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Review Article

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Triage for low income countries: is ESI truly the way forward?

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ABSTRACT

A triage desk at the doorstep of an emergency department (ED) is to "sort, select or prioritize" presenting patients as per their clinical needs. Many triage systems exist globally, however, the need and/or practical applicability of any triage is dictated by the hospital system and setting. In low-income/developing countries, the triage system must be capable and proficient enough to pair the right patient with the most appropriate management. Ineffective and/or inefficient triage leads to overcrowding, delays, inappropriate resource utilization and patient dissatisfaction. A sizeable proportion of triage systems rely on three to five levels/tiers. Five level triage systems, such as the Australian Triage System (ATS) and the Canadian Triage Acuity Scale (CTAS), to name a few, are widely used worldwide. Based on door-to-physician time, these systems not only allow the institution to monitor and meet the timelines recommended by the institution policies, but have also been identified as an effective triage tool hence widely adopted in hospitals of developed countries. However, both ATS and CTAS are time-consuming and require skilled and qualified nursing staff to process it. On the other hand, the ESI (Emergency Severity Index) scale which is also a 5-level triage system, categorizes patients based on resource requirement and severity of the patient's condition. Although ESI is in the developing phase, it is proving to be nurse-friendly and reliable in both intra and inter-rated conditions. The aim of this paper is to critically analyze the merits and pitfalls of the ESI system, in addition to proposing further modifications, in order to fulfill the needs of a developing country.

Keywords: ESI, Nursing friendly triage, Low income countries

INTRODUCTION

Triage is derived from the French word "tier" which means "to sort/separate or select". It is the process of determining disease severity and prioritizing patients as per their medical urgency in health care settings like hospital emergency departments (EDs). Owing to its dynamic nature, triage guidelines must be plausible, understandable and measurable, and should be developed by experienced health care providers. Triage in LIC (low income countries) is based on the need of clinical condition and should be able to predict severity and outcomes of disease, along with resource requirements.

After the first medical triage system which was developed during the French War, there was no improvement in it until World War II. The emergency triage is a relatively modern approach. It was first introduced during the 1950's in the US.² This was later modified to a need based entity in order to prioritize patients according to the urgency of health care needed.³ Later in the 1970's, an Australian physician developed a 5-level triage system.⁴ By the 1990's, most developed countries formulated and introduced their own ED triage systems, mostly influenced by the seminal work of FitzGeral on 5-level scales.⁵⁻⁸

Table 1: International triage systems. 10

| Australian (ATS) | | Manchester (MTS) | (SL) | Canadian (CTAS) | | Emergency Severity Index (ESI) | erity | South African Triage System (SATS) ⁽¹⁸⁾ | ın Triage FS) ⁽¹⁸⁾ |
|-----------------------------|-------------------------|------------------------|-------------------------------|-----------------------------|-------------------------|-----------------------------------|-------------------------|---|----------------------------------|
| Level | Physician response time | Level | Physician response time | Level | Physician response time | Level | Physician response time | Level | Physician response time |
| 1=Resuscitation 0 Immediate | 0 Immediate | 1=Immediate (Red) | 0 Immediate | 0 Immediate 1=Resuscitation | 0 Immediate 1=Unstable | 1=Unstable | 0 Immediate 1=Red | 1=Red | 0 Immediat e |
| 2=Emergency | ≥10 | 2=Very Urgent (Orange) | ≤10 | 2=Emergent | <15 | 2=Threatened Minutes | Minutes | 2=Orange | <10 |
| 3=Urgent | <30 | 3=Urgent (Yellow) | 09> | 3=Urgent | <30 | 3=Stable | 09> | 3=Yellow | 09 > |
| 4=Semi-urgent | 09> | 4=Standard (Green) | <120 | 4=Less Urgent | 09> | 4=Stable | Could be delayed | 4=Blue | < 120 |
| 5=Non-urgent | ≤120 | 5=Non-Urgent (Blue) | <240 | 5=Non-Urgent | <120 | 5=Stable | Could be delayed | 5=Green | < 240 |

