ADVANCED EMERGENCY DEPARTMENT PROTOCOLS: SKILL-BASED INTERVENTIONS FOR WOUND MANAGEMENT AND RAPID TRIAGE

Deepa Mogilivaripalli kurapathi

Independent Researcher,USA.

Abstract

This paper aims at explaining the required changes in ED protocols of Northwestern to increase the efficiency of treatment by using skill-based interventions and rapid triage of patients. The main problem here is that with growing number of patients and complexity of emergency cases the traditional linear type of work usually does not guarantee adequate and efficient patient management. These interventions come in the form of practice guidelines, professional development training and the application of information technology with the goals of increasing patient throughput, decreasing overbooking and worsening patient condition automobile. The paper analyzes the existing literature, ways of protocol application, and pilot studies. The study underlines the positive effects of the standardized care pathways and gives further suggestions for the future that may include the use of AI, remote training, and inclusion in national preparedness plans

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1. Introduction

As the number of patients and needs of a population visiting the EDs has increased significantly, the need to adapt the ED care provision to increase the efficiency and specialisation of the services. Past conventional care models are fiancé-centric hence, do not put into consideration the most critical care that would be needed at that particular time hence delay arises. Integration of ED tracks imply the implementation of the advanced protocols that are based on skill in supporting clinical diagnosis and navigation of patients. Among them, the control of wounds and the expeditious assessment into the degree of urgency of care needed fall out as areas that require more attention. Some of these areas can be well served if techniques are put into practice within the mentioned areas, and these include; Cutting down on wait times, enhancing recovery outcomes and also resource utilisation within the high pressure emergency care setting.

2. Literature Review

2.1 Evolution of Emergency Department Protocols

According to Gilboy et al., 2011, Emergency departments on the other hand have always been serving patients based on the order of arrival or presenting complaints without much consideration as to how severe the cases were or in what specialty they fell under. Since the subject of patients and the treatment of cases was broad, deepening in terms of growing populations and newly arising and severe terminologies, founding proper structured dealing, and methods based on proven evidence became the need of the hour (Gilboy *et al.,* 2011). The problem of underinvestment lagged improve arrangements for waiting lists and did not focus on long-term goals for patient care in the early phases of the models.
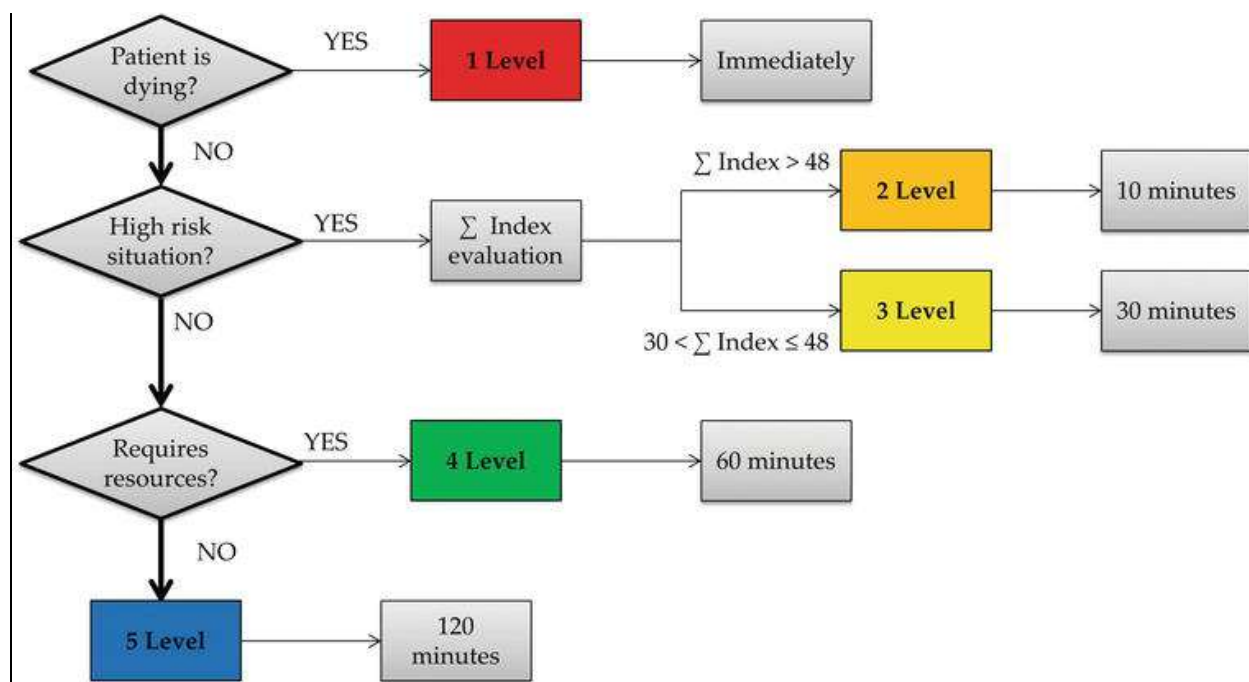
Figure 1: Triage algorithm for emergency management

