

Evaluation and Improvement of Post-operative Note Documentation in the Gynaecology Department at Al-Hasahisa Teaching Hospital, Sudan: A Two-Cycle Clinical Audit

M.B. Habeeb^{1*}, Ahmed Elmustfa Mohammed Sheik Edries², Zainab Osama Elnour Elsharif³, Mohamed Elamin Mohamed Ahmed Elkhazien⁴, Zainb Abdalgader Abosen Aman⁵, Elhadi Eltayeb Elhadi Mohamed⁶

^{1,4}Department of Gynecology, Faculty of Medicine, University of Al-Butana, Sudan

²Department of Gynecology, Faculty of Medicine, University of Gzeria

³ Medical Student, Third-Year, Al Butana University, Rufaa City, Gezira State, Sudan

⁵Registrar of Obstetrics and Gynecology Al-Hasahisa Teaching Hospital, Sudan

⁶Department of Gynecology, Al-Hasahisa Teaching Hospital, Sudan

*Corresponding Author

DOI: <https://doi.org/10.51584/IJRIAS.2026.11080158>

Received: 03 September 2026; Accepted: 07 September 2026; Published: 21 September 2026

ABSTRACT

Post-operative notes are essential clinical records that support continuity of care, communication between surgical, anesthesia, nursing, recovery, and ward teams, clinical audit, and medicolegal accountability. International surgical standards recommend that operative and post-operative documentation should be clear, accurate, contemporaneous, legible, and complete. In resource-limited and paper-based settings, however, documentation gaps remain common and may reduce the clinical value of operative records. This study aimed to evaluate and improve the completeness of post-operative note documentation in the Gynecology Department at Al-Hasahisa Teaching Hospital, Sudan, using a 20-item RCS-aligned checklist. A two-cycle clinical audit was conducted. In the first cycle, 60 randomly selected post-operative notes for gynecological surgical procedures were reviewed using a 20-item checklist aligned with Royal College of Surgeons documentation standards. After the first cycle, the findings were shared with the clinical team and educational lectures were delivered on how to complete post-operative notes according to an international checklist. Data were analyzed using (SPSS), Fisher's exact test was used as a supportive comparison of item-level proportions between cycles, and 95% confidence intervals were calculated for the difference in proportions. A second cycle reviewed another 60 randomly selected notes. A total of 120 post-operative notes were reviewed. The data were analyzed using descriptive static. Overall documentation compliance increased from 580/1200 items (48.3%) in the first cycle to 705/1200 items (58.8%) in the second cycle, representing a 10.4 percentage-point improvement. The largest improvements were observed in documentation of extra procedures and reasons (10.0% to 73.3%), problems or complications (21.7% to 65.0%), prosthesis/material identification (1.7% to 41.7%), DVT prophylaxis (30.0% to 65.0%), and closure technique (35.0% to 55.0%). Date and time documentation declined in the second cycle. The study concluded that educational lectures and audit feedback improved selected components of post-operative note documentation, but compliance remained below the expected 100% documentation standard and some basic items declined

Keywords: Clinical audit; Post-operative notes; Operative notes; Documentation; Gynaecology; quality improvement; Sudan; Royal College of Surgeon.

