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ORIGINAL RESEARCH

Improving Emergency Department Documentation Through SAMPLE Tool Implementation: A Clinical Audit From Sudan

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Introduction: Efficient documentation is crucial for patient care in the high-pressure environment of the emergency department (ED), directly influencing clinical decision-making. Accurate documentation is vital for patient safety. The World Health Organization (WHO) and International Committee of the Red Cross (ICRC) recommend the SAMPLE tool (Signs and Symptoms, Allergies, Medications, Past Medical History, Last Oral Intake, Events leading to the incident) for quick history taking in emergencies. This audit aimed to assess compliance with the SAMPLE tool and improve history documentation practices among ED doctors.

Methodology: This clinical audit was conducted at the Emergency Department of Ibrahim Malik Teaching Hospital in Khartoum, Sudan, from August 2022 to February 2023. It assessed medical officers' adherence to the SAMPLE tool and aimed to improve history documentation quality. Data were collected from patient files during two cycles, pre- and post-intervention, which included the introduction of new short-stay files.

Results: The first audit cycle reviewed 352 short-stay patient files, revealing suboptimal documentation across all SAMPLE elements. The highest compliance was in documenting Signs and Symptoms at 68.2%. After the implementation of interventions, a second review of 230 files showed significant improvements in all elements, notably in documenting Signs and Symptoms (96.9%), Allergies (92.6%), and Medications (84.7%). Chi-square analysis confirmed that all improvements were statistically significant, with effect sizes ranging from moderate to strong.

Conclusion: The introduction of new short-stay files and targeted educational sessions markedly improved the quality of patient history documentation in the ED. These findings highlight the potential of structured interventions to enhance clinical practice, thereby improving patient care and safety in emergency settings. Further clinical audits are required to ensure the sustainability of these improvements and to explore the long-term outcomes of such interventions.

Keywords: clinical audit, emergency department, SAMPLE, quality improvement study, Sudan

Introduction

The Emergency Department (ED) has a distinctive setting where patient volumes are unpredictable, and the nature of clinical interactions can vary significantly in terms of urgency. Emergency medicine physicians are often required to make complex clinical decisions with limited information, all while managing a multitude of competing demands and distractions.[1]

A systematic approach to patient assessment in the ED is crucial to promptly identify life-threatening conditions and ensure the timely execution of critical interventions.[2]

The approach and method of taking a patient's medical history are crucial aspects in the ED, where time is of the essence. This information can have life-or-death consequences; therefore, documentation is a critical step in patient

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evaluation. Medical history can reveal various key details, including relevant chronic disease and past medical history, which might lead to differential diagnoses.[3]

Clear and comprehensive documentation goes beyond immediate patient care, serving a critical function for medico-legal purposes by providing a legal record of the care provided and decisions made. This helps protect healthcare professionals and institutions in case of litigation. Furthermore, it can contribute significantly to the field of medical research and the development of evidence-based practices, thereby advancing medical knowledge and improving future patient care. A 2018 retrospective study found that incomplete documentation of medications significantly delayed the time required for order resolution by an average of 21 minutes compared to those fully documented.[4]

A commonly used standard approach for obtaining relevant background information from critically ill patients is the SAMPLE history. SAMPLE stands for Signs and Symptoms, Allergies, Medications, Past Medical History, Last Oral Intake, and Events leading up to the present illness. It is recognized as a highly beneficial standard method for gathering essential information from a patient's history, aiding in diagnosis and treatment decisions, and facilitating clear communication among healthcare providers.[5]

The World Health Organization (WHO) recommends using SAMPLE as a focused history-taking approach during the patient assessment, immediately following the primary survey.[2]

Well-established programs like Advanced Trauma Life Support (ATLS), Pediatric Advanced Life Support (PALS), and Advanced Cardiac Life Support (ACLS) revolutionized critical care. These courses emphasize a systematic assessment that prioritizes a focused history-taking method known as SAMPLE. This structured approach ensures crucial information is gathered efficiently during critical situations.[6–8]

Clinical audits are a part of the quality improvement process, focusing on particular challenges within clinical practice by comparing current practices with best practice standards.[9] Evidence of their effectiveness in improving documentation practices is well-documented.

