

## Original Research Article

Orthopedic operation notes: What are we Missing .

**Commented [Ma1]:** Why not give a more Reflective title that highlight the study;

- 1.The relevance of adherence to global surgical note writing
- 2.The paucity of hand written surgical notes as compared to global standard:Our experience in Asian Subregional Hospital.
- 3.Standard Orthopedic practice vis a vis hand written surgical notes compared to electronic documentation: our experience in an Asian Subregional Hospital.

### Abstract

**Background:** Accurate legible documentation of operation notes is core element of surgical practice in any Specialty .Complete comprehensive operation notes are also important for maintaining high standard of patient care and for defense in medico legal cases.

Objective of our study was to compare the quality of orthopedic trauma operation notes at our hospital with standard set by ~~te~~ the Royal college of Surgeons , England (RCSE) 2008.

**Material and Methods:** Retrospective review of 300 Orthopedic trauma surgery notes was carried out for the period 01/1/2017 to 31/12/2017.Additional variables not included in RCSE 2008 guidelines were included in results. The complete data collected was analyzed using SPCC 20 version.

**Results:** The demographic details ~~along with~~ as well as date, time of surgery, name of surgeon, assistant surgeon, anesthetist, scrub nurse and signature were documented well in nearly all cases. Notes were written by the lead surgeon in 80.6 % ~~the cases~~ ~~although~~ and 0.5% were consultant notes. ~~were found in 0.5% cases only~~ Adequate document were; Implant usage in 62.5%, Postoperative instructions 96.6%, Intra operative complications ,blood loss, ICD -10 coding were poorly documented while Tourniquet time was not documented well. ~~were Implants used were documented adequately in 62.6% cases. Tourniquet time was not documented well. Postoperative instructions were documented well in 96.6% cases .Intra operative complications ,blood loss, ICD -10 coding were poorly documented.~~

**Conclusion:** Our study highlighted major deficiencies in some areas with good compliance in other areas. Therefore we suggest to use aide memoire and standard based Performa's which will improve quality of operation notes and better follow up patient care.

### Introduction

A high standard of medical record keeping is important for ~~safe~~ ~~Safe~~ care of patients. Comprehensive, ~~accurate~~ documentation of surgical operation notes is ~~an essential~~ ~~the most important~~ part of any surgery as it contains details of all relevant operation findings, ~~and~~ postoperative plans ~~to which facilitate which~~ facilitate ~~further~~ post operative management of the patients . ~~They~~ ~~Surgical operative notes~~ are important for medical cost billing, quality assurance, ~~medical~~ education, research purposes and medico-legal issues. The importance of good note keeping is recognized by the General Medical Council ( GMC) ~~GMC (General Medical Council) who state~~ ~~which states~~ that good note keeping is an essential part of good medical practice [1] .

The Royal college of surgeons of England (RCSE) in keeping with this published the booklet: – "Good surgical Practice" which contains recommendation for documentation of complete operation notes [2]. The British orthopedic association (BOA) ~~BOA (British orthopedic association)~~ also states that "good record keeping is as basic tools of clinical practice "[3]. There is no consensus among surgical disciplines ~~disciplines~~ on the required standard operative notes. The Royal royal college of surgeons of England (RCSE) published guidelines on the operative notes documentation are widely accepted in the United Kingdom and supported by the British Orthopaedic Association. There has been increasing litigation rates in orthopedics being only second to obstetrics and Gynecology worldwide ~~and we have seen~~ the same trend is emerging in this part of globe. This ~~The~~ fact is also highlighted by the National Confidential Enquiry into Per operative deaths in U.K.[4] which labeled ~~where~~ orthopedic operation notes as were labeled on "untidy one liners" due to poor incomplete , inadequate operation documentation and inappropriate ~~in appropriate~~ abbreviation use . As stated elsewhere the yearly increase in orthopedic litigation of 16% between 2010 -2011 and 2011 -2012 compared to the 6% increase in the NHS is note worthy. It is worthwhile to note the rising trend of litigation in orthopedic surgeries which is increasing on a year on year basis in the NHS with a 16% increase between 2010/2011 and 2011/2012 compared to only 6% increase in claim volume for the NHS as a whole. [5].