INTRODUCTION

Post-operative and operative notes are essential surgical records because they transfer critical information from the operating theatre to recovery, ward care, subsequent surgical review, audit, and medicolegal review [1,2]. The Royal College of Surgeons of England describes good surgical documentation as clear, accurate, legible, timely, and sufficiently detailed to support safe continuity of care after an operation [1]. A complete note should document the date and time of surgery, urgency of the procedure, operating personnel, operative diagnosis, findings, and procedure performed, complications, tissue handling, prostheses or materials, closure, blood loss, prophylaxis, post-operative instructions, and signature [1,3,4]. These elements are not administrative details only; they are clinical information that allows the next team to understand what happened during the procedure and what risks require monitoring after transfer from theatre [1,2]. International guidance places documentation within the broader safety system of surgery because preventable perioperative harm often occurs at points of handover, communication, and transition between clinical teams. The World Health Organization Safe Surgery program emphasized structured communication and reliable recording of essential perioperative information as part of safer operative care [2]. RCS standards similarly require operative records to be available to the team caring for the patient after theatre, which makes the quality of the written note part of clinical governance rather than a separate clerical task (1). These guidelines provide a practical benchmark for clinical audit because each expected documentation item can be measured as present or absent and then re-evaluated after intervention [1, 3, 5,6]. The problem is clinically important at the global level because surgery is delivered at very high volume, across many specialties, and often by teams that change between theatre, recovery, and ward settings [2, 3]. International audits have repeatedly shown that operative notes often omit key fields even in well-resourced systems, especially when handwritten notes are used or when clinicians are not prompted by a structured template (3-5). Parwaiz et al. reported that operation-note documentation improved after targeted quality-improvement changes based on RCS guidance, while Nzenza et al., (2019), showed that handwritten operative notes by surgical trainees remained a notable documentation-quality problem in Australia [3,4]. Electronic or standardized proformas have been associated with better compliance because they reduce dependence on memory and make omission of key fields more visible to the writer [5,11,13]. Regional and low-resource evidence shows a similar pattern, with incomplete post-operative documentation reported in Jordan, Egypt, Nigeria, Malawi, Pakistan, Ethiopia, and other surgical settings (6-14). In A Wad Madani study raised concern about the effectiveness of operation-note documentation in a Sudanese surgical setting and supported further local audit work [3]. At Dongola Teaching Hospital, overall adherence improved from 50.3% to 71.9% after introduction of a standardized format, training, and dissemination of the new documentation approach [7]. At Port Sudan Teaching Hospital, a two-cycle audit reported improvement after a structured intervention, and later Sudanese papers have cited overall compliance rising from approximately 51.9% to 82.1% [8,19]. Doka Hospital reported improvement from 50.5% to 82.5% after a revised documentation structure and staff training, and Elobeid Teaching Hospital reported major post-intervention gains in anticipated blood loss, antibiotic prophylaxis, DVT prophylaxis, and other key criteria [9, 10]. More recent Sudanese audits from Atbara, Managil, Kassala, and Ribat University Hospital confirm that documentation gaps persist across hospitals, specialties, and regions despite the availability of clear RCS standards [11, 13]. The Atbara audit showed that structured proformas and education improved multiple documentation parameters but did not eliminate all gaps [11]. The Managil audit reported marked improvements in complications, extra procedures, tissue details, prostheses, and post-operative instructions after structured interventions [14]. Kassala and Ribat audits further support the view that operative documentation quality is a recurring Sudanese clinical-governance issue rather than an isolated departmental problem [12,13].

MATERIALS AND METHODS

Study Design

A two-cycle clinical audit with a pre- and post-intervention comparison. The audit was conducted in the Gynecology Department at Al-Hasahisa Teaching Hospital, Gezira State, Sudan. The first audit cycle was conducted within September 2025. The educational intervention and audit feedback were delivered in September 2025. The second audit cycle was conducted with October 2025. The audit followed a quality

improvement approach in which current post-operative documentation practice was compared against predefined standards, followed by an educational intervention and re-audit.

Sample Size

The audit population consisted of post-operative notes for gynecological surgical procedures performed during the two audit periods. Both elective and emergency gynecological procedures were eligible. In the first cycle, 60 post-operative notes were randomly selected and assessed. After the educational intervention, another 60 post-operative notes were randomly selected and assessed in the second cycle. Random selection was performed from the available surgical files or registers during each audit period.

Inclusion Criteria

Post-operative notes for gynecological surgical procedures performed during the audit periods, including both elective and emergency gynecological operations.

Exclusion Criteria

Unavailable files, duplicated files, files that were incomplete to the extent that the post-operative note could not be assessed, and surgical files related to procedures performed outside the Gynecology Department.

