certain items should be interpreted as conservative estimates of performance. No item-level stratification or sub-group adjustment (*e.g*., gender-specific applicability) was performed.

Another key limitation of this audit was the absence of formal inter-rater reliability testing across all reviewers. Although training and a written codebook were used to standardize abstraction, the lack of quantitative reliability assessment may introduce variability in scoring, particularly for borderline or ambiguous cases. Although staffing levels and clinical workflows remained stable, future audits should incorporate case-level data or risk-adjusted comparisons to control for these factors. Furthermore, although a structured intervention was implemented in our audit, the lack of formal fidelity metrics (*e.g*., detailed monitoring of training quality, staff adherence to new documentation practices) limits the certainty with which improvements in documentation can be attributed solely to the intervention. The possibility of a Hawthorne effect, in which staff temporarily improve performance due to awareness of being observed, cannot be ruled out. Future quality improvement cycles should incorporate standardized fidelity checklists, follow-up assessments, and direct observation to better attribute outcomes to specific intervention components.

Additionally, although time documentation improved substantially, our study did not assess associated process outcomes such as re-attendance rates, delays in care, or handover efficiency, limiting our ability to evaluate the clinical impact of this improvement. Future

studies should determine specific strategies and include multiple healthcare settings to enhance applicability. Ongoing monitoring is recommended, with targeted improvements in areas such as complaint recording and medication changes. Comprehensive documentation training may also help address current gaps.

CONCLUSION

The clinical audit and subsequent re-audit, combined with targeted education and reminders, demonstrated encouraging improvements in the completeness of emergency notes, particularly in areas critical to patient safety and care. However, persistent gaps in certain aspects of documentation underscore the need for ongoing interventions to raise and sustain high standards. Continued efforts and systemic changes are needed to uphold and further enhance documentation practices, thereby supporting better clinical care and medico-legal standards in emergency settings.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA

The data set may be acquired from the corresponding author upon a reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

AUTHORS' CONTRIBUTION

This study was conceived and designed by BW, NIB, AA, and AB. BW, AA, UJ, and IK conducted the initial literature review. NIB, BW, AA, UJ, and IK did the data collection, assembly, and medical record assessment. NIB, BW, and IK did data analysis and interpretation. BW, AA, AB, and IK were involved in manuscript writing. NIB, UJ, and BW did the final critical review and corrections.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors acknowledge the assistance of ChatGPT (OpenAI) in refining the language of this manuscript. All aspects of the study design, data collection, analysis, interpretation and intellectual content were carried out exclusively by the authors.

SUPPLEMENTARY MATERIAL

The supplementary material is available on the publisher's website.

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