

# The quality of hand-written operative notes in a surgical unit at Queen Elizabeth Central Hospital (QECH), Malawi: A prospective completed audit loop study

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## Abstract

**Background**  
Operative note writing is one of the fundamental parts in surgical practice. Accurate documentation is critical, to be of value when used for postoperative care, research, academic purposes and medical legal clarity. Although guidelines guiding surgeons on how to write operative notes exist, deficiencies are noted worldwide.

**Purpose**  
To assess quality of hand-written operative notes in surgical unit at Queen Elizabeth Central Hospital (QECH) using the RCSEng guidelines as a standard.

**Methods**  
To identify key areas of weaknesses, a sole observer in this study assessed prospectively the quality of operative notes in our setting. The audit loop was completed after adoption of new interventions.

**Results**  
Sixty-seven percent of the notes were written by trainees in both audits. Key areas of missing data were on time of performing the operation, urgency, estimated blood loss, complications and extra procedure in the first audit, with a frequency of 0%, 2%, 14%, 38% and 11% respectively. The results improved significantly to 62%, 84%, 62%, 70% and 32% respectively [ $p < 0.05$ ] in the second audit. Half of the postoperative care instructions were inadequate with 29% of the notes partially illegible or completely illegible.

**Conclusion**  
The study identifies significant deficiencies in our operative note writing. Surgeon's education, use of detailed pro formas with heading prompts and aide memoirs for vital information play a major role in better note completion. The role of electronic health records is highlighted.

## Introduction

Medical records are fundamental for clinical care and audit of surgical services. Accurate and detailed documentation of surgical operation notes is crucial; for post-operative care, research and academic purposes, and medico-legal clarity<sup>1,2</sup>. With the increasing litigious nature of medical practice, accurate documentation is critical and the errors of documentation are known to occur in all medical specialties with possible range of clinical implications and medical legal consequences<sup>1</sup>. Previous audits on the quality of operation notes have identified various areas of weakness applicable to all surgical specialties<sup>2,4</sup>. Many medical councils have identified gaps in operative note taking and have published or recommended guidelines to aid surgeons in the comprehensive writing of these notes<sup>3,5</sup>. To meet the standards set out in the Good Medical Practice, the Royal College of Surgeons of England (RCSEng) produced the guidelines – Good Surgical Practice – in 2008 and 2014<sup>6</sup>. The Good Surgical Practice guidelines aim to be a base line of clear and assessable standards for individual surgeons, a unit and their practice. Operative notes help in planning future operative procedures and serve as a vital

means of communication between health professionals<sup>2</sup>. Despite the existence of these published guidelines, several studies worldwide have demonstrated deficiencies in the quality of operative notes and this remains a frequently cited weakness in defense of many medical legal cases<sup>1</sup>. Operative notes are often produced in a court of law as documentary evidence, either by the plaintiff or the defendant<sup>1,2</sup>. Errors in the recording or interpretation of operative notes can compromise patient safety and care, lengthen hospital stays unnecessarily and leave authorities open to litigation<sup>7,8</sup>. Overall standard of reporting and documentation in medicine is poor, with many reports failing to contain important and pertinent data<sup>1,9</sup>. Not enough time and effort is spent in critically and objectively evaluating the outcome of clinical audits and the audit loop is often not completed<sup>10</sup>. The main aim of this study was to assess the quality of hand-written operative notes in a surgical unit at Queen Elizabeth Central Hospital (QECH), Malawi, using the RCSEng guidelines as a standard.

**Methods**  
This was a prospective descriptive hospital based completed audit loop study. QECH is a major referral and teaching

hospital in Malawi. Its surgical unit comprises General Surgery, Trauma and Orthopedic Surgery, Neurosurgery, Pediatric Surgery, Ear, Nose and Throat (ENT), and Plastics and Reconstructive surgery subspecialties. The unit has a 220 bed capacity, with an average of 320 major operations per month. There are currently 13 surgeons and 12 trainees. The initial audit was conducted over a one-month period (1-30 November, 2015) and a re-audit (1-31 March 2016) one month after intervention.