(Source: https://www.intechopen.com/chapters/54838)

At the late 1900s, new models of emergency care processes started being established in hospitals and include triage systems, as well as the use of a decision making algorithm. This transition stands out from the general care plans that most nursing organizations had earlier adopted to new ones that where initiated to improve safety and effectiveness. It stepped to the new century with focus on the efficiency of the procedures, the timely intervention, and the clinical specialties. This has paved way for more appropriate care especially of wounds and triage nursing care to various specialties.

2.2 Skill-Based Interventions in Wound Care

According to Berger et al., 2013, This paper aims to investigate the barriers in relation to wounds and, more specifically, wound care management within the emergency department of a major London National Health Service (NHS) hospital. Some of the clinical measures including negative pressure wound therapy, moist wound healing environments, and antimicrobial dressings have been found, when implemented properly, to enhance the clinical results. That being so, their efficiency highly depends on the experience and qualifications of the staffers managing such patients (Berger *et al.,* 2013). The skill based interventions suggest goals of carrying out precise analysis of the wounds, accurate methods of cleaning the contaminated area, and selection of

dressings in accord with the type and extent of the wound. Several attempts have been made in the past years to advance the clinical training in this area and the certification on wound care. To ensure that clinicians are up to date in their knowledge, there is use of simulation based education, hands on workshops as well as continuing professional development (CPD) modules. Some of the quality areas have demonstrated that the effectiveness in the teaching and practice of the competencies enhance the healing rates, patient satisfaction and decreased re-admission. Due to diabetes and immunosuppression, wound complexity inevitably increases, and for such patients only structured interventions would be safe as well as financially efficient.

2.3 Strategies for Rapid Triage Implementation

According to Farrohknia et al., 2011, Triage is an integral part of the emergency departments as that serves as a way of categorizing the patients depending on the level of their ailment. The currently used systems include the Emergency Severity Index (ESI) and the Canadian Triage and Acuity Scale (CTAS) in which patients are placed into arbitrary levels to inform calls for haste.

Level	Urgency	Estimated Time to be seen	Place
Level 1	Resuscitation	Immediately	Emergency
Level 2	Emergency	Within 15 min	Emergency
Level 3	urgency	Within 30 min	Emergency
Level 4	Less urgency	Within 60 min	Local health center
Level 5	Non urgency	Within 120 min	Local health center

Figure 2: Canadian Triage and Acuity Scale System

(Source: https://www.researchgate.net/figure/Canadian-Triage-and-Acuity-Scale-System-SQUH-EMD-LEAFLET-01-2016_tbl1_370204404)

This depends on the initial nurse assessments and therefore is so much dependent on human factors (Farrohknia *et al.,* 2011). To this effect, new technology-enhanced triage systems have been developed to overcome these limitations. Presently, there are algorithms that engage artificial intelligence in making the triage levels on the basis of patient's history, current clinical signs, and symptoms. These systems have, especially been proven to provide reliable and fast results in a high throughput capacity. Furthermore, main features of mobile triage applications and electronic medical records (EMRs) including triage features provide higher accuracy of data and effective coordination between caregivers. Incorporate with skills composed triage training, such

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technologies can lessening misclassification possible and more importantly, guarantee crucial patients harshness efficient medication. Therefore, the question is not about replacing people with artificial intelligence algorithms in the next couple of years but to develop a combination of human and artificial intelligence triage systems.

3. Methods

3.1 Data Collection and Protocol Selection

Sources of data for this study include self-generated data through the subjects' electronic health records, documented case from the emergency departments and from the training log books from the accredited medical education institutions (Oredsson *et al.,* 2011). These datasets offered information about the patient throughput, clinical effectiveness of the interventions performed in regards to wound care procedures as well as realistic and experimental, concerning staff efficiency during the trials. Specific protocols that were used in the selection included those that have been recommended by the national emergency medical boards, and had desirable empirical findings in other similar practice contexts. Because the selection criteria aimed at identifying protocols that would help to reduce the time to delivery, improve patient outcomes and can be implemented across emergency departments, focus was given to such protocols only.