Several clinical audits have highlighted the positive impact of targeted interventions on documentation practices. For example, an audit in the emergency department (ED) of an Italian hospital focused on nurses and demonstrated the effectiveness of training interventions in the ED on improving nurses to document vital signs.[10] Similarly, an audit in the ED of Queen's Hospital in the United Kingdom found significant improvements in documentation accuracy following targeted changes.[11] Additionally, a recent audit in a large Sudanese hospital assessed inpatient medical record filing. Before any interventions, documentation quality was poor (55.6%) and unsatisfactory (11.1%), with none rated excellent and only 33.3% rated good. After interventions, including orientation sessions for interns, the second cycle showed significant improvement, with 44.4% of records rated excellent and 55.6% rated good.[12]

To the best of our knowledge, there is no published audit on this topic in the ED, making this the first paper of its kind. This audit was conducted to assess compliance with the use of the SAMPLE tool and to improve the quality of focused history documentation practices among doctors in the ED.

Methodology

Study Setting

This clinical audit was conducted from August 2022 to February 2023 in the ED of Ibrahim Malik Teaching Hospital, located in Khartoum, the capital city of Sudan. The hospital is a public institution established in 1977.[13] This hospital boasts one of Sudan's busiest and largest emergency departments. It receives cases transferred from various hospitals both within and outside the Khartoum state. The audit covered all areas of the emergency department, including the yellow zone, the red (resuscitation) zone, and the trauma room.

Ethical Consideration

The audit proposal was reviewed and approved by the head consultant and the technical manager of the ED of Ibrahim Malik Teaching Hospital, located in Khartoum, the capital city of Sudan and the ethical approval was given by the hospital's ethical committee. All patients admitted to the ED during the audit periods were included. The audit adhered to

the Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) guidelines.[14] The authors anonymized patient data to ensure confidentiality.

Criteria Selection

Criteria were selected from the World Health Organization (WHO) and the International Committee of the Red Cross (ICRC) clinical recommendations in the Basic Emergency Care Handbook, approach to the acutely ill and injured, 2018.[2]

The handbook outlines the different the components of the SAMPLE history taken during the primary assessment of an ED patient. The components were: signs and symptoms, allergies, medications, past medical history, last oral intake, and finally events around the incident. The standard was set at 100% when writing the audit's proposal.

The data collection team consisted of medical officers working within the ED. Each short-stay file was assessed for the inclusion of information recommended by the WHO and ICRC in the Basic Emergency Care Handbook. To minimize bias, the medical officers were not informed about the audit.

First Cycle

Data collection for the first cycle commenced in August 2022. The audit aimed to capture a representative week of practices related to filling out the short-stay files, ensuring the inclusion of medical officers working both day and night shifts. A total of 352 files were collected during this cycle.

An online Google Forms checklist, developed based on the WHO recommendations, was used for data collection. Each short-stay file was evaluated for the presence of the six key components, with two possible responses for each: written or not written. To ensure consistency in data evaluation, the team reviewed the initial files together. This cycle aimed to establish baseline compliance with documentation standards and identify areas needing improvement.

Intervention

Following the data collection and analysis of the first cycle, the team formulated recommendations based on the identified deficiencies. These findings were presented to the technical manager and the head consultant of the ED, and action plans for improving documentation quality were shared with hospital stakeholders and administrative bodies.

A new short-stay file template was introduced in December 2022. Figures 1 and 2 illustrate the old and new file formats, respectively. The new template, designed based on WHO and ICRC guidelines, included clear sections for each of the six key components of the SAMPLE history.

Second Cycle

The second cycle was conducted two months after the introduction of the new template, in February 2023. During this cycle, 230 files were collected, and the same checklist used in the first cycle was employed for evaluation. Feedback was gathered on the barriers to compliance with the SAMPLE tool (Figure 3).