Audit Criteria and Checklist

Post-operative notes were assessed using a 20-item checklist aligned with Royal College of Surgeons operative note documentation standards (1). The checklist assessed whether each note included date, time, elective or emergency status, operating surgeon, operating assistant, theatre anaesthetist, procedure carried out, incision, operative diagnosis, operative findings, problems or complications, additional procedures and reasons, tissue removed or altered, prosthesis/material identification, closure technique, anticipated blood loss, antibiotic prophylaxis, DVT prophylaxis, detailed post-operative care instructions, and signature. Each item was coded as compliant if it was explicitly documented in the post-operative note and non-compliant if it was absent, unclear, or not explicitly documented.

Intervention

After completion of the first cycle, the findings were presented to the clinical team. Educational lectures were delivered to improve awareness of complete post-operative note documentation and adherence to the international/RCS-aligned checklist. The sessions focused on continuity of care, patients safety, communication, medicolegal protection, clinical audit, and the checklist items most frequently omitted during the first cycle (1-3,11). The confirmed intervention in this audit was educational lectures combined with audit feedback. A mandatory standardized preform was not assumed as part of the completed intervention unless later confirmed by the audit team.

Data Collection

Data were collected by trained members of the audit team using the predefined checklist. Each post-operative note was reviewed for the presence or absence of the 20 documentation items. Data were entered into an electronic spreadsheet, and no patient identifiers were included in the analysis dataset.

Ethical Considerations

The audit was conducted after permission from the administration of Al-Hasahisa Teaching Hospital. This work involved review of existing clinical documentation for quality improvement purposes. No direct patient contact occurred, no intervention was applied to patients, and no patient identifiers were collected in the analysis dataset.

Data Analysis

Data were analyzed using descriptive statistics. For each checklist item, the number and percentage of compliant notes were calculated in the first and second cycles. Absolute percentage-point change was calculated by subtracting first-cycle compliance from second-cycle compliance. Overall compliance was calculated as the total number of documented checklist items divided by the total possible number of checklist items across all reviewed notes in each cycle. Fisher's exact test was used as a supportive comparison of item-level proportions between cycles, and 95% confidence intervals were calculated for the difference in proportions.

RESULTS AND DISCUSSION

A total of 120 post-operative notes were included in the final analysis, with 60 notes reviewed in the first audit cycle and 60 notes reviewed in the second audit cycle. Each note was assessed against 20 documentation criteria, resulting in 1200 possible documentation opportunities per cycle. Overall documentation compliance increased from 580/1200 documented items (48.3%) in the first cycle to 705/1200 documented items (58.8%) in the second cycle. This represented an absolute improvement of 10.4 percentage points, equivalent to 125 additional documented checklist items after the educational intervention. The relative increase in documented items compared with baseline was approximately 21.6%. At the item level, improvement was not uniform. Twelve of the 20 criteria showed improvement, seven showed a decline, and one criterion remained unchanged.

The largest improvements were observed in documentation of extra procedures and their reasons, problems or complications, prosthesis/material identification, DVT prophylaxis, and closure technique. These items had been among the weakest or moderate-performing criteria during the first audit cycle and improved substantially after the educational intervention. Despite these improvements, several criteria remained below the expected 100% documentation standard in the second cycle. The lowest second-cycle compliance was observed for signature, followed by incision documentation, prosthesis/material identification, time documentation, anticipated blood loss, and theatre anaesthetist name.

These findings indicate that important documentation gaps remained after the educational intervention. Some basic documentation items declined in the second cycle. Date documentation decreased from 80.0% to 56.7%, and time documentation decreased from 66.7% to 46.7%. Smaller declines were observed for the names of the operating surgeon and assistant, operative procedure carried out, operative findings, and tissue details. Operative diagnosis remained unchanged at 73.3% in both cycles.