Triage system may either be comprehensive or focused.⁹ A comprehensive triage system comprises of a detailed history and clinical examination. It is relatively more accurate in early identification of life threatening emergencies and timely allocation to the appropriate management area with improved patient and their dependents' satisfaction. This may be augmented by a simple "two-tier triage" system, to minimize prolonged waiting times while improving the accuracy of the triage. In this system, the patient is seen by a triage nurse and is initially categorized as per disease acuity. The patients are then reassessed in few minutes by another nurse for their vitals and visual assessment of clinical severity and/or pain scale etc. to rule out the need for critical or urgent care.9 In case of reduced patient load and/or more available bed space, a triage bypass system allows the triage counter to be temporarily disbanded, resulting in a decrease in waiting times and backlog.

A focused triage system, on the other hand, relies on brief histories and basic screening/assessments, and thus, could potentially benefit resource limited countries. Even though this requires less time and limited resources to process, it has its downsides: reducing patient satisfaction and increasing the chances of being over-triaged to name a few.

Depending on the need and local experiences, many countries developed their own functional triage systems. A few examples include the Australian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS), the Manchester Triage Scale (MTS), the South African Triage System (SATS) and the Emergency Severity Index (ESI).

The ATS has been practiced in Australia since 1994. This is a 5 level system where 1 is the most critical (resuscitation) and 5 is the least critical (non-urgent). 10-12 ATS provides the platform for triage scales practiced in various other countries such as the UK, Canada, Brazil, Hong Kong and Belgium. 13-15 ESI utilizes a 5 level triage acuity scale as well, and has been widely implemented across the US since 2000. 16 Conversely, Finland, France, Germany, Hong Kong, Japan, South Africa (Cape Town) and many more have developed their own triage systems. [Table 1 compares a few of the key triage systems mentioned above]. Even though many European countries still lag behind in terms of identifying an independent scale based on their populations as well, developing and implementing an ideal, uniform triage scale for low income countries is an even bigger ask.⁵ Inadequate literature on triage systems from LICs further amplifies the crisis during rush hours in ED and may lead to missed critical patients hence delays in their management.

EDs worldwide face similar challenges that are affecting service delivery. For instance, increasing number of ED visits, more complex/critical disease presentations, and limited resources, not just in the ED, but the hospital as a

whole, result in overcrowding and limited output. Furthermore, increased number of patient and work load on ED physician due to inability of the system to capture the needy first, other than failure to retain trained physicians and nurses, has evolved into an escalating challenge for most ED's. Hence, the most appropriate triage system for LICs with limited resources and rapidly increasing number of patients with higher acuity levels urge the need to identify the most suitable triage system for their use.

The aim of this paper is to discuss the potential benefits of using the ESI, keeping in mind the resource limited nature of developing countries, and how the triage system may be further modified to minimize its shortcomings in LIC settings.

TIMELINE

Like most triage systems, and as mentioned above, ESI has five levels. Most triage systems ask the question "How long can the patient wait before being evaluated by the physician in the ED". However, in the ESI system, time limits are not defined, other than for the emergent patients or those with life threatening conditions. Despite depending on the criticality of the patient and resource requirement, waiting times for all ESI categories are optimal as compared to other triage system; possibly due to the focused triage approach employed by the ESI. 17,18

USER DEPENDENCY

Considering the simplicity of the ESI algorithm, the initial two categories are simple and dependent of visual assessment of dying or can wait, however vitals play an important role in differentiating category two and three, if vitals are abnormal (respiratory rate, heart rate, oxygen saturation, temperature, blood pressure and pain score) and if normal vitals labeled as category two, else category 3. Hence only a short training is required for the nurses to follow the ESI triage system effectively. Patients who requiring minimal resources are considered stable and can be diverted to more stable patient care area or walk in area. In comparison, the Manchester Triage System (MTS) has 52 flow charts for different clinical presentations that the triage nurse must follow. This requires extensive training in order to learn the complex algorithms, which in turn drains the already scant resources, making it impractical for a developing country to adopt.