In our hospital, ~~we have been using the typed~~ computerized electronic surgical note keeping which is saved in the Hospital Information management system( HIMS) software is the practice as hand written notes were ~~found~~ often found illegible, not legible and could be lost or misplaced over period of time .

The aim of this audit was to assess the completeness of our Orthopaedic surgery operative notes and;

- Evaluate its ~~the~~ completeness of operative notes with respect to the RCSE 2008 guidelines
- Highlight the essential information ~~that was~~ found lacking in the operative notes
- Develop an electronic operation note templates for common orthopedic procedures
- Link the ICD-10 diagnosis codes, co morbidities and operation codes thereby promoting integrated sustainable comprehensive electronic notes that which are easily accessible for nurses, physiotherapy staff in order to achieve optimal postoperative rehabilitation for continuation of patient care and follow up in the outpatient clinic ~~on subsequent visits~~.

### **Material and Methods :**

The study was conducted by retrospective review of 300 orthopedic trauma surgery operation notes with respect to RCSE 2008 guidelines over a period twelve months from 01/1/2017 to 31/12/2017 .Additional variables not included in RCSE guidelines 2008 were also analyzed in the results. The study sample included both adult and pediatric patients admitted in our hospital ~~who underwent orthopedic trauma surgery~~ .The information about surgery notes was extracted from Hospital Information management system( HIMS) and recorded on prepared data performa sheet .Informed consent was not required in our

study as it was retrospective review of already stored data in HIMS with no patient contact required. However patient confidentiality was referred ~~reviewer~~.

#### Inclusion Criteria :

- All orthopedic trauma patients admitted in our hospital ~~for who underwent~~ major elective or emergency surgery.

#### Exclusion Criteria :

- Patients who underwent Intermediate or minor orthopedic surgery ~~such as for example~~ closed reductions under anaesthesia , Excision of ganglion , K - wire removal etc.
- Polytrauma patients with multiple ~~trauma~~ injuries .
- Soft tissue surgery where no implant was used.
- Local intrarticular or intratendinous injections
- Revision orthopedic surgery cases
- Where operation notes data could not be retrieved or was incomplete

#### Data Analysis :

The data derived was compared to RCSE 2008 operation notes guidelines on data sheet in coding manner for each variable: Present (+), Absent (-) and Not applicable (NA) ~~NA (Not applicable)~~ . ~~At the end~~ The percentage of all variable codes ~~along~~ with mean ~~percentage~~ was calculated. The data was analyzed using Statistical Package for social sciences (SPSS) version 20. The final outcome was assessed by recording the number of variables missing from RCSE 2008 set guidelines plus additional variables not included in RCSE 2008 guidelines.( Table 1-2 ) .

#### Results:

The study compared a total of three hundred total 300 orthopedic trauma operation notes ~~which~~ comprised of 210 adult and 90 pediatric upper and lower limb surgery notes. All operation notes were legible as we used ~~have~~ electronic system ~~3~~ for entering patient notes. ~~Out of 300 operation notes only~~ Only 203 (67.7%) of all notes met all the set RCSE 2008 guidelines. The missing variables were 1-5, 6-12 and 13-18 in 15 (0.5%), 36 (12%), 46 (15.3%) patients respectively. ~~In 15 (0.5%) patients variable between 1-5, in~~

36 (12%) 6-12 variable and in 46 (15.3%) between 13-18 variable of RCSE 2008 guideline were missing (Table 1).

The ~~proportion of~~ operation notes written by Surgeon were 242(80.6%) while those of the Assistant Surgeon were ~~and rest 58(19.4%) were written by assistant~~. Only 15 (0.5%) notes were written by the ~~Consultants Consultant~~. In majority of the cases, (273 / 91%) by the specialist grade surgeons ~~had documented the notes were as in only and 12(0.4%) by the medical officers cases medical officer had written the operation notes~~. The signatures were present in all notes, as by default the surgeon entering the notes on logging in the HIMS ~~the name~~ is automatically saved by computer. Additional 19-23 variables found to be missing in 14(4.7%) patients and in 286(95.3%) variable 24-27 were missing (Table 2).

Majority of patients were adult males 186 (62%), followed by females 58 (19.4%) and children 56 (18.6%).