Table 1. Results of overall documentation compliance across the two audit cycles

Measure	First cycle	Second cycle	Change
Number of notes reviewed	60	60	-
Checklist items per note	20	20	-
Total documentation opportunities	1200	1200	-
Documented items	580	705	+125
Overall compliance	48.3%	58.8%	+10.4 percentage points
Relative increase from baseline	-	-	+21.6%

Table 2. Results of item-level compliance, change, 95% confidence intervals, and statistical comparison

Documentation criterion	First cycle n/60 (%)	Second cycle n/60 (%)	Change (pp)	95% CI for change	p- value
Date	48 (80.0%)	34 (56.7%)	-23.3	-39.4 to -7.2	0.010
Time	40 (66.7%)	28 (46.7%)	-20.0	-37.4 to -2.6	0.042
Elective/Emergency procedure	23 (38.3%)	34 (56.7%)	+18.3	+0.8 to +35.9	0.067
Name of the operating surgeon	46 (76.7%)	45 (75.0%)	-1.7	-17.0 to +13.6	1.000
Name of the operating assistant	43 (71.7%)	42 (70.0%)	-1.7	-17.9 to +14.6	1.000
Name of the theatre anaesthetist	23 (38.3%)	31 (51.7%)	+13.3	-4.3 to +31.0	0.199
Operative procedure carried out	46 (76.7%)	45 (75.0%)	-1.7	-17.0 to +13.6	1.000
Incision	18 (30.0%)	19 (31.7%)	+1.7	-14.9 to +18.2	1.000
Operative diagnosis	44 (73.3%)	44 (73.3%)	+0.0	-15.8 to +15.8	1.000
Operative findings	43 (71.7%)	42 (70.0%)	-1.7	-17.9 to +14.6	1.000
Problems/complications	13 (21.7%)	39 (65.0%)	+43.3	+27.4 to +59.3	<0.001
Any extra procedure performed and the reason why it was performed	6 (10.0%)	44 (73.3%)	+63.3	+49.8 to +76.9	<0.001
Details of tissue removed, added, or altered	41 (68.3%)	39 (65.0%)	-3.3	-20.2 to +13.5	0.847
Identification of prosthesis/material used	1 (1.7%)	25 (41.7%)	+40.0	+27.1 to +52.9	<0.001
Details of closure technique	21 (35.0%)	33 (55.0%)	+20.0	+2.6 to +37.4	0.043
Anticipated blood loss	24 (40.0%)	28 (46.7%)	+6.7	-11.0 to +24.4	0.581
Antibiotic prophylaxis	37 (61.7%)	41 (68.3%)	+6.7	-10.4 to +23.7	0.566

DVT prophylaxis	18 (30.0%)	39 (65.0%)	+35.0	+18.3 to +51.7	<0.001
Detailed postoperative care instructions	35 (58.3%)	41 (68.3%)	+10.0	-7.2 to +27.2	0.344
Signature	10 (16.7%)	12 (20.0%)	+3.3	-10.5 to +17.2	0.814

Note. pp = percentage points; CI = confidence interval. Fisher's exact test was used for item-level comparison of proportions. p-values are supportive and should be interpreted in the context of a clinical audit rather than as the sole indicator of improvement.