Additionally, user satisfaction ratings amongst different triage system nurses identified ESI as more effective, accurate, easier to use, and satisfying with reduced subjectivity for end users as compared to other triage tools. ¹⁹

RELIABILITY AND VALIDITY

A triage system being valid and reliable is essential to combat overcrowding in ED, while ensuring that

critically ill patients are seen in time. ²⁰ Studies report that 5-level triage systems like ESI are more reliable and accurate as compared to 3 to 4-level triage systems. ²¹ Patient assessment with ESI levels I and II, especially vital signs charting, have been found to be superior in recognizing high-risk patients. ²² Although limited literature is available from developing countries regarding the validity of ESI, research has been conducted in developed countries to assess the inter-rater and intra-rater reliability of ESI. ^{17,23} The results have been promising so far as one clear benefit of ESI is the rapid identification of patients that need immediate attention and quickly sorting of patients in constrained resource settings. ^{16,20,23-28}

IMPROVEMENT IN ED OUTPUT

The ESI triage helps in rapidly sorting patients in the ED and hence improves flow of patients through the emergency room; This results in an improvement in the hospital's output. Additionally, the ESI reduces congestion in the ED as levels I and II are seen immediately, and more stable and low acuity patients may be referred to fast track clinics within the same or other hospital setups.

TRIAGE AND DIVERSION POLICY

Developed countries have established proper communication channels between hospitals and ambulance services. This results in appropriate and efficient diversions in case the ED is full. In LICs, however, communication channels are primitive, if at all present. A quick focused triage, therefore, becomes a need of the hour and allows full EDs to immediately reambulate the patient or, at least, manage the "category I" patient and make arrangements for safe transfer to the best available ED/hospital.

COMMUNICATION AND PATIENT SATISFACTION

Triage nurses using ESI reported it to be an effective method for representation of patient acuity with more categorical and evident based assessments e.g. vitals. This system surpassed affectivity of the former 3-level triage scales used by Wuerz et al.²⁹

IMPLEMENTING 2-TIER SYSTEMS IN ESI

During periods of high influx, the 2-Tier system (detailed above) in ESI enables reduction in excessive triage delay, by accelerating the assessment and management process. This in turn leads to an increase in patient satisfaction and improvement in quality of care. By reducing the chances of a bottle neck occurring at the triage, this system also has the potential to minimize litigation due to delay in care provision (LWBS).

PITFALLS

No triage system is ideal and there is always room for improvement e.g. ESI doesn't have provisions to monitor ED physician performance as opposed to the other triage systems like CTAS. ²¹ Furthermore, due to the system's reliance on a focused triage, nursing staff may find themselves continuously re-triaging less acute patients. It is important to note that this system is still in its developing phase, and warrants further study especially in the pediatric, geriatric and obstetric patient populations. ¹⁶

Though ESI is able to recognize higher risk patients however most patient falls under the grey area of P3 Category, with abnormal vitals the patients may be categorized as higher risk or vice versa.

CONCLUSION

ESI, 5-level triage systems doesn't require extensive training and years of experience to process effectively along with its efficiency and accuracy in triaging coupled with minimal resource requirements, makingit best suited for developing countries and LICs.

Recommendations

A national triage system should be locally developed as per the requirement, available resources and can be generalized in most hospital both rural and urban settings.

The triage system should be simple, easily and rapidly applicable, understandable, able to standardized and generalize-able for all ages in busy EDs and able to predict clinical outcomes.

Adoption of ESI is a reasonable stepping stone towards developing a true standard for triage acuity assessment that facilitates benchmarking, public health surveillance, and research.

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