Operative notes were consecutively assessed solely by the authors using the RCSEng Good Surgical Practice guidelines for completeness of components on a checklist formulated for data collection. The assessment included intermediate and major surgical procedures performed in the unit and written on the operative note pro forma. Operative notes written by the authors, operative notes not written on the operative note pro forma, day cases and minor operations were excluded from the study. The variables included the presence or absence of information regarding the following components: name, age, sex, date of the operation, time of the operation, the surgeon's name, assistant's name, scrub nurse's name, theatre anesthetist's name, urgency of the operation, use of antibiotic prophylaxis, name of procedure, incision used, operative findings, operative diagnosis, closure technique and type of suture used, estimated blood loss, complications encountered, extra procedure performed, postoperative care instructions, signature, and cadre of personnel writing the operative note i.e. surgeon or trainee. Each component was checked as 'present/indicate' or 'absent/not indicated' and presented as a proportion or frequency of the total number of operative notes assessed for the two audits respectively. Further assessment of the details of the postoperative care instructions was done using a pre-defined assessment scale that was devised based on eight common and general postoperative instruction parameters, namely: antibiotic prescription, analgesic prescription, monitoring instructions, postoperative investigations, fluid prescription, feeding instructions, mobilization and rehabilitation and wound care.

The rating system used for postoperative instructions detail assessment was as follows: Absent (No instructions present, incomplete and unclear instructions e.g. 'continue management', 'back to the wards'); present but inadequate (clear with <80% of expected details); and present and satisfactory (clear instructions with > 80% of expected detail). Legibility of the hand-written operative notes was assessed using a checklist method for the total number of illegible words per operative note. The assessment was based on a pre-defined scale adopted from a previous study<sup>12</sup>. The rating system used for legibility assessment was as follows: Illegible (More than 3 illegible words); partially legible (1-3 illegible words); and Legible (Zero illegible words). The grading of performance of operative notes quality is as shown in Table 1.

**Interventions**  
The initial audit analysis and results were disseminated in the form of oral presentations at the departmental level in the surgical unit at QECH, to the QECH administration and at the Surgical Association of Malawi Annual General Meeting and Scientific Conference. The main focus during these presentations was situational analysis, performance analysis and awareness, and education to the surgeons and the trainees with advocacy to adhere to standard guidelines like the RCSEng Good Surgical Practice guidelines.

Consequently, key areas of weakness and deficiencies were identified and highlighted. A collaborative decision between the department and the hospital administration was made to address some of the contributing factors to these areas. The following interventions were implemented:

- The old operative note pro forma was modified and a new operation note pro forma with prompts to specific essential data points was developed based on the RCSEng guidelines. The old operative note pro forma was withdrawn from all theatres and replaced with the new operative note pro forma.
- Integration of the RCSEng guidelines into the training curriculum and on induction of new trainees
- RCSEng guidelines were incorporated into colored and laminated aide memoirs that were posted on all the operating theatre walls, coffee room and recovery areas.

**Data analysis**  
Data were coded using non-identifier unique numbers and entered into a Microsoft Excel database. Data analysis was done using Microsoft Excel and Statistical Package for Social Science (SPSS) version 23. The analysis was in terms of frequencies of compliance to the RCS Eng guidelines for the two audits. The component frequencies were then compared and tested for statistical significant difference by calculating the Z-scores for the two data sets (initial audit and re-audit) at 95% Confidence Interval (CI) and p value <0.05.

**Table 1: Grading of performance of operative notes quality**

Class	% of Standard
Poor	Below 69
Below Par	70-79

**Table 2: Comparative analysis of the frequency of indication of basic operation details**

RCSEng criteria for ideal operative note documentation	Initial audit operative notes compliance (%)	Re-audit operative note compliance (%)
Name	100	100
Age	77	84 p=0.04
Sex	69	86 p=0
Date	70	79 p=0.01
Time of the day	0	62 p=0
Surgeon	100	100 p=1
Assistant	94	95 p=0.6
Scrub Nurse	88	90 p=0.45
Anesthetist	86	92 p=0.02

**Results**  
A total of 563 operative notes were recruited and reviewed for their quality in the whole audit cycle: 291 in the initial