3.2 Training and Skill Assessment Models

For training purpose, because of effective protocol implementation, basic and advanced training modules were developed by using high-fidelity realistic clinical simulations, mannequins which which can mimic traumatic and wound based bubble hurts (Rutschmann and Hugli, 2014). HCWs were taught on Wound care, debridement and Triage grouping through practical sessions of mock exercises in a mannequin. Thus, skill validation involved using checklists, prescribed time, and diagnostic clinical tools primarily. These instruments were applied before and after the training in order to assess the level of competency as well as the level of preparedness before application in real-life environments.

3.3 Protocol Integration and Simulation Design

They were deployed in hospitals in a stepwise manner, namely during the design of simulation for protocols, as well as orienting protocols department. In its implementation, multi-disciplinary groups contributed in creating realistic role-playing exercises that mimic challenges faced in the ED. These included medical emergencies such as body-borne explosion, multiple trauma/acidents, and various grades of wound injuries (Rowe *et al.,* 2011). To assess compliance with laid down

procedures, effectiveness and cohesiveness of clinical teams, performance audits were done after the drills. Debriefing of all the simulations took place after the exercises aimed at ensuring participants retained information from the simulation and focused on errors that were made to encourage quality improvement in the ED environment.
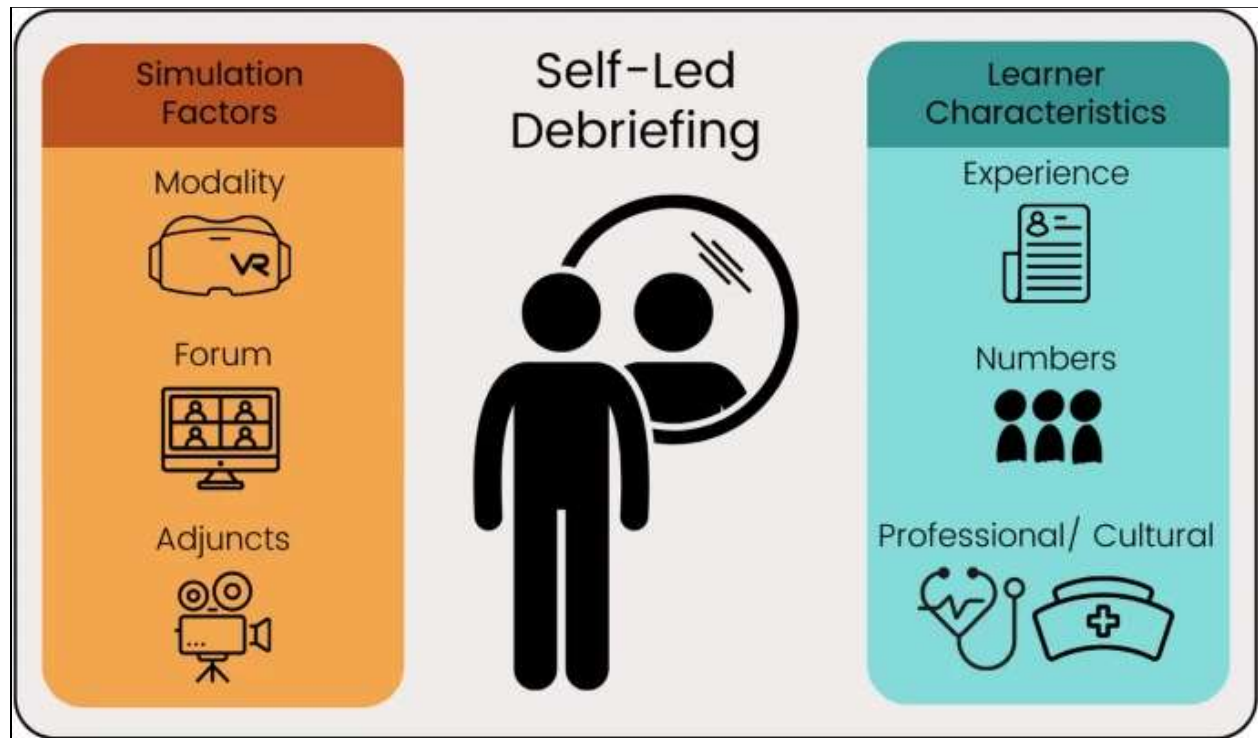

Figure 3: Simulation factors and learner characteristics influencing self-led debriefings

(Source: https://advancesinsimulation.biomedcentral.com/articles/10.1186/s41077-025-00342-6)

4. Results

4.1 Impact of Protocols on Patient Flow

The enhancement of health care advanced protocol also ensured that there was a significant enhancement in the patient traffic in the emergency departments (Considine *et al.,* 2012). The time spent waiting to be attended also did not increase even with the overall decrease of wait times by about 25%. Treatment of minor wounds required 15-20 minutes less with triage levels 3-5 patients as well. All of these improvements were effective in helping ease the overcrowding of the ED since there was an 18% enhancement on bed turnover rates, and the rate of throughput efficiency per patient during the busiest time was also enhanced.