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics for Windows, Version 26. Continuous variables were described as mean and standard deviation, while categorical variables were described by frequency and percentage. The impact of the new short-stay file format on patient data documentation was evaluated by comparing the results of the re-audit with those of the first audit, using chi-square test analysis. Additionally, effect size was measured using Cramer's V. A p-value of <0.05 was considered statistically significant.

Result

The audit comprised two cycles: the first included 352 short-stay files, and the second, conducted after implementing targeted interventions, included 230 short-stay files. In the first cycle, the majority of the reviewed short-stay files were from the yellow zone (82%), followed by the red zone (12%) and the trauma room (5.4%). The second cycle involved the review of 230 files, with a similar distribution pattern: 198 files (86%) from the yellow zone, 19 files (8.3%) from the red zone, and 13 files (5.7%) from the trauma room (Table 1).

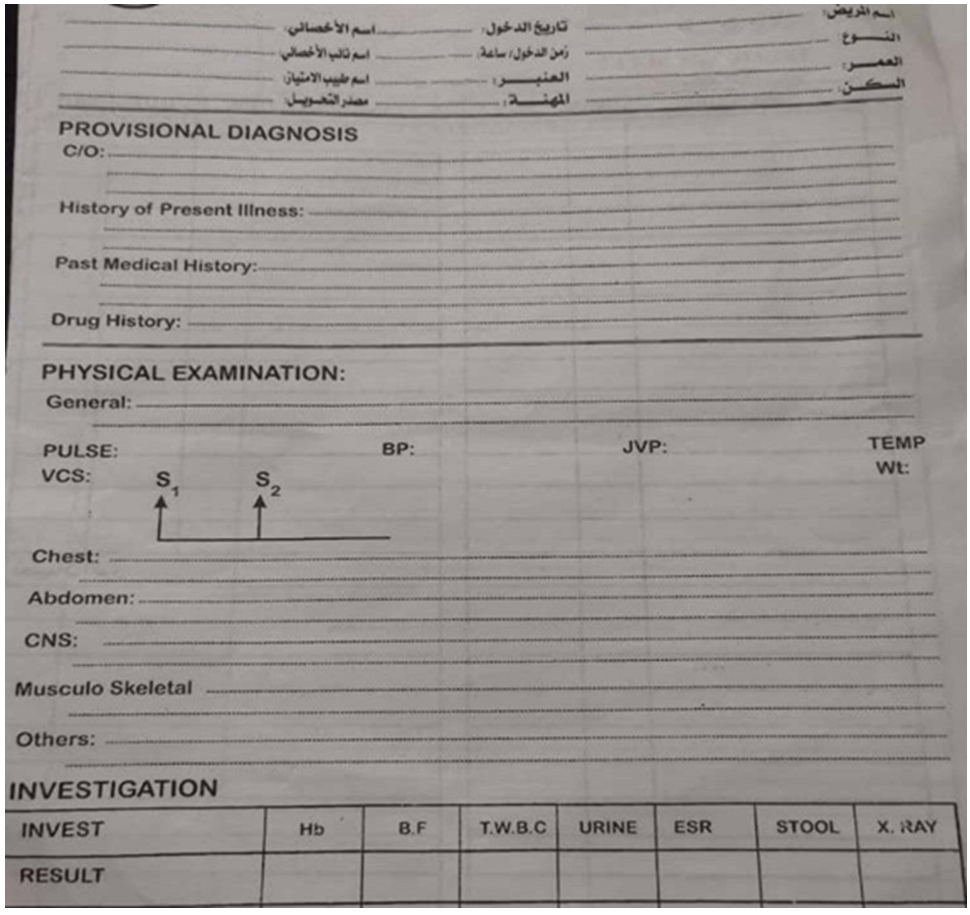

Figure 1 Old ED File: Limited history sections and no specific allergy area, posing challenges for thorough documentation.

Regarding the elements of the SAMPLE history in the first cycle, the findings indicated that the highest compliance was in documenting signs and symptoms, with only 68.2% of files meeting the standard. Compliance for allergies and past medical history documentation followed closely, at 50.5% and 49.7% respectively. Medication information was recorded in 45.7% of cases. The least adhered-to components were last oral intake and events surrounding the incident, documented in 36.3% and 24.4% of the cases, respectively, against a 100% standard (Table 2).