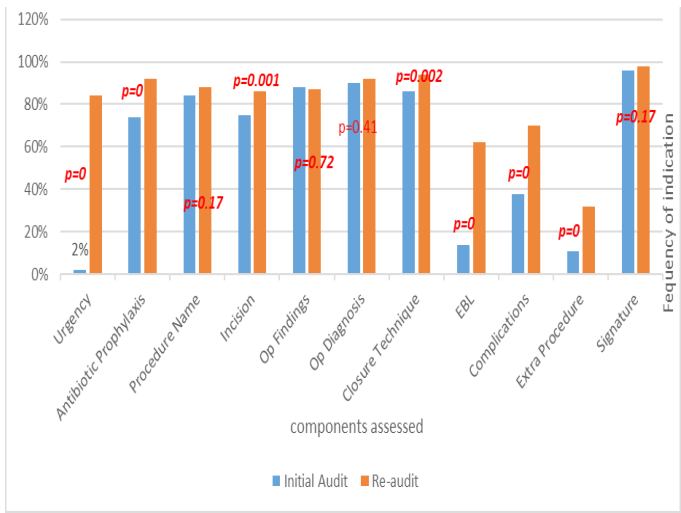


Figure 1: Performance of indication of operative procedure details

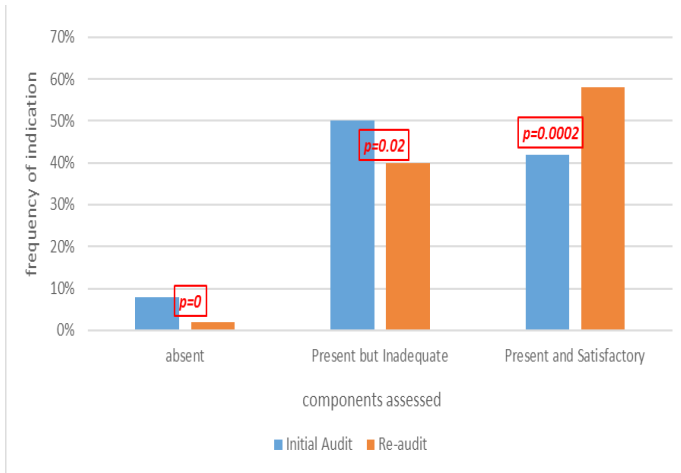


Figure 2: Assesment of perfomance of indication of postoperative care instructions

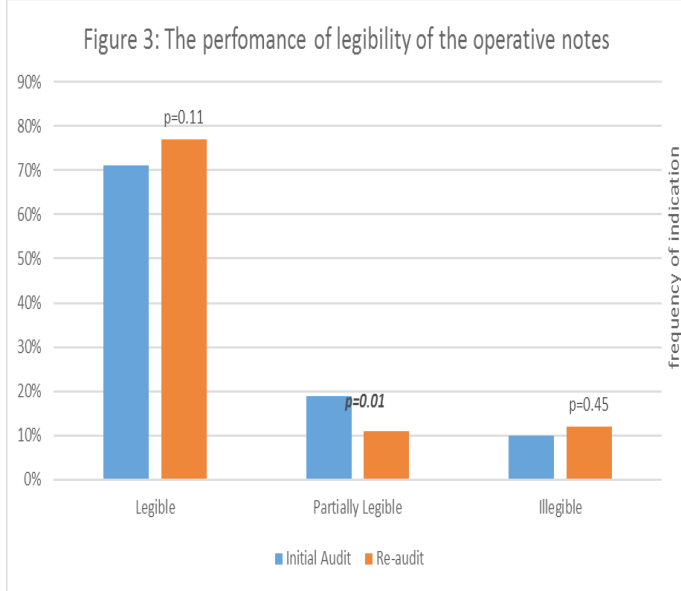


Figure 3: The Perfomance of legibility of the operative notes

audit and 272 in re-audit for the whole unit with 65% and 68% of the notes written by trainees respectively. All the operative notes were hand-written. The majority of notes did not conform to the RCSEng guidelines as shown in Table 2 where performance of the indication of the basic operative details in the initial audit and re-audit are shown.

The difference was statistically significant for age, sex, date of operation, time of operation and name of anesthetist (Table 2).

Op=operative

EBL= estimated blood loss

Comparative analysis of the frequency of indication of components of operative procedure details based on RCSEng guidelines showed that the difference between initial audit and re-audit was statistically significant for urgency of operation, antibiotic prophylaxis, incision made, closure technique, estimated blood loss, complications and extra procedure done (Figure 1).