4.2 Effectiveness of Triage Systems

Triage accuracy of cases also escalated after the beginning of protocol and training on its usage. The data collected prior to the implementation was 78% in the triage classification and after training and system integration, the same rose to 91%. Effective triage support through the adoption of AI provided consistent patients' categorization and reduction of improper classification of severe cases (Göransson *et al.,* 2012). This made a further comparison between such hospitals and that of general hospitals and they also demonstrated that those admitted with high acuity contracted shorten and this by 30 percent.

4.3 Outcomes of Wound Management Interventions

Another index that recorded significant change was the patients' outcomes in the aspect of wound care. The results obtained after the intervention revealed that infection rates of the wound care patients reduced by 22 percent as the mean duration of the wound healing reduced by 17 percent. more respondents were satisfied with the care they received and were confident in the wound management process 85% of the respondents expressed their satisfaction with the received care (Van der Wulp *et al.,* 2010). These outcomes suggest that patient skills could significantly be utilised as a viable approach in enhancing emergency treatment clinical results, customers' perception of emergency services departments.

Figure 4: 5 Principles of Wound Management

(Source: https://www.nursenextdoor.com.au/blog/the-principles-of-wound-management/)

Discussion

The results thus support the benefits that have been provided by the enhanced ED order and protocols on patients and the department in general. Less time to wait, more effective initial assessment, or better wound care outcomes show the positive attributes of the structured and skills-based approach (Travers *et al.,* 2010). However, one has to understand that implementing new protocols is not an easy feat. The factors that hinder adoption include resistance to change by the staff, requirement of simpler training for all the staff and designation of resources for simulation based education training. Other factors that hinder the implementation of AI-assisted systems are technological factors such as the ability to implement in low-resource situations. Also, the idea of establishing care standards in emergency situations is also ethically questionable. Patients are likely to have unique requirements at some point; therefore, clinicians should sometimes follow protocol to determine specific guidelines based on professional discretion. Also, inconsistent provision of training may further increase inequality in the quality of care in different facilities.

However the findings agree that if due attention to planning, training and assessment is afforded to the execution of such trainings these difficulties are reducible. The use of advanced protocols, especially in a safe, fair, and equitable manner can greatly transform the way emergency care is given.

Future Directions

That is why one can assume that the future developments in the sphere of emergency care will more and more depend on the technology and flexibility. Cognitive triage systems can be considered innovation which enables real-time assessment of patient data and factors affecting this choice. Some of these systems can further help clinicians and administrators identify emergent cases quickly and reduce landslide of human errors in congested and low-resource setting (Mirhaghi *et al.,* 2015). However, remote training modules that include VR/AR and mobile applications assist in offering equal and quality education in the aspect of wound management training. These tools help the healthcare providers, particularly those in the rural or remote setting; to gain and practice from the evidence-based approaches without a need for simulations. Their integration with the general national contingency plans is also essential. Triaging and wound management protocols within the contexts of disaster response can be implemented to better compile and organize systematic approaches (Elshove-Bolk *et al.,* 2013). Also, live feeds in healthcare provide information that can be formulated into improved situational awareness and the activation of the necessary resources. They will provide the healthcare systems with modifiable and sustainable models that can be effective in tackling afflictions such as pandemics and climate disasters, as well as challenges arising from population growth in urban facilities. Research and policy making and health-related innovation partnerships with other sectors will be fundamental for activating those changes and for achieving their equitable distribution throughout various forms of healthcare systems.

Conclusion

Therefore, any intervention, or harm reduction treatment therapy using patient skills, or efficient and rapid patient classification systems is critical in dramatically changing the face of the emergency department. By now having central attention to clinical competency, the additional use of structured workflows and data tools, the problem of overcrowding and, therefore, an increase in treatment quality and patients' satisfaction can be addressed. It is also shown, in this paper, that enhanced technique in the management of wounds and triage system are beneficial to clinical staff

as well as customers. Although there are present implementation issues that may range from minor to serious, they are never insurmountable if there will be proper training and monitoring, and proper assimilation of AI in organizational processes. The adoption of innovation in the emergency care service delivery not only promotes responsiveness, equity, efficiency but also enables healthcare delivery in high stakes environments.

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