

Efficiency of triage in the emergency department of an urban academic clinical hospital - a retrospective study

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ABSTRACT

This is a retrospective study using a hospital electronic database incorporating a total of 82,666 patients, from March 1st, 2015 to February 28th, 2017, who underwent triage in an urban, academic clinical hospital emergency department (ED) and were treated in the Internal Medicine Emergency Department (IMED) and the Surgery Emergency Department (SED). The primary outcomes were the distribution of patients in triage categories, performance indicators and length of stay (LOS) in the ED. The percentage of patients assessed and treated within the recommended timelines for Australasian Triage Score (ATS) Categories 1, 4 and 5 were within the recommended limits. In ATS Category 2, the IMED achieved a 59.99% efficiency rate and the SED a slightly higher rate of 62.6% whilst an ideal target would be 80%. Similarly, in ATS Category 3 patients, the IMED only achieved an adherence of 66.95% and the SED 65.67% as opposed to the 75% performance threshold. Overall, on a monthly basis, in the IMED, 1806.96 patients were assessed and treated; their average length of stay (LOS) was 4 hours and 57 minutes. In comparison, in the SED, 1719.5 patients were assessed monthly, with an average LOS of 2 hours and 40 minutes. Considering our results, we conclude that extra staff and resources should be deployed in order to achieve better performance indicators in the second and third ATS Categories and to decrease the LOS in the ED in order to ameliorate the quality of care and patient access.

Key words: efficiency, organizational, emergency service, hospital/organization & administration, length of stay/statistics & numerical data, patient admission/sta-

tics & numerical data, time factors, triage/statistics & numerical data, croatia.

INTRODUCTION

As patients present simultaneously to the Emergency Department (ED), triage is an essential function that enables staff at the first point of contact, to assess a patient's clinical urgency and thus allocate them to the appropriate treatment area in a timely manner. (1) The ED at our urban academic clinical hospital has adopted the Australasian Triage Scale (ATS) as implemented by the Australasian College of Emergency Medicine (ACEM) and the triage process is carried out by specifically trained Triage Nurses. The ATS aims to provide a timely assessment of all people who present to the ED based on clinical criteria. The ATS has five levels of acuity: immediately life-threatening (Category 1), imminently life-threatening (Category 2), potentially life-threatening or important time-critical treatment or severe pain (Category 3), potentially life-serious or situational urgency or significant complexity (Category 4) and less urgent (Category 5). (2) The time-to-treatment criteria as outlined in the ATS categories, describe the maximum time a patient can safely wait for medical assessment and treatment (response time). The performance indicators describe the minimum percentage target adherence per ATS category that are expected to achieve the ideal time-to-treatment criteria, which are 100% for Category 1, 80% for Category 2, 75% for Category 3 and 70% for Categories 4 and 5. In situations where achievement of a performance indicator is at risk, organizational strategies should be implemented to satisfy demand and meet clinical needs. (3) The underlying principles of triage are

justice and efficiency, meaning the distribution of resources for treatment is fair and the best use is made of all available resources. (4) Since EDs experience an overwhelming demand from patients encompassing an enormous range of conditions, they are not entirely satisfied because of the limited amount of resources in the ED. Achieving the greater good for the greatest number of patients requires resource allocation on the basis of need which in turn requires a process to identify and prioritize the needs of the presenting population. (4) In order to improve the quality of patient care, we analyzed triage efficiency in our ED.

MATERIALS AND METHODS

This is a retrospective study using information obtained from the hospital electronic database dating from March 1st, 2015 to February 28th, 2017. It included a total of 82,666 patients who underwent triage in an urban, clinical hospital ED and were treated in the Internal Medicine Emergency Department (IMED) and the Surgery Emergency Department (SED). We used descriptive statistics and the official hospital program. The primary outcomes were the distribution of patients in triage categories, performance indicator and LOS in the ED.

RESULTS

Most patients assessed and treated in the IMED were ATS Category 3 patients (21,068 patients or 50% of the total number of patients seen) whereas in the SED most patients were from a lower, Category 4 triage (25,744 patients or 64% of total num-

Table 1. The total number of patients assessed and treated in the Internal Medicine Emergency Department (IMED) and the Surgery Emergency Department (SED) from March 1st, 2015 to February 28th, 2017 according to their Australasian Triage Score (ATS) categories.

ATS Category	Response time1	Performance threshold2	Patients in IMED3	Wait time in IMED4	Efficiency of IMED	Patients in SED5	Wait time in SED6	Efficiency of SED
1	Immediately	100	204	0:00	99.51%	55	0:00	96.36%
2	10 min	80	3062	0:14	59.99%	393	0:13	62.60%
3	30 min	75	21068	0:36	66.95%	7251	0:30	65.67%
4	60 min	70	16732	0:51	74.12%	25744	0:40	81.92%
5	120 min	70	1262	0:44	90.89%	6895	0:45	93.89%

1 Maximal recommended wait time from the first point of contact at triage in minutes

2 Minimal percentage of patients in which the ideal target time is expected

3 Total number of patients assessed and treated in the IMED

4 Average wait time from the first point of contact at triage in the IMED

5 Total number of patients assessed and treated in the SED

6 Average wait time from the first point of contact at triage in the SED

ATS, Australasian triage score

IMED, internal medicine emergency department

SED, surgery emergency department

Table 2. Comparison between patients assessed and treated in the Internal Medicine Emergency Department (IMED) and the Surgery Emergency Department (SED) from March 1st, 2015 to February 28th, 2017.