**Pre operative Details:** Final diagnosis was not revised based on intra operative findings in 217 (72.4%) cases. There was inadequate ICD-10 coding in 98.2% of operation case notes reviewed. Consent forms were completed in all cases ~~however but in 241(80.4 %)~~ cases were obtained by non operating surgeons while ~~and only in 59 (19.6% cases were obtained by the operating surgeon~~.

~~There was no documentation in In 97 (32.3 %) of the elective or emergency operations cases there was no documentation of elective or emergency operations~~. Tourniquet was used in 92 (30.6%) cases but ~~poor poor documentation of pressure , start end time of tourniquet in all cases were noted there was poor documentation of pressure , start end time of tourniquet .~~

The implants used were ~~inadequately documented -documented inadequately~~ in 188(62.6%) cases.

Blood loss estimates were missing in all operation notes.

Intraoperative complication rate was documented adequately in 290 (96.6%) cases.

### **Discussion :**

This is a novel subregional audit study carried out at the ~~probably the first of its kind in this part of world is from a~~ Nizwa Hospital Regional referral trauma centre, Oman ~~as a medical outlet for a which caters to~~ large population. ~~The availability of a legible and accurately documented operation notes is essential for rendition of medicare and basis for auditing in a resource challenge environment complete. Complete legible accurate documentation of operation notes are important for delivery and continuation of patient care which serves as one of the basics for auditing the delivery of health care in present resource challenged environment.~~

Secondly ~~it provides reliable easily accessible communication platform for forms important bridge for communication between healthcare professionals and is important legal document for any further medico legal concerns suites~~. There is no perfect operation notes model ~~for faultless operation notes which vacuum the~~ The RCSE guidelines [2] ~~readily fits in~~, has been widely accepted ~~and followed over years~~ as ideal reference guideline for operation notes documentation. Our study and findings provide us with good insight ~~about the range of orthopedic trauma operations and vivid experience of Surgeons documentation of operation notes.~~

Most of the Surgeons ~~writing the notes documented well the were found to document~~ technical aspects well but ~~lacked~~ documentation of secondary details where  $\epsilon$  only 67.7% notes were completed as per RCSE guidelines while ~~and in~~ 98% of the notes of the additional variables were found missing~~;~~

~~This~~ Our audit study highlighted important missing points in our practice ~~operation note documentation which has been as compared to shown in other studies also~~ [3,5-9]. Various reasons ~~advanced included can be attributed to~~ poor compliance with guidelines ~~as a result of absent the foremost being poor or no~~ formal training in documentation of operation notes ~~in accordance with guidelines. Secondly, time constraint~~ ~~Second being time factor~~ in operation theatre ~~forcing suboptimal notes documentation compelling some surgeons to cut short notes without understanding the need for documenting the details with precision for clinical and medico legal use.~~

*Acquisition of patients biodata in form of Personal Data:* Patients' name, age, gender and hospital registration number were documented ~~electronically in all cases as our data is electronically and stored routinely in HIMS at variance to at the time of patients visit to hospital. This is in contrast to other studies [6,9,14,15] in which cases the reviewed where these variables were found lacking in 32-54% cases.~~

There are good chances of ~~misplacement or loss of hand written operation notes documentation as a result of non diligent patients documentation. operation notes getting misplaced or lost due to lack of patients documentation in centers where it is hand written.~~ In this study, the good documentation of 95% and 5% compliance of date and timing of surgery and start and end time of surgery of surgery respectively correlates well with other studies [3,6,9,14]. ~~There was good documentation of date and timing of surgery with compliance of nearly 95% but in 5% the start and end time of surgery were not recorded accurately. This is comparable to other studies [3,6,9,14].~~

~~The~~ In 80.6% (n =242) cases of the operation notes were written by operating surgeon and in 19.4% (n=58) by assistant in our study, is lower than the 90-100% operating surgeons written operation notes were written by in some studies whereas in other studies (9,11,13,14) 90-100% operation notes were written by operating surgeons . Only 15(0.5%) notes were written by Consultant. Operation notes written by senior surgeons were found to be more elaborate and detailed compared to those written by Junior surgeons(3,17).