Change in documentation compliance by criterion

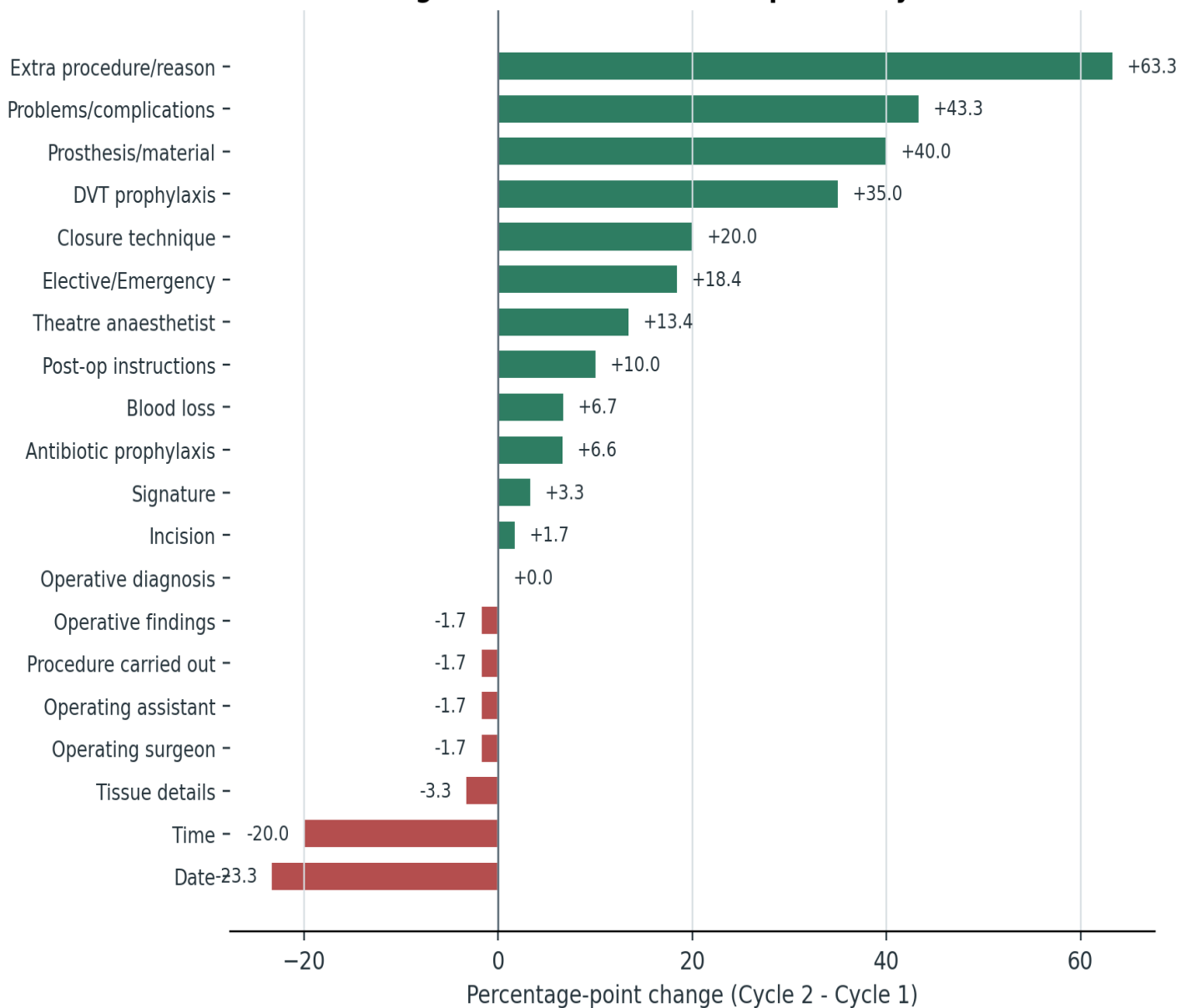


Figure 1. Waterfall plot of percentage-point change by documentation criterion.