Comparative analysis of the postoperative care instructions showed that the difference was statistically significant for all the three components assessed (Figure 2). Comparative analysis of the performance of legibility of operative notes showed that the difference was statistically significant for partially legible notes (Figure 3).

### Discussion

In this study, the majority (67%) of the operative notes were written by trainees in the initial audit. For a training institution, this is commendable and the results are similar to previous studies<sup>7</sup>. However, there is no formal training for trainees in our setting on operative note writing according to standard guidelines. The results highlight the need for formal training for trainees on how to write operative notes in accordance to departmental and standard guidelines.

### Assessment of basic operation details

In the initial audit, only two components had a 100% rate of completion, namely: name of patient and name of surgeon. There were significant deficiencies in the completion of details for all the other components on assessment such as age, sex, date of operation, time of operation, name of assistant, name of scrub nurse and name of theatre anesthetist. The completion rate was low in comparison to other studies<sup>4,7,13,14</sup>. Clinical audits and comparative studies are governed by availability of good quality study designs and adequate detailed information. With missing of vital information, it is difficult to conduct such audits or studies. Personal identification is very essential and should be written in the operative notes of every patient<sup>9</sup>. In cases of litigation, team members are usually paraded during the hearing of proceedings to provide evidence on the events that transpired during the operation for medical legal clarity. It is therefore important to have all this information indicated in the operative note. In the re-audit, the expected standard was set at 100% adherence. It was only the two components – indication of name of patient and operating surgeon as in the initial audit – that achieved the target adherence of 100%. There was a remarkable deficiency in the frequency of indication of the age and sex of the patients. The change in the completion of the operative notes was, however, statistically significant. We recommend frequent education to the surgeons and trainees, and use of aide memoirs to achieve an excellent performance. The role of dedicated pro forma with prompts on components with vital information and aide memoirs in improving quality of operative notes has been discussed in several audits<sup>8,5,16</sup>.

### Assessment of operative procedure details

In the initial audit, there were major gaps in the indication of the many operative procedure details, such as the urgency (indication of whether it was an elective or emergency case), estimated blood loss, whether there were complications or not, and whether an extra procedure was performed or not.

After the intervention, there were statistically significant

differences in the compliance of indicating these components. The introduction of the new operative note pro forma with specific reminders of the components aided in better compliance in these data points in the re-audit.. The impact of the detailed pro forma is similar to other previous studies<sup>8,15,16</sup>. Continued advocacy and education is needed to help improving detailed and frequent indication of these components

### Assessment of postoperative care instructions

The studies reviewed in the literature only indicated whether the instructions were present or not, and with that view, the compliance to the standards was good<sup>13,14</sup>. But looking further as we did, there is need to assess the actual quality of the postoperative care instructions. The specific prompts based on the postoperative care instructions outlined in assessment tools should be used. The use of a series of operative notes pro forma, which is conformed to commonly performed procedures with common postoperative care instructions, can improve the quality of operative notes further.

### Assessment of legibility of the operative notes

A third of the notes were either partially legible or illegible. The RCSEng guidelines recommend legible operative notes (preferably typed) for every operative procedure with all steps and actions recorded. Incomplete and illegible Hand-written notes often weaken the doctor's defense<sup>8</sup>. There is an improvement in both the compliance of indication of standard components and, obviously, the legibility with electronic health systems<sup>17</sup>.

Many electronic health systems enforce compliance by using drop down selections with failure to close pop out windows if incompletely filled<sup>14</sup>. Introduction of an electronic based template improves the standards of documentation and education of surgeons<sup>18,19</sup>. The major limitation of this study is that, although the operative notes written by the authors were excluded to counteract and eliminate bias, the unavailability of a second independent assessor for collateral and simultaneous assessment of the operative notes opens to analytical biasness.

The audit cycle improved the knowledge of surgeons and the key areas in documentation of the operative notes. Regular quality control audits should be performed to further improve the standard of the operative notes as per the targeted adherence levels set based on the RCSEng guidelines. Formal teaching sessions on how to write operative records will be helpful. The use of dedicated pro formas and aide memoirs has a role in improving the quality of operative notes. The future of the operative note format is envisaged to be an electronic one.

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