	IMED	SED
Average number of patients assessed and treated monthly	1806.96	1719.50
Average Patient Length of Stay (LOS) from assessment to treatment and release (T&R) (hours:minutes)	4:57	2:40
Average number of patients per month that are assessed, treated and released/hospitalized within 60 minutes	121.25	313.95
Percentage of total patients per month that are assessed, treated and released/hospitalized within 60 minutes	6.76 %	18.26 %

IMED, internal medicine emergency department

SED, surgery emergency department

LOS, length of stay

T&R, treatment and release

ber of patients seen) as can be seen in Table 1. The percentage of patients assessed and treated within the recommended ACEM timelines for ATS Categories 1, 4 and 5 were within ideal limits. In ATS Categories 2 and 3, a lower percentage of patients were assessed and treated within the ideal time frames. ATS Category 2 patients should be seen within the recommended 10-minute time frame. The IMED achieved a 59.99% efficiency rate and the SED a slightly higher rate of 62.6%. A minimal target should be 80%. Similarly, in ATS Category 3 patients, the IMED only achieved an adherence of 66.95% and the SED 65.67%. The recommended time frame of 30 minutes should have an ideal adherence of at least 75%. The greatest impediment was in the adherence time in the IMED for ATS Category 2 patients with an assessment and

treatment time of 14 minutes. This is 40% longer than the recommended 10 minutes. Paradoxically, patients assessed in the lowest ATS Category 5 in the IMED had an average shorter wait-time (44 minutes) than patients in Category 4 (51 minutes). Overall, on a monthly basis, in the IMED, 1806.96 patients were assessed and treated, their average LOS was 4 hours and 57 minutes, and only 121.25 patients per month were discharged from the ED within 60 minutes which accumulated to 6.76% of all patients (Table 2). In comparison, in the SED, 1719.5 patients were assessed monthly, with an average LOS of 2 hours and 40 minutes, with 313.95 patients discharged within 60 minutes, thus a higher discharge rate per hour of 18.26%.

DISCUSSION

Our results show failure to meet the performance indicator threshold for patients in ATS Categories 2 and 3. Delay in examination times of patients in ATS Category 3 is even more significant since it has been shown by Doherty et al. that these patients have the highest number of total admissions and the highest number of deaths post-admission. (5) In comparison to other EDs, ATS Category 4 and 5 patients represent approximately 41% of ED presentations in Australia compared to our 43% and 81% in the IMED and the SED respectfully, and 61% for all patients in total, which is substantially higher than the Australian average. (6) Particularly in the SED, 61% of patients designated ATS 4 and 5 Categories represent the majority of the workload. Similarly, in a Greek ED, “non-urgent” cases were found to consume more time than other cases. (7) Although, Schull demonstrated that low-complexity ED patients are associated with a negligible increase in ED LOC and a negligible increase in time to first physician contact for other ED patients, meaning that reducing the number of low-complexity ED patients is unlikely to reduce wait-times for other patients or lessen crowding. (8) In

our study, only 6.76% and 18.26% in the IMED and the SED respectively, are admitted or discharged from the ED within 60 minutes. This is ambiguous as we have no data as to the triage acuity level of these patients. Seeing that 61% of patients in the SED are Category 4 and 5 and only 18.26% are resolved within 60 minutes, that would imply that these patients were more complex even though less urgent. (9) Length of stay for ED patients in the IMED (4 hours and 57 minutes) is lengthier in comparison to the 2 hours and 37 minutes in a Hong Kong ED, keeping in mind that comparing ED performance should be assessed for similar hospitals. As stated in the aforementioned study and other research, a variety of factors influence the LOS, including communication within the medical department, blood result time, admission waiting time, bed availability and radiology wait times. (10, 11) To assess and manage ED workload, other factors should be considered which are not in the scope of this research. There is evidence to suggest that other variables such as the amount of procedural work required, arrival by ambulance, level of trauma, patient complexity and other co-morbidities contribute to patient volume and the perceived level of urgency. Since the ATS in its current

form can only be used to describe urgency, separate measures are needed to describe the level of severity, complexity, workload and staffing issues in the ED. (12 - 14) Research shows that implementing leaner techniques and process evaluation in the ED leads to a more uniform patient flow. (15) There is evidence to suggest that better ED design can shorten the average wait times and LOS, despite an overall increase in patient census. (16) For example, the opening of a fast-track area has improved ED effectiveness (measured by decreased wait times and LOS) without deterioration in the quality of care provided (measured by rates of mortality and revisits). (17)

CONCLUSION

Based on our results, we conclude that an increase in staff and resources should be deployed to ameliorate performance indicators in the second and third ATS Categories, which would decrease the LOS in the ED, thus increasing the quality of care and patient access. A detailed assessment and an upgrade of ED design should be conducted to improve the efficiency, quality and safety of patient care.

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