Post-intervention documentation gaps

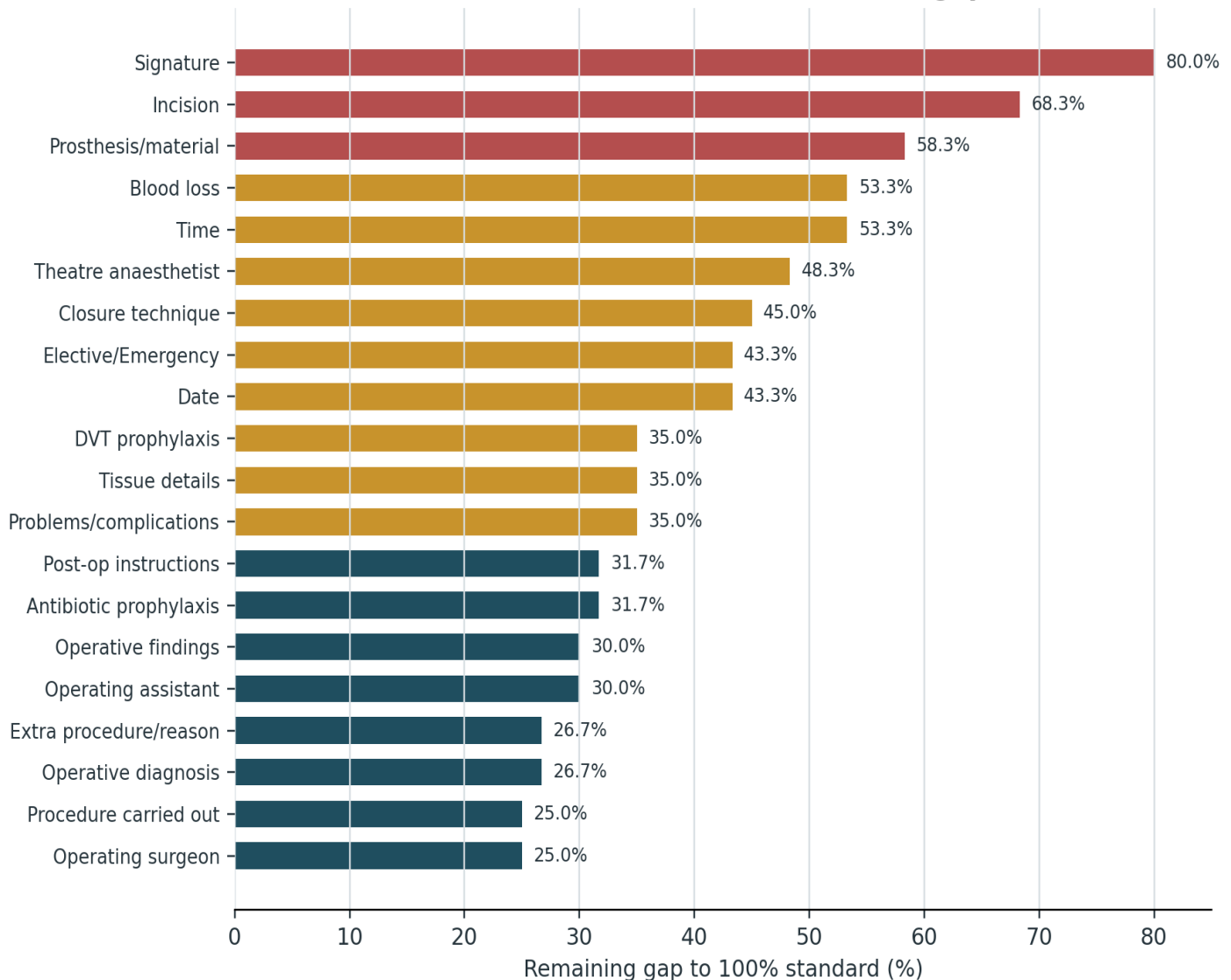


Figure 2. Remaining gap to the 100% documentation standard after the second audit cycle.