Following the implementation of targeted interventions, a re-audit was conducted. This subsequent review included 230 short-stay patient files and demonstrated significant improvements across all elements of the SAMPLE history. The compliance rate for documenting signs and symptoms soared to 96.9%, making a 38.7% improvement. Documentation of allergies and medications saw increases to 92.6% and 84.7%, respectively. Past medical history documentation matched medications at 84.7% compliance. Notably, the documentation of last oral intake and events related to the incident also saw considerable improvements, with 70% and 69.1% compliance, respectively. These improvements in documentation practices were statistically significant across all elements, with p-values less than 0.001 (Table 3).

The effect sizes, as depicted by Cramer's V in Table 3, ranged from moderate to strong (0.339 to 0.440), indicating a robust impact of the interventions on documentation rates.

A survey conducted among 20 medical officers who had been using the new short-stay file template based on the SAMPLE tool assessed its usefulness in documenting patient history. Of these, 55% (n=11) reported it as somewhat useful, and 45% (n=9) as very useful. Among those who attended the educational sessions, 90% (n=9) reported a very positive to positive impact on their understanding and application of the SAMPLE history-taking process (Table 4).

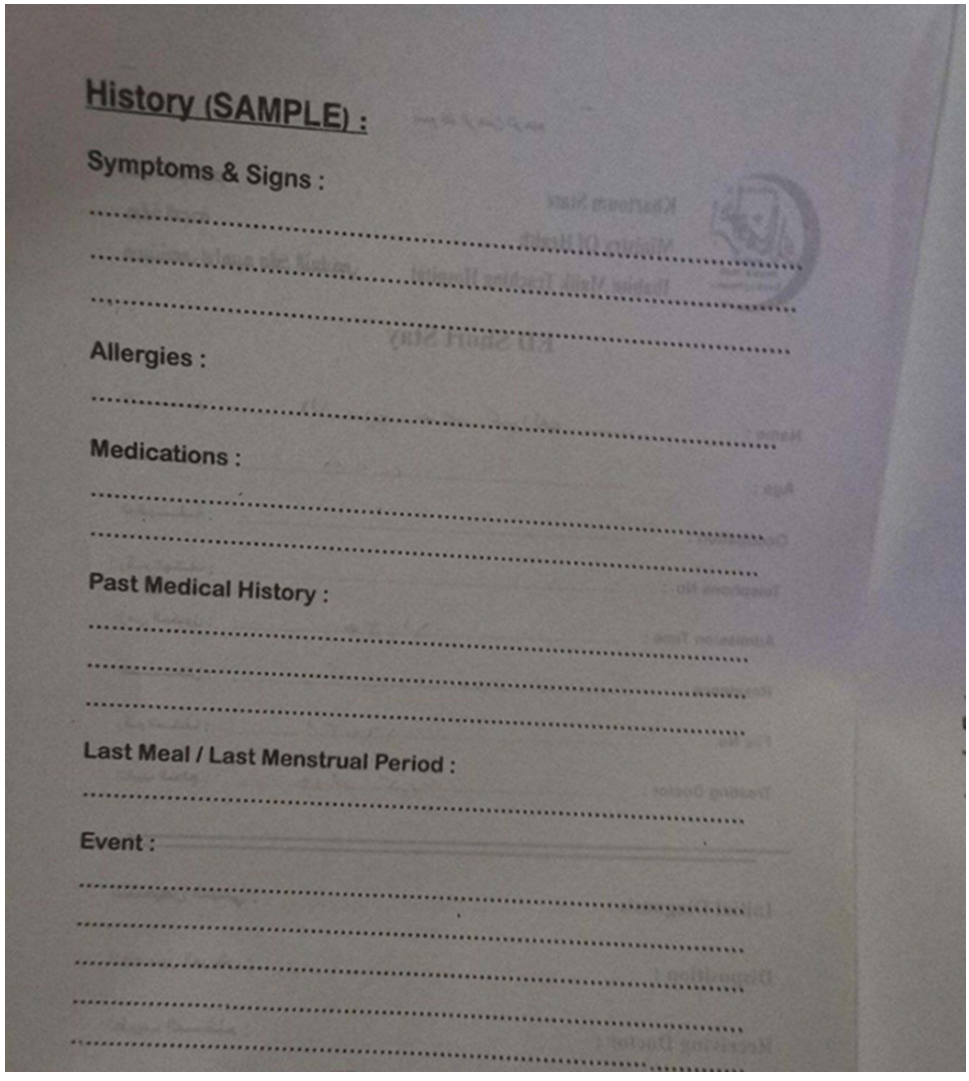

Figure 2 New ED File: Incorporating Standard SAMPLE for a thorough and structured patient history.

When evaluating challenges with implementing the SAMPLE history-taking process, 70% of respondents (n=14) identified time constraints during patient assessments as the primary concern. Other notable challenges included patient reluctance or inability to provide necessary information (45%, n=9), a lack of clarity regarding its importance (25%, n=5), and insufficient training on the SAMPLE process (20%, n=4). Less frequently cited were difficulties in recalling all components of SAMPLE (15%, n=3) and language barriers with patients (10%, n=2) (Table 5).

