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SPECIAL COMMUNICATION

SETTING UP TRIAGE SERVICES IN THE EMERGENCY DEPARTMENT: EXPERIENCE FROM A TERTIARY CARE INSTITUTE OF PAKISTAN. A JOURNEY TOWARD EXCELLENCE

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The history of triage started from the French battle field for prioritizing patients. Emergency triage was started in early 1950's in USA in order to treat the sickest first. It has now become an integral component of all emergency departments (ED). The basic aim of triage is not only to sort out patients according to the criticality of their illness, but it also serves to streamline the patient flow. This will ultimately enable the ED physician to provide right management at the right time to the right patient in the available resources. In turn has a positive impact in reducing the ED overcrowding. The history of triage at AKUH-ED dated back in 2000. In the beginning physicians and nurse both were assigned to triage desk where they use to sort out the patient according to presenting complaints. At that time the documentation was manual with locally developed triage priorities. With the expansion of ED in 2008, responsibility of triage was shifted to nursing services. Triage policy was established and implemented. Specific triage protocols were developed for guidance and uniformity of care. Manual recording system was replaced by computerized triage data entry software. Enabling the department to monitor patient quality care indicators like total number of patients triaged, triage category, lag time reports and left without being seen by physicians.

Keywords: Triage, Emergency department, Pakistan

INTRODUCTION

Historically Emergency departments have provided treatment to every one visiting any time 24/7.[1,2] Currently hospital emergency departments (ED) have emerged as an important entry point for accessing health care because of lack of effective primary health care infrastructure.[3,4] For these reasons EDs are serving increasing number of patients having conditions ranging from life-threatening to mild illnesses worldwide.[5] Studies have shown that around 50% of ED visits are because of non-urgent complaints.[2,6,7] This has resulted in inappropriate utilization of ED resources and overcrowding which may lead to multiple adverse consequences. Thus it has become trivial that the patients arriving for emergency care need to be assessed and sorted out according to their priority of their illness, irrespective of their order or arrival and other factors like sex, age, socioeconomic status, nationality or race etc.[8]

This process of classification is termed as triage which had adopted from a French word "Tier" which means sorting out patients.[9] Triage is an integral part of Emergency Department (ED) functioning.[10] In response to the increasing number of patients visiting ED every day, triaging system assumes a central role in distributing the workload of ED and catering the most urgent medical problem requiring immediate medical care.[11,12] It is also important for redistribution and reduction of waiting times, increasing the effectiveness and efficacy of ED and improving the quality of care by effective organization.[9,13] The earliest documented record of triage use in ED as a system was in the early 1950s at USA. However, this and other early systems lacked formal structure and organization.[14] There were no accepted standard criteria for triaging. Individual institutions formalized systems based on variable categories according to their own experience and need. Despite the need for a uniform triage guideline, majority of countries did not have any accepted triage tools at a local level. Most current triage tools are based on a categorical measurement acuity scale of three, four or five-level. The Australasian Triage Scale, the Canadian Triage and Acuity Scale, the Manchester Triage System, and the Emergency Severity Index are all five level triage tools.[15–22] Common factor in use by majority of the triage systems is the severity of the patient's condition based on time to intervention. The further definition of these categories differentiates the scales from one another with different criteria for severity of disease. Immediate medical care plays a role in reducing mortality and morbidity especially in developing countries. The key to achieving adequate care lies in appropriate planning.[23,24] Elizabeth *et al*. emphasized that by improving triage and emergency care in resource constrained setting, patient mortality can be decreased by approximately 10%.[25] Unlike developed countries where the importance of triage had been well recognized, awareness of triage trends at EDs of developing countries like Pakistan are still lacking.

Emergency Medicine and Triage concept in Pakistan:

Emergency medicine is a recently evolved medical specialty in Pakistan with the aim of providing management of unexpected illness and injury round the clock.[1] In Pakistan the need and scope of emergency medicine has been realized in recent past and is still in infancy.[3–5] Till lately, when emergency medicine was not considered as a specialty, Emergency rooms of medical college – affiliated hospitals is run by a full time practitioner called Chief medical officer being trained in medicine or surgery. Emergency rooms of private hospitals are staffed by moonlighting or shift based house staff. No triage system has been developed for ED in Pakistan at local or national level and patients are being catered on first come first basis.[5] The lack of knowledge and awareness has failed Pakistan's Emergency Departments to reach modern practices of triage. By developing a triage system public health working can be facilitated by developing triage software in low and middle income countries. ED burden can be identified along with catchment area, clinical pathology, diseases pattern and outbreaks in minimal time. This would result in development of better ED policies, curriculum design for ED training etc. Keeping this need in mind it was intended to implement a well-defined triage system at AKUH – ED, the first of its kind in Pakistan.

