

Evaluation of Laboratory Investigations in Accident and Emergency Department, Salmaniya Medical Center

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Objectives: The main objective of this study is to evaluate the proper use of laboratory services in view of test ordering and its relation to the number of patients attending the Accident and Emergency Department as well as the cost-effectiveness of those tests.

Design: A retrospective study of one month duration, included all patients attended the Accident and Emergency Department.

Setting: Accident and Emergency Department, Salmaniya Medical Complex, Kingdom of Bahrain.

Subject: Data obtained from the Health Informaton Directorate of Salmaniya Medical Complex about patients attended the A/E Department during the month of June, 1999 Information about the number of patients attended A/E Department, number of patients in A/E who have been investigated, and the type and number of laboratory investigations, were analysed and compared with data obtained from subsequent three months after implementing the Triage system.

Results: The total number of patients attended during the month of June 1999 was 21026, 24% of them had hematology and biochemistry investigations. The total number of hematology investigations was 11461, a total cost of BD 64883. The total number of biochemistry investigations was 36169 a total cost of BD. 32213. Forty two percent of the investigated patients required admission, after implementing the Triage system about 50% o of laboratory investigations have been eliminated.

Conclusion: Appropriate laboratory test ordering would promote, appropriate utilization of laboratory services. The educational initiatives would provide the clinician with guidelines for optimal laboratory test selection. The availability of cost-efficient tests, and optimal utilization of laboratory based on decision –analysis methodologies, available laboratory test profiles should be restructured to match clinical problems, treatment and patterns of clinical thinking.

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This study proved, the reduction of patients attending the accident department, and the number of requested laboratory investigations, which meant saving BD. 276000 per year .

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Salmaniya medical complex is the main secondary and tertiary care hospital in the State of Bahrain. Accident and Emergency department at SMC is the busiest department in the hospital in view of the overwhelming increase in the island population and hence the number of patients attending the Accident and Emergency.

Cost effectiveness and the test utilization have several things in common. The rationale behind test ordering is based on the proper understanding of the clinical background and the importance of the investigations in justifying such order.

Cost-effective improvements in the use of laboratory tests may require modifying clinicians' test selection through strategies such as problem-oriented request forms and changes in administrative policy¹.

It would be appropriate to focus on the use of high-cost tests in attempting to foster cost effective use of diagnostic technologies². The main objective of this study is to evaluate the use of the laboratory services in terms of test ordering and its relation to the number of patients attending the department including the cost effectiveness of these tests.

METHODS

This is a retrospective study, based on the data collected from the health information directorate of Salmaniya Medical Complex for the month of June 1999 data included the total number of patient attending the department, also the number and types of hematological and biochemistry investigations ordered (Table 1). These were analyzed and compared with the data obtained during the next three months after implementing the triage system. The Triage in brief, is sorting out system involving clinical assessment that determines whether patients should attend the Accident and Emergency Department or should they be discharged to the health centers in case that they are not critically ill or injured.

Table 1. The number of haematology and biochemistry investigations during June 1999 and the estimated cost

Laboratory Services	No. of Tests	Estimated Cost (BD)
Haematology	11461	64883
Biochemistry	36169	32213

RESULTS

The total number of patients attending accident and emergency department through the month of June 99 was found to be 21026 patients³ with an average of 700 patient per day. Out of these 5048 (24%) patients underwent Hematology and/or Biochemistry investigations,

The number of patients admitted after investigations were 2212 , which is 42.8% of the investigated patients, and 10.5% of total examined at Accident and Emergency Department. The number of hematology investigations undertaken were 11461 tests and Biochemistry investigations were 36169, accounting for 2.27 and 7.16 tests per patient respectively.

The cost of hematology investigations was about BD 64883 and biochemistry was BD 32213. The total cost of laboratory hematology and biochemistry investigations was BD 97096. It was noticed that about two thirds of the total was due to hematology investigations.

The effect of triage system can be seen in the data of the following two months of July and August when this system was implemented in the Accident and Emergency Department of Salmaniya Medical Complex (SMC), this system considerably reduced the number of the patients seen by the A/E doctors, and consequently the number of lab investigations requested.

There was 50% reduction of the number of attendants during August. The number of tests per month decreased progressively till it reached over 23% compared to the month of June, which equals to BD. 22332 per month (Table 2).