This two-cycle clinical audit showed that post-operative note documentation in the Gynecology Department at Al-Hasahisa Teaching Hospital improved after educational lectures and audit feedback, but the improvement was selective rather than comprehensive. Overall compliance increased from 48.3% to 58.8%, which indicates early movement toward better documentation but remains far below the 100% documentation standard expected for essential operative-note items under RCS-aligned practice [1, 3, 11]. The result is clinically meaningful because operative notes are part of the communication chain between theatre, recovery, ward, and follow-up teams, but it also showed that education alone did not create a reliable documentation system [1, 2, 5]. The greatest gains occurred in items that were poorly documented at baseline and that are often missed when surgeons or junior doctors write notes from memory rather than from a structured prompt. Documentation of extra procedures and reasons increased by 63.3 percentage points, complications by 43.3 points, prosthesis/material identification by 40.0 points, DVT prophylaxis by 35.0 points, and closure technique by 20.0 points. Similar item-level improvements have been reported after audit feedback and structured interventions in the United Kingdom, Pakistan, and ENT settings, where preformats and repeated feedback improved adherence to RCS criteria [3, 10, 5, 6]. The smaller overall improvement at Al-Hasahisa compared with template-based audits is plausible because the confirmed intervention was educational feedback rather than a mandatory proforma [5, 11, 6]. The findings are also consistent with African and regional evidence showing that handwritten or manual operative notes frequently omit clinically important details. Okoli and Adetula reported omissions in post-operative notes in a Nigerian tertiary hospital when compared with RCS guidance, Nyamulani and Mulwafu found substantial deficiencies in handwritten operative notes in

Malawi and recommended proformas and electronic records, and Tegegne et al. reported that all reviewed manual operation notes in an Ethiopian hospital were incomplete when assessed against RCS-related standards (8,9,14). These studies support the interpretation that incomplete documentation is a system problem related to workflow, templates, supervision, and documentation culture rather than a problem limited to individual clinicians [8, 9,14]. The Sudanese comparison is especially important because several recent audits have used similar RCS-based standards. At Dongola, compliance improved from 50.3% to 71.9% after a standardized format, training, and dissemination; at Doka, compliance improved from 50.5% to 82.5% after a revised structure and staff training; and at Elobeid, substantial improvements were reported after implementing a standardized template and training sessions [7,9,10]. The difference between the Al-Hasahisa findings and several Sudanese audits is important because it suggests that the content of the intervention matters. Studies from Dongola, Doka, Elobeid, Atbara, and Managil generally combined audit feedback with a standardized template, proforma, revised documentation structure, or repeated staff training, and several of them reported larger overall gains than the 10.4 percentage-point improvement observed in this audit (16, 18-21). In contrast, the confirmed intervention at Al-Hasahisa was educational lectures and audit feedback, which may explain why selected high-priority items improved while other routine items declined or remained unchanged [3, 7, 5]. This distinction supports a quality-improvement interpretation: education can raise awareness, but a mandatory structured note is more likely to produce reliable completion of both simple and complex documentation fields [5, 11, 6, 11]. Future data collection should use three categories - documented, not documented, and not applicable - to improve analytic precision [1, 9, 14]. The implications for gynecological surgery are direct. Patients may move from theatre to recovery and the ward under the care of staff who were not present during the operation, and WHO surgical safety guidance emphasizes communication and transfer of essential information during perioperative care (2). In gynecological surgery, incomplete documentation of bleeding, complications, extra procedures, tissue handling, antibiotics, thromboprophylaxis, and post-operative care can affect early recognition of deterioration and continuity of management [1, 2,8]. The audit therefore supports treating post-operative note documentation as a patient safety and clinical governance priority rather than as routine paperwork [1, 2, 7]. The next quality improvement step should move from awareness-raising to system redesign. Published audits consistently show that the strongest improvements occur when education is combined with a structured proforma, checklist prompts, electronic records, or repeated re-audit (5,11,13,16-21). A one-page RCS-aligned post-operative note proforma for the Gynecology Department would directly address the mixed results observed in this audit by making both basic items and complex clinical items visible at the point of writing [1, 5,11]. Regular induction training for house officers and registrars, senior review of a random sample of notes, and periodic departmental feedback would help maintain improvement across staff rotations and workload variation [3, 5, 9, 11].

CONCLUSION

This two-cycle clinical audit demonstrated that educational lectures and audit feedback improved several important components of post-operative note documentation in the Gynecology Department at Al-Hasahisa Teaching Hospital

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