This study recording of the Anesthetist and scrub nurse names were recorded in all our cases correlates well with other similar to other studies (14, 18) but at variance with ~~In contrast~~ Hamza et al [9] in their study found that Anesthetist name was recorded in 13.9% and scrub nurse in 0.9% cases only.

The provisional diagnosis recorded in our cases and intra operative finding based diagnosis of 72.4% cases ~~Provisional diagnosis was recorded in all cases but Final diagnosis based on intra operative findings was not changed in 72.4% cases which is similar to other studies [9,18]. where it was missing to the tune of 77% to 100% respectively .Other studies [6,15] only in 10-15 percentage of cases it was missing.~~

Correct ICD-10 coding is of medicolegal import in negligence law suit and claim payment delay ~~important in all cases in order to avoid Medical negligence law suits and delay in claim payment~~ [2,19]. In our study ICD-10 coding was seen in 98.2% of operation case notes reviewed. There is no clear documentation of type of surgical procedure elective or emergency in 32.6% (98) cases. which is reflected in other studies

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Commented [Ma4]: Is this a reflection of experience or compliance of the RCSE guideline or lack of it in the junior cadre?

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also where it varies from 1 to 97% [3,9,14,15,18]. Although the type of surgery can be checked from theatre registry and documentation of type of surgery can be improved by introduction of Aide Memoire and surgeon education [8,20].

~~Anesthetist notes:~~ the type of anesthesia, drugs used and any adverse events during and complications as recorded in this study as documented in anesthesia were documented well in 92% cases is at variance to in contrast to other studies were its I recorded in 68% [11], 80.6% [14] but correlates well with the and 94% in [9] cases respectively.

Consent forms were completed in all cases, but in 80.4% cases consents were obtained by non operating doctor in consonance but higher than 53% obtained in which is similar to other studies [21] where in 53% cases consents were obtained by junior doctors. Insufficiently filled ~~Insufficient informed~~ consent forms by junior doctors and ; non operating surgeons risks undermine the validity of consent and may not offer full protection to the Doctors in face of litigation protect the surgeons in case of medico legal complaints in the court of law.

Patients proper documentation of 73% positioning during surgery was documented properly in 73% cases which is better than study in UK by SARCO [22]. There was poor documentation of draping in 81% cases, 74% in solution used or skin preparation with no mention of solution used or skin preparation in 74% cases which is similar to reports as found by other authors also [23].

~~The prophylactic use of intra procedural antibiotic recorded in only 81.6% in our study Prophylactic antibiotics during our surgical procedure are routinely prescribed but our records found that in only 81.6% cases it was documented in operation notes which is comparable to other studies findings also [3,24,25]. Inconsistency and lack of antibiotic dosage documentation was found in many cases and neither any mention was made of repeat antibiotic used for prolonged surgery.~~

Tourniquet use was recorded in 30.6% cases but the record was silent on timing and pressure applied as seen in there was poor documentation of amount of pressure applied and tourniquet timings. Similar findings were found in other studies [8,24,25].

Surgical approach and incision type were specified clearly mentioned in 74% cases which is comparable to the 60.8% [6], 80.1% [24] in other studies, other series with varying percentages 60.8% [6], 80.1% [24]. Operative findings were documented in only 74.2% cases in our study compared to other studies in the literature where operative findings were missing in 57.5% [6], 56% [16] and 80.1% [24].

Operative complications were not recorded in 26.4% cases which is similar to other studies where poor documentation in detailing complications was found [7,9,16,24,26], but far higher than that the 2.5% of Kawa et al [6] however reported only 2.5% intra operative complications.

Documentation of extra surgical procedures performed were not recorded in found missing in 40.6% of cases and in 78.5% cases of tissues removed during surgery was not documented in 78.5% cases which compared favourably with those of other authors. Similar findings were found in other studies also with varying percentages [6,9,15,18,25,26].

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**Commented [Ma10]:** 1. Is the " ICD-10 coding was seen in 98.2% " is medicolegal reference as in [2,19] above? 2 elective or emergency in 32.6% (98) a variance of varies from 1 to 97% [3,9,14,15,18]?