Table 2. Cost effectiveness before and after triage system in laboratory services

Laboratory services	Haematology		Biochemistry	
	No	% cost saving	No	% cost saving
A	11461	--	36169	--
B1	9782	14.65	31622	12.57
B2	8814	23.1	27825	23.1
B3	8778	23.41	27022	25.3

A – before triage system, June B1 – after triage system, July
B2 – after triage system, August B3 – after triage system, September

Similarly, the biochemistry tests recorded a decrease by more than 25% in the month of September (Table 2), saving about BD.8000 in the month of September. The data

indicates that the expected total reduction of the cost after implementing triage system would be BD.276000 per year.

Although the number of patients requiring laboratory investigations decreased, the number of admissions remained unaffected by the triage system (Table 3).

Table 3. Number of patients admitted through A/E Department before and after triage system

Month	No. of admission
Before triage system	June 2212
After triage system	July 2238
	August 2122

DISCUSSION

Managed care organizations (MCOs) have recently focused on the high cost per patient visit in the Accident and Emergency (A/E) Department⁴. MCOs emphasize preventing low acuity patients access to the A/E, believing that billions of healthcare dollars will be saved. Combined with new A/E service lines, perhaps another, rather paradoxical approach to managing healthcare costs in the A/E is more patient focused and more cost-effective long-term plans. This approach is more comprehensive and offers more services, not less. The A/E is an important community resource and entry port to healthcare. It is the only place open 24-hours a day, 7 days a week with no appointment, and all lab and radiology services available.

A high percentage of patients (24%) attending the Accident and Emergency Department, who are subjected to laboratory investigations, only 42% of these required admission, indicating that there is a tendency of overuse of the laboratory facilities.

In view of the exponential increase in patients attending the Accident and Emergency Department during the last several years, additional staff and expansion of facilities to meet the growing demands of the patients are necessary to achieve speedy and accurate diagnosis. However this is sometimes not feasible due to financial constraints. Therefore, Triage System has been adopted and implemented in Accident and Emergency Department. The Triage is a clinical assessment used in the time order sequence to determine whether patients need the immediate attention of Accident and Emergency Department or should be referred to the health centers in case of non-critical illness or injury. After starting the triage system, about 50% of laboratory investigations for patients not requiring admission had been eliminated.

The number of patients requiring the laboratory services decreased, but the number of patients requiring admission remained at the same level despite triage system. This

indicates that a significant portion of laboratory investigations have been carried out for cold cases prior to discharge, and most of these investigations are probably unnecessary. On the other hand, triage has not affected the management of serious cases that needed prompt care and admission. In addition, this provided and created a proper environment, more space and time for the emergency physician to provide optimal care. In view of all these findings, triage expected to bring about BD. 276,000 annual saving without jeopardizing the care.

The clinical and scientific justification to provide the standards for ordering laboratory investigation, should be practiced by the emergency physician, and this is another way to eliminate the unnecessary laboratory investigations. Physicians who order tests excessively put an unjustified burden on the laboratory, this overuse does not contribute to the quality of medical care, does not shorten hospital stay, nor reduce mortality.

Educating the practitioners in appropriate test ordering would promote more appropriate utilization of laboratory services. The educational initiatives would provide the clinician with guidelines for optimal test selection, the availability of cost-efficient tests, and optimal utilization of laboratory services.

Based on decision analysis methodologies, available test profiles should be restructured to match clinical problems, treatment and patterns of clinical thinking⁵.

CONCLUSION

Appropriate test ordering would promote optimal effective utilization of laboratory services. The educational initiatives provide guidelines for the emergency physician for optimal test selection. In this situation we would like to stress the role of medical auditing in providing the rationale and justification for laboratory test selection. This would definitely overcome the overuse of laboratory services by emergency physician, and enable the optimal utilization of laboratory tests based on decision analysis methodologies.

Cost effective and patient relevant laboratory tests only should be undertaken to control and prevent the misuse of laboratory tests. Hence, we believe in restructuring the current laboratory test profiles to match the pattern of logical clinical thinking and their treatment.

This study proved the reduction of patients attending the accident and emergency department, and reduction of laboratory investigations, which meant saving BD. 276000 per year.

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