Triage Implementation at AKUH–ED:

The Aga Khan University Hospital is a 550 bedded tertiary care hospital located in Karachi Pakistan. Around 48000 patients visit AKU-ED annually. Out of those, 37% admitted to the hospital for further management.[6] AKUH–ED was initially a section working under medicine department; later in October 2008 it was recognized as a separate department. At present AKUH–ED is a 51 bedded facility with resuscitation area, adult critical care area, adult non critical care area, a well designated 10 bedded paediatric area, fast track clinic and clinical decision unit for short duration admission.

Since the starting of AKU in 1983 there was a functioning emergency room with no existing triage system. Triage desk in AKUH -ED started in the year 2000 with manual documentation. At that time there was no policy and no objective guidelines for triaging the patients. The decision regarding urgency and criticality of illness was solely based on triage physician. With the expansion of ED and based on past experience, it was realized that patient care needs differ with criticality of their illness. Eventually this has highlighted the need of patient's prioritization at the triage desk facilitating patient centred care right from triage.

Observations that led to development of clear cut triage protocols and policy are; increase in the numbers of patients visiting AKU-ED, a gradual increase of critical patient population, diversity in patient referrals, i.e., outside referrals coming from various parts of Pakistan, avoiding variability in the physician decisions at triage counter and establishing a system of care whereby uniformity of care is provided to the patients as per their respective severity.

To address all these issues a multidisciplinary team from ED was formed comprising of senior physicians, nursing leadership and administrative staff. Triage implementation plan was decided after detail discussion and several meetings. Nursing staff was trained and triage responsibility was then handed over to them. The important variables of improvement plan are as follows

a) **Triage policy:** It described about the scope, triage procedure and patient flow through triage counter to inside ED after their arrival to different patient care area.

b) **Triage Protocol:** The team reviewed several triage protocols implemented in different countries like ESI-IV (Emergency Severity Index), Canadian Triage & Acuity Scale (CTAS), Australian Triage Scale (ATS). As these scales and protocols would have limited applicability in developing countries, the team comes up with Four level priority protocol (P1-P4), where P-1 is life threatening, P2-Emergency, P3-Urgency & P4- stable/walk-in patients which was then revisited in 2010 according to ESI IV to 5 level triage. (Figure-1)

c) **Development of Triage data entry software:** The IT department of institution was asked to develop triage data entry software named Emergency Room Management System (ERMS) which would replace the manual register entries. ERMS application consists of Oracle database containing schema for dictionary tables with data and transaction tables, main exe of the project which is deployed on the application server, all associated dlls and ocxs of the project deployed on application server and external components deployed on application server.

d) **Functionality of ERMS / ADT system**
Emergency room management system and admission discharge and transfer system is basically a system developed by information technology department and deals with the data management of ED. The data based consists of comprehensive documentation of all relevant patients' detail that is arranged in various heads and can be retrieved both electronically and in the form of hard copies. Operational working of

this system is user friendly. User initially enters user identification (ID) and password, subsequently ERMS menu appears which has various icons. Most important icons are related to triage patient assessment, triage patient flow, triage patient detail which includes bed designation detail of the patient in ED as well as the discharge disposition status, i.e., (LAMA, LWBS, Admit, Sent home and observation). Triage patients list is an all-inclusive triage summary that not only highlights patients detail but along with these details also provides information about patient priority ratings and clinical details in terms of describing the symptoms. Based on these data we have the options of generating customized reports that are related not only to triage but also to ED floor. Reports that are at the disposal of user include ED statistical volume report, clinical decision unit report, gross physician revenue fee report, triage patient flow report and triage patient list.

Admission discharge and transfer system is basically concerned with the relevant patient detail on ED floor. This includes patient turnaround times, ED patient flow lag times and length of stays details. As far as the ED turnaround times are concerned not only the specific data bases are available but based on that customized turnaround times report can be generated and that too in two different dimensions, i.e., turnaround times report by clinical discipline and turnaround time report by patient locations. This report enables the user to analyze clinical decision times, admission times and transfer time of patients being managed on ED floor. ED process flow has inherent lag times that are now being measured through ED lag time report. Six different dimensions of ED lag times are being monitored at the moment and are available for analysis as per requirement. They are as follows

1) Time lag between Triage and ED registration (Door to ED floor)
2) Time lag between ED registration to bed request (clinical decision time for admission)
3) Time lag between bed request to inpatient admission (admission time)
4) Time lag between inpatient admission and patient departure from ED (transfer time)
5) Time lag between ED registration till discharge summary (Clinical decision time for discharge)

