Comparison of pre-hospital triage system of disaster

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ABSTRACT: Triage in critical situations is a vital skill. Although there are many triage systems to conduct health care providers in triage decisions, no national scale for pre-hospital triage has been sent to medical centers in Iran and hospitals are responsible for determining triage system. The aim of this article was to evaluate and compare different pre-hospital triage protocols in disaster; it’s hoped to provide a simple and suitable protocol for prioritizing victims in disaster. The proposed system which is called START protocol can be more applicable than other protocols in evaluation and prioritization of victims in disaster.

Keywords: Pre-hospital triage, Triage, Disasters, Emergency nursing

INTRODUCTION

Crisis is defined as all natural events, including tornadoes, hurricanes, tsunamis, volcanoes activation, Curran snow, fires, floods or explosions that require foreign assistance. Generally, there are three types of crises, namely natural disaster, technological and terrorism. In recent decades, the most important events in political, economic, social and geographic expressed that internal and external benefits are threatened. Currently, trauma is one of the main causes of death in the world; despite all the efforts made, deaths which are caused by trauma have not declined (Chapman and Arbon, 2008). Pre-hospital care has a special place in emergency medicine (Lidal et al, 2013). In cases where there are thousands of victims, we may not do triage processes as it should be done and the equipment and personnel for the care of victims may not be enough, in these cases, the care of injured patients who are most likely to survive should be replaced with the care of victims with serious injuries (Djalali et al, 2011). The word triage is derived from the French word Territor which means to arrange and categorize in which for two or more casualty, triage is used and for one casualty, first aid should be used and in general, triage is divided into two types of hospital and pre-hospital triage and it has different protocols (Rehn, 2013). No national scale for Pre-hospital triage has been sent to medical centers in Iran and hospitals are responsible for determining triage system (Mirzaei, 2009). This problem is besides the fact that there is no triage training courses in the Universities, so that the share of triage in education of in nursing courses in the emergency department is very small and only in one session and the onlywayforward is to gotoworkshops and refer to occasional articles (Haghdoust and Yahyavi, 2009). On the other hand, in Iran, there are few studies on pre-hospital care. The majority of deaths in Iran usually occur during the pre-hospital care (Taylor et al, 2013). In this regard, writing review articles and research can be very helpful in identifying and explaining the use of the national scale for the pre-hospital triage. To this end, this review article was written to evaluate and compare different systems of pre-hospital triage. In this paper, the main reasons for the need to triage, type of triage based on location and situation and different types of pre-hospital triage in disaster are briefly described.

METHODOLOGY

This review article examines the perspectives associated with these areas through books and databases that were published between 1999 and 2013 such as Pub Med, Pro Quest, and Google Scholar using keywords pre-hospital triage, triage, disaster.
There are three main reasons for the need to triage

The mismatch between existing facilities and needs, particularly in the field of human resources (doctors, nurses, etc.) and equipment. 2. Large number of injured and sick people at certain times (e.g. accidents, disasters or congestion of patients in emergency department). 3. People's attitude and perception of emergency and non-emergency situations, according to what was mentioned it seems that the purpose of triage is maximum and optimal use of existing facilities (Atashzadeh Shorideh and Zahri Anbohi, 2006).

Prioritizing Patients in a disaster

Urgent: Veterans who are severely injured but need short time and minimal equipment to treat and they have good survival prognosis.

Delayed: Veterans who have traumatic and debilitating injury, but do not need immediate help to save lives or limbs.

Waiting: Veterans who have been injured very severely that they have little chance for survival (pending).

Outpatient: Veterans who are walking, have the minimal injuries and can wait for treatment; they are even able to comfort other victims or to assist in carrying the victims.

Dead: Veterans, who do not respond, don't have a pulse and do not breathe. In a disaster, lack of equipments rarely allows to rehabilitate patients with cardiac arrest (Mirzai, 2009).

Types of triage

Triaged can be classified into several types according to different criteria:

1. Types of triage based on the location on which it's done:
   A) Pre-hospital triage 1 – in normal situation 2 – in disaster
   B) Hospital triage 1 – in normal situation 2 – in disaster.

2. Types of triage based on the situation and conditions in which it's done:
   A) Triage in normal situation 1 – in the scene 2 – in the Hospital
   B) Triage in disaster 1 – in the scene 2 – in the hospital 3 - before surgery (Bond, 2002).

Different types of Pre-hospital triage systems in disaster

START Triage

A triage system that has been widely accepted and used is START system (simple triage and rapid transport). The system was first used by Newport Beach Fire and Marine Department and Hoag Hospital in Newport Beach, California United States (Kahn et al, 2009). START system is recommended for adults and can be used for children who weigh more than 45 Kg and who are older than 8. START is primary used for primary sorting of the victims to be transferred to the triage section (Asaeda, 2002). Triage for victims should not take more than 30 seconds. The four basic parameters that are used in Start are initials ARPM, ability to get up and walk, respiratory, perfusion and mental status (Gebhart and Pence, 2007).

