

## Two-Year Experience of Orthopaedic Audit in a Teaching Hospital in Saudi Arabia

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**Objectives:** To implement orthopaedic audit and quality assurance, and to assess the results after 2 years of implementation.

**Design:** A prospective audit has been designed and implemented. A brief "audit on audit" was also performed.

**Setting:** The department of Orthopaedic Surgery at King Fahd University Hospital, Al-Khobar, Saudi Arabia.

**Subjects:** Data was compiled on 961 patients over two years. Analysis included Demographic details, type of procedure and post-operative outcome.

**Results:** Points of interest include the following: the observed age and sex distribution of patients correlated directly with the proportion of beds allocated to the department, the frequency of elective operations increased significantly from 51% in first year to 68.5% in second year. The overall rate of complications decreased over the second year by 51%.

**Interpretation and Conclusion:** It is concluded that clinical audit in Orthopaedic Surgery is feasible. Incomplete and adequate documentation needs to be improved through modification of the computer to store more comparable information with that recorded in the ward logbooks.

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Audit has been defined in various ways including the Alment committee's definition: "The sharing by a group of peers of information gained from personal experience and / or medical records, in order to assess the care provided to their patients, to improve their own learning and to contribute to medical knowledge<sup>1</sup>." Bunker et al<sup>2</sup> have identified 3 aims of audit, and Pollock<sup>3</sup> made a plea that surgical audit must be complete, accurate and honest, "Our attitude towards mistakes must change"<sup>3</sup>. Staniforth<sup>4</sup> further raised a point "Audit-guidelines, policies, best practice or 'cook-book' medicine?"<sup>4</sup>.

As the expectations and demands of patients and their relatives increase, orthopaedic surgeons should ensure that the quality of their science and craft is not only maintained and improved but also that they should be actively involved in the practice of quality assurance (QA) or audit<sup>5</sup>. Furthermore: "quality assurance is not an ivory tower term. It can make the difference between life and death"<sup>6</sup> and

hence the Royal Colleges of Surgeons in the United Kingdom are actively promoting QA<sup>7</sup>.

Quality assurance in health care has been accepted in most parts of the world including the Kingdom of Saudi Arabia<sup>8</sup> where the ministry of health and other healthcare providers have recommended its implementation. In King Fahd Hospital of the University, (KFHU), QA implementation began effectively in April 1987 with the setting up of a hospital-wide QA directorate by the dean of the college of medicine and medical sciences (CMMS).

The purpose of this paper is to review the evolution of this process in the department of orthopaedic surgery, to define its current status and to see what remains to be done.

### METHODS

A prospective study was undertaken in the department of orthopaedic surgery, KFHU, Al-Khobar, Saudi Arabia.

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Meetings were held between the department of orthopaedic surgery and QA directorate and it was agreed as follows: The objectives were to implement the policy of the hospital-wide QAD including audit for clinical services, assessment of quality of clinical care, and selectively monitoring process of care.

The data was collected on a present proforma which was approved by the department of the QAD. The proforma included: age, sex, nationality and type of injury. The nurse remained in touch with the chairman who validated the data regularly. Data analysis and presentation were according to timing and format determined by the department.

After much discussion, the ICD-10 code was chosen. Originally, the intention was to code trauma cases separately and to classify them with the trauma severity scoring (TSS). The difficulty in selecting appropriate coding system remains unresolved.<sup>2</sup>

**Definitions of Terms**

For the purpose of this audit, medical records were the only data source used. If a clinical event was not documented in the medical records, it did not happen. However, to conduct "audit on audit", two additional data sources were used; the operating room (OR) register and the ward logbook.

Wound infection was defined as the discharge of frank pus or of copious exudate which grew pathogen (s); it included pintrack infection but excluded stitch abscess and drain site sepsis. At first, post-operative "anaemia" was defined as a drop of hemoglobin of 2 gram or more compared with the preoperative level. At the end of the first presentation, the figure was revised up to 4 gram or more.

"Intermediate Equivalent" is the term used by the BUPA classification<sup>9,10</sup> system to assess the operation on the basis of numerical definition.

Minor = 0.5, intermediate = 1 major = 1.75, major + = 2.20, and complex A-D = 3.10 - 6.33.

**Analyses and Statistical Tool**

Computer programmes used were dBase 3, SPSS PC+ and SPSPC. Data were entered in the QA directorate by one person(the Surveillance Nurse). The statistical tool used to compare proportions was the X<sup>2</sup> test with Yates' correction.

**RESULTS**

**Volume Indicators (Case Load Vs Work Load)**

Data on a total of 961 patients were compiled by the computerised audit system. Table I is the breakdown according to mode of admission, nationality, age group and sex. Table 2 sums up the mode of treatment. It can be see that the frequency of elective operations increased significantly from 51% in first year to 68.5% in second year (X<sup>2</sup> = 23.9; P< 0.0001).

Tables 3 and 4 show the distribution of the magnitude of operations including the "intermediate equivalent", and of the anatomical region operated upon.

**Perioperative Outcome & Discharge Status**

The frequency of complications has markedly decreased over the 2nd year as shown in Table 5. The overall complications during the first year totalled 53 which then reduced to 27 (50.9%) in the second year. The incidence of post-operative infection was the only variable which increased during the second year from 6 to 10 patients. Over 95% of patients were discharged home and only one death was catalogued.