6) Time lag between discharge summary to actual discharge

Holding the gains In Emergency Department Functioning:
Total number of patient visits, their triage time and time they were assigned bed in ED, their Triage category, main complaints, vital sign, length of stay in ED, flow pattern over 24 hours period ,disposition, number of patients left without being seen after triage and return visits within 48 hours all can be monitored. Using this software we generated report from Jan2011 to December 2011. Total of 55,629 patients were triaged, out of them 48,743 patients were seen and managed in ED. Out of those 7782 (15.96%) were P-1, 7945 (16.29%) were P-2, 25894 (53.13%) were P-3, 6008 (12.32%) were P-4 and 1114 (2.30%) were P-5. (Table 1) One more important information we now able to retrieve is "Patients Left Without Been Seen" (LWBS) which is around 12.37% (6886) between Jan–Dec 2011. (Table 2) They are those patients who upon arrival were triaged by nurse but while waiting to be taken inside ED and seen by physician for evaluation they left. In modern emergency department left without being seen is very important indicator for measuring overcrowding and by analyzing its data patients flow can be managed. It was this information who helped us to establish ED clinic in afternoon for follow up and for walk stable for P-4 and P-5 patients when the flow of the patients on its peak. This step helps to control ED overcrowding and try to minimize patients who left without being seen.

Strength of Triage Software:
Currently there is no existent surveillance system in EDs anywhere in Pakistan. This experience was first of its kind. After implementing this software we were able to have better monitoring and surveillance for patient flow in ED. Patients could be directed to appropriate area in ED where they received timely care with judicious resource utilization. ED overcrowding could be better handle and minimize left without been seen. Report from this system could be extracted on monthly or quarterly basis which ultimately will enable us to improve quality of patient care.

Limitation of Triage Software:
The major limitation for the software is that it is implemented in a single institute. It is not ICD 10 codded, therefore lacking uniformity.

Table-1: ED volume statistics for the year 2011 through ERMS

Volume variable	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
PI (n) (%)	1754 (16)	2160 (18)	2073 (16)	1795 (14)	7782 (15.96)
PII (n) (%)	1535 (14)	2160 (18)	1814 (14)	2436 (19)	7945 (16.29)
PIII (n) (%)	6469 (59)	5761 (48)	7126 (55)	6538 (51)	25894 (53.13)
PIV (n) (%)	1096 (10)	1560 (13)	1685 (13)	1667 (13)	6008 (12.32)
PV (n) (%)	110 (1)	360 (3)	259 (2)	385 (3)	1114 (2.30)
Total Patient Triage	13324	13859	14649	13797	55629

Table-2: Admission discharge & transfer statistics for the year 2011

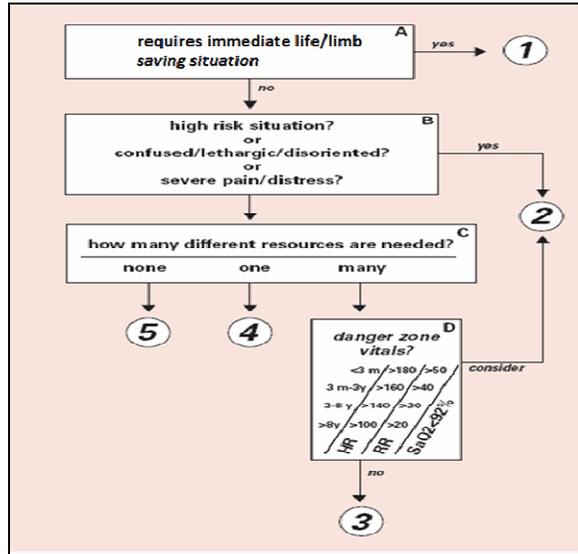| Volume variable	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Adult (n) (%)	7432 (68)	8896 (74)	9271 (72)	9233 (72)	34832 (71.46)
Pediatrics (n) (%)	3532 (32)	3105 (26)	3686 (28)	3588 (28)	13911 (28.54)
LWBS(n) (%)	2360 (17.7)	1858 (13.40)	1692 (11.55)	976 (7.07)	6886 (12.37)
LAMA (n) (%)	439 (94)	745 (6.210)	707 (5.46)	718 (5.6)	2609 (5.35)
Admissions (n) (%)	4020 (37)	4479 (37)	4422 (34)	4390 (34)	17,311 (35.51)
ED Visits	10,964	12001	12957	12,821	48,743

Figure-1: Five level triage categorization ESI IV

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