Discussion

EDs are recognized for their fast-paced environment, often marked by regular staff changes, intense workloads, and frequent overcrowding. Additionally, they experience constant interruptions, unpredictable patterns of patient arrivals, and a wide range of medical cases.[15] Given these challenges, there was a critical need for interventions to improve the quality of patient histories and their documentation, which is essential for effective communication among doctors and can significantly impact patient safety and care.

The documentation in the ED of our hospital, similar to most public hospitals in Sudan, did not align with the standard history-taking practices recommended for the secondary survey of critically ill patients, which is performed after the primary survey and initial stabilization. This deviation made it difficult for doctors to obtain and document accurate patient histories.

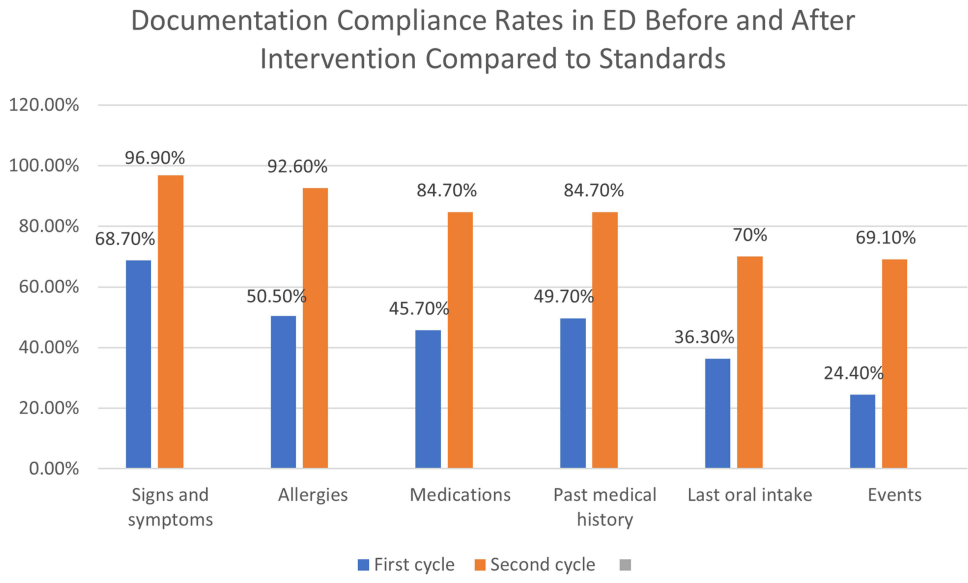

Figure 3 Comparison of Documentation Compliance Before and After Interventions.

To address this issue, we introduced a new short-stay file template based on the SAMPLE history. This template provided a clear structure, adequate space, and a logical flow for documenting essential patient information. As a result, we observed significant improvements in the documentation of key elements such as "Events surrounding the injury or illness". This aspect, which had been the least documented in the first cycle, showed substantial improvement (44%) following the intervention, demonstrating a marked increase in compliance.