**DISCUSSION**

**Table 1: Distribution of 4 Variables in 961 admissions**

Variable	1st year		2nd year	
	No.	%	No.	%
<b>Total Admissions</b>	400	(42%)	561	(58%)
Elective	173	(43%)	254	(45%)
Emergency	217	(54%)	279	(50%)
Planned readmission	7	(1.8%)	25	(4.5%)
Unplanned readmission	2		3	
Unspecified	1		0	
<b>Nationality</b>				
Saudi (=S)	236	(59%)	336	(60%)
Non-Saudi (=NS)	164	(41%)	225	(40%)
Ratio S:NS	1.4:1		1.5:1	
<b>Age Group</b>				
Adults (=A)	295	(74%)	441	(79%)
Children (=C)	105	(26%)	120	(21%)
Ratio A:C	2.8:1		3.7:1	
<b>Sex</b>				
Males (M)	309	(77%)	436	(78%)
Females (F)	91	(23%)	125	(22%)
Ratio M:F	3.4:1		3.5:1	

**Table 2: Mode of Treatment**

Variable	1st year		2nd year	
	No.	%	No.	%
<b>Operated</b>	291	(72%)	422	(75.2%)
Elective	148	(51%)	289	(68.5%)
Emergency	142	(49%)	127	(30.1%)
Not specified	1		6	(1.4%)
<b>Not Operated</b>	109	(28%)	139	(24.8%)
<b>Total</b>	400	(100%)	561	(100%)

51% VS 68.5: X<sup>2</sup> 23.9; P<0.0001

**Table 3: Distribution of Magnitude of Operations\***

Variable	1st year		2nd year	
	No.	%	No.	%
Minor	45	(14.8%)	35	(7.7%)
Intermediate	158	(54.3%)	252	(55.6%)
Major	83	(28.5%)	150	(33.1%)
Major plus	2	(0.7%)	4	(0.9%)
Complex	5	(1.7%)	2	(0.4%)
Not specified	20		10	
<b>Total</b>	313*	(100%)	453*	(100%)
Intermediate Equivalent (I.E)	345.7		564.5	

(\*some patients had more than one operation)

**Table 4. Anatomical Region Operated Upon\***

Anatomical Region	1st year	2nd year
<b>Upper Limb</b>		
Wrist & Hand	55	71
Forearm	35	43
Elbow	15	9
Humerus	10	23
Shoulder region	9	12
<b>Lower Limb</b>		
Ankles & foot	33	43
Lower leg	37	63
Knee	22	68
Thigh	45	76
Hip & Pelvis	23	35
<b>Spine</b>	9	4
<b>Not specified</b>	20	6
<b>Total</b>	<b>313</b>	<b>453</b>

\* some patients had more than one operation

**Table 5. Frequency of complications**

Complication	1st year	2nd year
Wound infection	6	10
Postoperative "Anemia"	25	5
Urinary tract infection	8	5
Others*	14	7
<b>Total</b>	<b>53</b>	<b>7</b>

\* others: knee effusion, tight plaster of paris, redislocation, pressure sore and bleeding.

The Department of orthopaedic surgery in KFHU has successfully established surgical audit and thereby, its first objective in implementing QA has been fulfilled. Nine hundred sixty one patients have been processed. The distribution of their sex and age group correlated directly with the proportion of beds allocated to the department.

Primarily, although the ratio of elective emergency admissions remained unchanged, when it came to the urgency of operative intervention, there were proportionately more elective operations in second year (Table 2). This was due to lack of consent for surgery of emergency cases and some patients initially, were not fit for surgery. These patients were operated on at a later date under the elective list of operations. So this issue was raised to the administration to take an immediate action with the following suggestions.

To sign consent for every patient admitted through ER.

When the patient's condition permits surgery must be done in the golden period of the 1st 24 hours.

Secondly, it was observed that the complication rate reduced in the second year from 13.3% to 4.8%. The reason or reasons for this cannot be explained but one could speculate that it is due to the QA enforcement. The surgeons were much more careful or they had learned from mistakes made in the first year. It was obvious that knee arthroscopy surgery

improved in the department as more cases were done in the second year ( Table 4).

Incomplete and inadequate documentation was one of the major causes for concern. However, these difficulties have been described also by Coleman et al<sup>11</sup> and by Barrie and Marsh<sup>12</sup>. Thus, Coleman et al<sup>11</sup> found that the computerized audit system contained details of only 63% of the operations performed. Similarly, Barrie and Marsh<sup>12</sup> obtained an overall completeness of data of only 62%. Data on fewer patients was logged in the ward. Also, there was indirect evidence of inadequate documentation. Examples are the paucity of displaced fractures requiring remanipulation and no documentation of post-operative deep vein thrombosis.

Recently, to solve the problem, Malefijt<sup>13</sup> has called for the establishment of a register of complications. We concur that the time is overdue to start the "Register of Complications" as a separate entity which will chronicle minor and major complications. The chairman of the department should instruct all members to log all the complication in a special register and discuss it in a special morbidity meeting once a month which without doubt will improve the services.

## CONCLUSION

**In conclusion, the enforcement of QA revealed that the complications of patient care dropped, incomplete and inadequate documentation was prevalent and lastly the data logged in the wards had more and complete information that was lacking in the auditors data .**

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