**Commented [Ma11]:** Explain its role in your study.

**Commented [Ma12]:** This is a cautionary note. Could fit well in your recommendation.

**Commented [Ma13]:** Better in what sense? Do you want to say higher or lower? Then give the figure of study in UK by SARCO [22].

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**Commented [Ma15]:** What is the figure obtained by the cited authors?

**Commented [Ma16]:** What is the figure obtained by the cited authors?

**Commented [Ma17]:** How do you compare documented findings in your study with what were missing in others?

**Commented [Ma18]:** Are you insulating there were 73.6% of complications recorded in your study? What is or are the figures of complications in the reference comparison?

**Commented [Ma19]:** What are the figures for comparison?

This study 62.6% recorded usage of Implants and prosthesis is higher than the used was recorded well in 62.6% cases. This is in contrast to other studies where there is poor documentation of around 30% in other studies attributably resultant of poor documentation cases where implants were used [8,22,24,25].

Type of fluid and irrigation used was documented well in 80.4% cases, surgical wound closure was well documented in 89% and cases but incomplete details of as regards suture material used was found in 96.4% are consistent with others is similar to other studies also [3,6,7,9,13,14].

There was poor Poor documentation of intra operative blood loss in 88.6% was seen nearly 88.6% cases which is comparable to other studies [23,26,27].

Majority of orthopedic trauma surgery is done under with use of fluoroscopy but in none of the cases the radiation exposure time and number of exposure of fluoroscopy shots taken were documented.

The post operative Post operative instructions were clearly written in 96.6% of the cases which is much better than the reported lower percentage in other studies[3,6,9,14,15] which have the reported lower percentage of proper documentation of postoperative notes.

In our study, the series post operative rounds were led lead by senior doctor in 84.2% cases in contrast to Rowland's et al [28] study from UK by Rowland's et al [28] who have reported less percentage of post operative rounds by senior doctors at Consultant level.

In Summary there is no perfect model for faultless operation notes documentation in different surgical specialties however strategies can be adopted by different institutions for improving operation notes writing but since the basic guidelines remain the same .

Improvement-improvement in documentation of operation notes can be further enhanced by made by

--- Provision of Providing operation note Performa's or Aide memoire for better documentation of notes[ as earlier noted by other authors 9.10.20.26]

--- Introduction of electronic smart note templates with previously highlighted advantages elsewhere in this write up which are superior to hand-written notes by removing the illegibility of hand written notes and help in keeping the documentation permanently stored [10,14]

Hand written notes were not admissible have been found to be non defensible in the court of law in medico legal cases[5,12,13]

---Implementation of training and retraining programme in Most important is introduction of structured training in operation note documentation to new and old staff members inducted in the is sine qua non to reduction or total elimination-respective departments. Lack of education and training leads to large gaps in documentation .

---Frequent supervision of junior surgeons by senior surgeons in operation note documentation .

---Avoidance Avoid use of abbreviations in note keeping and in diagnosis as it will help in avoid ambiguities in recording of notes properly.

**Limitations of Study :**

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--It is a retrospective study done in one hospital by single operator moreover Hawthorne effect cannot be excluded .

-- Many variables obtained from patients file through Hospital computerised data , thereby limiting the number, quality, and completeness of variables that can be obtained in some cases.

**Conclusion :**

Our study identified both areas of poor documentation in certain areas as well as positive elements in other areas as compared to RCSE 2008 guidelines .Also areas where we need improvement were identified and can be improved and monitored by periodic ~~auditing audits in order to maintain continuity of proper recording of operative notes.~~

The adoption of ~~Further adopting~~ operative note performa as contained in the ~~that includes sections for~~ RCS guidelines will ensure global best medical practice recording operative notes more effectively.

Formal inclusion of operative note writing ~~introduction of teaching writing operative notes~~ in the curriculum at early stage of surgical training will in the long run improve documentation and patient care.