Table 1 Distribution of Patients in the Emergency Department Zones

Room	Number of Patients	
	First Cycle	Second Cycle
Yellow zone	290	198
Red zone	43	19
Trauma room	19	13

Table 2 Summary of the First Cycle Audit Results (N= 352)

Elements of SAMPLE	Short-Stay Files		Standard
	Number	Percentage	
Signs and symptoms	231	68.7%	100%
Allergies	178	50.5%	100%
Medications	161	45.7%	100%
Past medical history	175	49.7%	100%
Last oral intake	128	36.3%	100%
Events	86	24.4%	100%

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Table 3 Summary of the second Cycle Results (N= 230)

Elements of SAMPLE	Short-Stay Files		Improvement	P value	Effect size (Cramer's V)
	Number	Percentage			
Signs and symptoms	223	96.9%	28.2%	<0.001	0.430
Allergies	213	92.6%	42.1%	<0.001	0.440
Medications	195	84.7%	39%	<0.001	0.392
Past medical history	203	84.7%	38.5%	<0.001	0.395
Last oral intake	161	70%	33.7%	<0.001	0.339
Events	159	69.1%	44.7%	<0.001	0.343

Table 4 Impact of Training Sessions on Understanding and Application of the SAMPLE History-Taking Process (n=10)

#	Impact	Number	Percentage (%)
1	Very positive impact	5	50
2	Positive impact	4	40
3	No significant impact	1	10
4	Negative impact	0	0
5	Very negative impact	0	0

Table 5 Challenges in Applying the SAMPLE History-Taking Process

#	Challenge	Number	Percentage (%)
1	Lack of time during patient assessment	14	70
2	Patient reluctance or inability to provide necessary information	9	45
3	Insufficient training on the process	5	25
4	Lack of clarity on the importance	4	20
5	Difficulty remembering all components of the SAMPLE	3	15
6	Language barriers with patients	2	10

Prior to the intervention, the old files lacked a specific section for detailing the circumstances of injuries or illnesses, offering limited space for critical historical elements such as the chief complaint and past medical history. These elements were not adequately designed to meet the demands of emergency departments (Figure 1). As a result, many doctors, particularly those with more experience, opted to record histories using the standard secondary survey format (SAMPLE) on their own while disregarding the old file format.

Despite encouragement from registrars and ED specialists to adopt the SAMPLE history, frequent staff changes and reliance on the old templates hindered consistent application, underscoring the need for standardized tools.

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This clinical audit aligns with an Italian quality improvement project focused on vital sign documentation during triage, utilizing structured training through a Plan-Do-Study-Act (PDSA) approach.[10] They achieved a significant improvement in compliance, increasing documentation rates from 77.9% to 87.9%. Similarly, another clinical audit in the UK emphasized compliance with GMC and RCP standards and achieved notable improvements, including a 25% increase in GMC number documentation and a 50% increase in physician signatures.[11] They used Email reminders and posted posters in the ED areas at Queen's Hospital. While we believe that structured training and reminders could have had a great impact, particularly for junior doctors, our intervention primarily relied on the simplicity of the new short-stay file template based on the SAMPLE history, which we believe ensures better sustainability.

A recent clinical audit in another region of Sudan, focusing on in-patient record documentation, revealed similar issues. It highlighted the insufficient documentation of daily readings of vital signs, attributed to the lack of designated space in patient files for such vital information.[12]

Including allergy history was observed as the second most improved component, with a 42% improvement rate. It is worth noting that some files had allergies written under drug history; however, the new design included a separate section for allergies, which may aid in reminding doctors. (Figure 2). A previous study has shown that documenting the details of allergy history can significantly streamline the patient care process, reducing delays and enhancing overall healthcare efficiency.[4]