JUMPSTART, Pediatric Patient MCI Triage

Jumpstart is an objective pediatric patient MCI triage tool developed specifically for the triage of children in the multi-casualty/disaster setting. Jumpstart was developed in 1995 to be used along with the START triage system and mirrors the structure. Jumpstart objectives: (Versel, 2009).

Optimize initial triage of children in the MCI setting

Enhance the effectiveness of resource allocation for all MCI victims 3. Reduce emotional burden on personnel assigned to initial the triage of Children (Lamba et al, 2013).

Jumpstart provides an objective structure to help assure responders triage injured children with their heads, not their hearts. This can reduce the possible over-triage that may siphon resources away from other patients who may need them more, and result in physical and emotional trauma to children from unnecessary painful procedures and separation from loved ones. Under-triage is addressed as well by recognizing key differences between adult and pediatric physiology, and using appropriate pediatric physiological parameters at triage decision points (Cone and MacMillan, 2005). Jumpstart is rapidly gaining popularity and has become widely accepted in many national and state venues. It has also been incorporated into pediatric education and is included in the curriculum of Advanced Pediatric Life Support (APLS) and Pediatric Disaster Life Support (PDLS) (Versel, 2009).
SAVE triage
In disaster, due to large number victims and limited personnel, there is a possibility for some the injured people to remain at scene of disaster for several days (Sztajnkrycer et al, 2006). SAVE protocol is used in these cases. In this protocol, victims are divided into three categories: the first category includes those will die whether they get help or not, and the preservation of their lives necessarily requires immediate surgery (Jenkins et al, 2008). The second category consists of those who have suffered a dislocation or closed fracture without active bleeding. And the third category is those who do benefit from treatment at the scene and in the SAVE protocol only the third groups are treated (Nocera and Garner, 1999).

MASS triage
It was developed by Coule & Schwartz in recent years. In this system victims based on ability to walk and adherence are divided into four groups: urgent, delayed and minimal and waiting (Aylwin et al, 2007). This system allows rapid triage of patients in heavy casualties with minimal training (Lerner et al, 2008). Mass triage has four phases. In first phase, the victims who can walk are asked to leave the scene (Cone and MacMillan, 2005). The rest of the victims who are unable to move are asked to follow simple commands, such as moving an arm or a leg, obedience of the commands is a sign adequate brain perfusion and these victims are in the delayed group and the remaining people who do not follow the simple instructions are in the immediate group (Hovancsek, 2007).

SALT triage
This type of system which is the abbreviation for The Sort, Assess, Lifesaving interventions, and Treatment and / or Transport (SALT) triage system provides the possibility for therapeutic interventions and in general is done in a three-step sequence involving:
Sorting population 2 – surveying people 3- transferring victim (Cone et al, 2011).

SACCO triage
This type of system is used in disaster and takes 45 seconds for each victim (Sacco et al, 2005). Sacco triage method is done based on scoring three physiological parameters (respiratory rate, heart rate and response to the motion) and based on these scores, the probability of survival and their priorities are (Navin and Waddell, 2005).

Under-triage and Over-triage
Under triage is associated with triage sensitivity in identifying patients needing critical care interventions. It results when triage activities underestimate the severity of injury and send the patient to a non critical area for care. This has an obvious impact on the morbidity and mortality of the individual patient. Acceptable under triage rates have been defined as 5% or less. Over triage occurs when a noncritical patient is triaged to a critical care area. Rates of over triage of over 50% have been defined as acceptable in an effort to reduce under triage. However, over triage has the less obvious side effect of overburdening the critical care system with noncritical patients. High levels of over triage have been demonstrated to increase the morbidity and mortality of critical patients (Kumar et al, 2010).

DISCUSSION AND CONCLUSION
The research shows that among pre-hospital protocols, START protocol the most prevalent one. In this protocol, the patients are triaged based on four criteria and in the occasions when there are a large number of victims it can save the life of many people. START triagesystem is a rapid method for identifying the victims in a disaster. There are three important principles at triage: Speed, accuracy and organization which are clearly observed in the START protocol. START system can be simply used by medical emergency personnel and those who have little education. This system is helpful as a significant reinforcement in the critical situations. Evidence indicates that the START protocol was first performed extensively in the Vietnam War and lead to remarkable reduction in the mortality rate of injured people (From 4.7% in World War II to 1% in this war). Also, the time between the injury and treatment was reduced from 12-18 hours in the World War II to 2 hours in the Vietnam War.

REFERENCES