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**Table 1 RCSE 2008 Parameters :**

1.Patient Name
2.Date of Birth
3.Hospital number
4.Date of operation
5.Time of operation
6.Elective /Emergency Procedure
7.Name of Surgeon
8.Name of assistant
9.Name of operation
10.Incision
11.Operative findings
12 Intra operative complications
13. Any extra procedure performed and reason
14 Details of tissue removed, added or altered
15 Identification of prosthesis or materials used
16. Details of closure technique
17. Post-operative care instructions
18. Signature of surgeon

**Table 2 Additional Variables not included in the RCSE guidelines**

19. Age and gender
20. ICD – coding
21. Final Diagnosis
22. Indication for operation
23. Consent Obtained by Operating surgeons
24. Prophylactic antibiotics
25. Preparation: Positioning , Skin preparation
26. Type of irrigation
27. Tourniquet time
28. Estimated blood loss

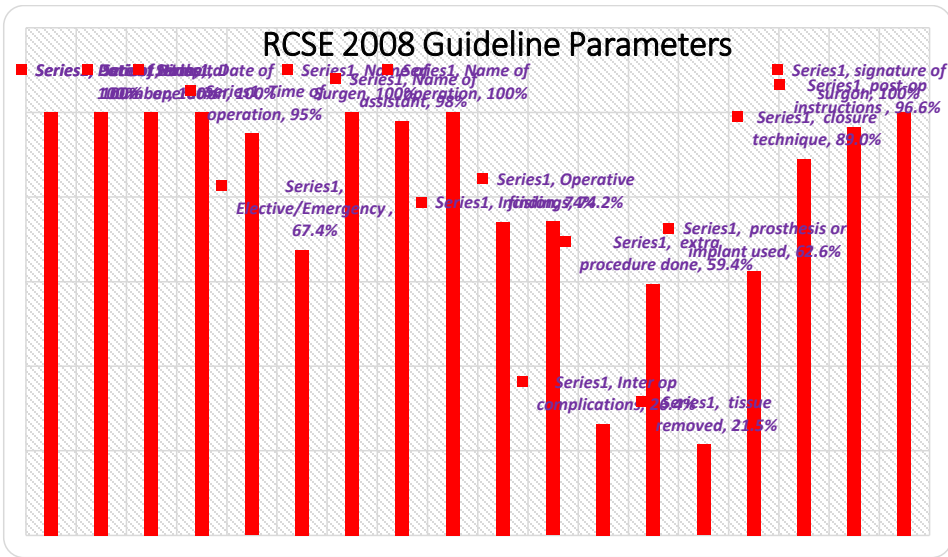


Fig 2: RCSE 2008 Guideline Parameters

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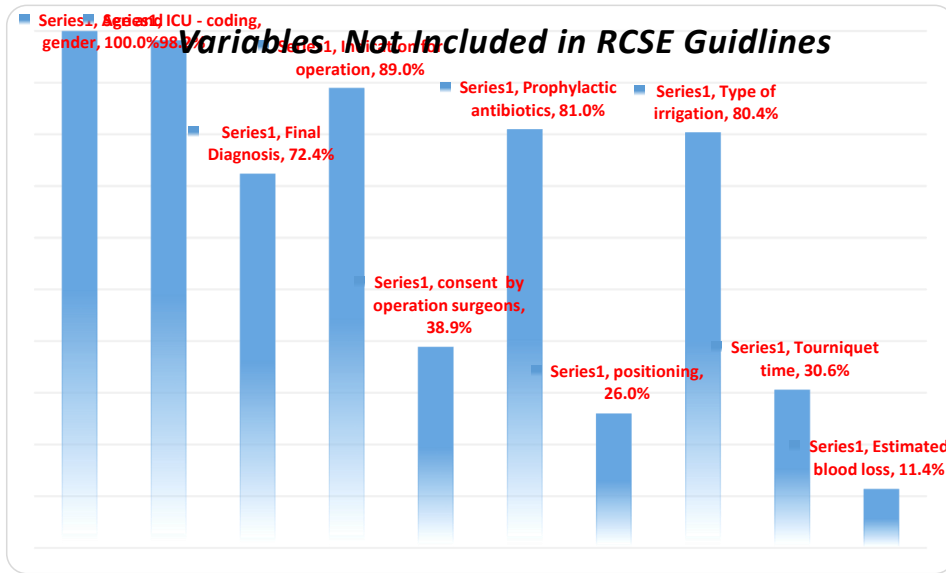


Fig 3: Variables Not Included in RCSE Guidelines