Initially, patient signs and symptoms were documented in only 68.7% of short-stay files, despite the expectation for such critical information to be routinely documented. Some files were missing these details. However, the introduction of new short-stay file templates and educational sessions led to a remarkable improvement, with a 28.2% increase in documentation completeness. This improvement aligns with findings in the existing literature. A systematic review by Lorenzetti et al found that active interventions, such as audit and feedback mechanisms along with the implementation of standardized templates in ED settings, significantly improved the quality of physician documentation.[15]

Although documenting medications was part of the old "Drug History" section, it was recorded in only 45% of files during the first cycle. This rate increased substantially to 84% in the second cycle. Asking about medications was a routine practice, and sections should not have been left blank even if the patient had no drug history. Initially, staff may not have been fully aware of the importance of thoroughly documenting medication history, leading to its oversight or it being considered less critical amidst more pressing tasks. The marked increase in compliance during the second cycle suggests that the introduction of new, more user-friendly templates made it easier for staff to record this information.

A systematic review conducted in 2015 indicated that audits and feedback were effective in improving low to moderate baseline performance. It suggested that feedback from peers or et.al was more effective than feedback from supervisors, particularly in an ED setting.[16]

In analyzing feedback from doctors collected through a structured form about their experiences with SAMPLE history-taking, several significant challenges were identified. The most prominent issue, noted by 70% of the respondents, concerns time constraints during patient assessments. This suggests that doctors might require a period to adapt. A simulation study by Jayaprakash et al showed that integrating the SAMPLE tool into patient assessments is feasible, and with practice and repetition, cognitive load decreases while efficiency in task completion time improves. This demonstrates the practicality of our audit and suggests that, over time, doctors may become more accustomed to the process and overcome this initial challenge.

Furthermore, 25% of the respondents identified insufficient training on the SAMPLE as a significant hurdle. A lack of clarity regarding the importance of the SAMPLE history-taking process was noted by 20% of the doctors, suggesting that the benefits and relevance of this method might not be fully appreciated or understood.

Limitations

Our study was not without limitations. Firstly, the time period for data collection was just one week. A longer duration would have provided a more comprehensive view of the practices. Secondly, there was a discrepancy in the sample sizes between the first and second cycles of our audit. This inconsistency could impact the comparability of the findings across cycles and might influence the interpretation of the improvements observed. Lastly, there was no structured training

provided to all staff members; instead, we primarily relied on the simplicity of the new template to guide documentation practices.

Recommendations

To maintain and enhance the quality of documentation practices identified in our audit, we propose several key actions. First, we suggest establishing a culture of detailed SAMPLE history-taking throughout all shifts, involving ED specialists to monitor and confirm the completeness of patient files, especially during shift handovers. Second, conducting qualitative research with doctors will provide deeper insights into the challenges and experiences related to documentation in the ED. Third, it is crucial to hold targeted educational sessions, particularly for junior doctors and those newly joining the hospital, to emphasize the significance and techniques of SAMPLE history-taking. Fourth, acknowledging and rewarding doctors who demonstrate exemplary documentation practices can motivate adherence to high standards. Lastly, implementing a third audit cycle after these recommendations are in place will allow us to assess their effectiveness and make ongoing adjustments, thereby ensuring continuous improvement in patient care quality through improved documentation practices.

Conclusion

This clinical audit demonstrated significant improvements in short-stay documentation quality at the ED of Ibrahim Malik Teaching Hospital, with a substantial increase in compliance following the introduction of new short-stay files. While the first cycle results fell short of the WHO and ICRC's recommended standards for SAMPLE history-taking, the implementation of the new files incorporating the SAMPLE tool led to a marked improvement. The results were statistically significant, bringing compliance much closer to the preset standards. Quality improvement initiatives like this audit are crucial for improving documentation practices, which directly impact patient care and safety. Hospitals, particularly in similar settings, are encouraged to adopt structured templates aligned with established guidelines and support them with regular staff training to ensure sustained improvements.

Data Sharing Statement

The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

Acknowledgment

We honour the memory of Dr. Salwa Anas, a vital member of our audit team and a dedicated medical officer at our hospital. Her commitment was crucial to the success of this project. Dr. Anas's compassion and dedication have left a lasting impact on us all and continue to inspire us. She is deeply missed.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests.

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