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Evaluation of First Aid for Surgical Cases, Injuries, and Transfer of Disease after Accidents to Emergency Departments in The Kingdom of Saudi Arabia

Wadha Faleh Aldossary

Saleh Mohammad Alaloosh

Abdulrahman Aaed Alqarni

Sima Qays Alkhunayzi

Fay Fath aldiyn Alsawadi

Dr.Rahmah Rubyyi Aljadani

And

Ibrahim Ali Almaghib

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Abstract

The study aimed to gather all available information from studies, research, and publications to evaluate the initial care given for surgical cases, injuries, and disease transmission following accidents at the emergency department. According to earlier research, when accidents happen in the Kingdom of Saudi Arabia, the emergency medical system is successful. The study followed the qualitative approach to evaluate the first aid for surgical cases, injuries, and transfer of disease after accidents in The Kingdom of Saudi Arabia through the literature review. According to its definition, the qualitative method entails treating the phenomenon as it actually is and is concerned with accurately defining it and communicating it qualitatively. The research found that Saudi Arabia has an extensive trauma system that is structured by businesses and industries that are able to offer medical care for the injured. This system contains elements for planning for medical emergencies, prehospital treatment, hospital care, rehabilitation of the disabled, trauma prevention, systems management, education and training in trauma care, assessment of trauma care, and improvement of overall quality. The study stressed that Saudi Arabia must establish trauma care systems in order to improve trauma care and outcomes due to the significant increase in road accidents that occur there each year. We recommend increasing the number of ambulances and ambulance stations in Saudi Arabia, employing the air medical evacuation system between cities for both moderately ill cases and serious cases.

Keywords: *Road traffic accidents (RTAs); Emergency medical technicians (EMTs); Trauma; Trauma system;* Emergency Medical Service (EMS)

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1. Introduction

Due to the oil boom and steep rise in living standards, urban expansion in Saudi Arabia has drastically altered the country's road system and increased the number of vehicles on the road. Over the past few decades, this relatively sudden transformation has resulted in an increase in the frequency of road traffic accidents (RTAs) and a multiplicatively higher number of injuries and fatalities (Ansari et al., 2000; Bendak, 2005).

The World Health Organization (WHO) estimates that there were 27.4 road traffic deaths per 100,000 persons in Saudi Arabia in 2015, compared to 2.9 to 10.6 per 100,000 in the US, the UK, and Australia (World Health Organization, 2015). In Saudi Arabia, a vehicle accident claimed the lives of one person and wounded four others every hour in 2013. The number of road fatalities reported by the Saudi Ministry of Interior (7661; 88% male) is significantly higher than the number of deaths from other trauma-related causes, such as falling, hypoxia, and burns (Ansari et al., 2000; Al Turki, 2014). In Saudi Arabia, ischemic heart disorders were the second-leading cause of death in 2018, behind injuries from traffic accidents (Alghnam et al., 2014).

Due to the country's rapid population expansion and improved socioeconomic conditions, many Saudis now own a car, or even several automobiles per family, which has increased the number of vehicles on the road. A variety of drivers who are unaware of local driving laws and lack the fundamental abilities for safe driving have arisen as a result of the diminished emphasis on effective public transportation networks and the reliance on cars for movement, Unexpected traffic increases have led to

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more car accidents, injuries, disability, and fatalities (Al-Naami et al., 2010).

1.1 Research Problem

Only 14 ambulances and less than 30 emergency medical technicians (EMTs) are available at Riyadh's 7 ambulance stations to serve a population of 4 million. To adequately serve such a densely populated urban area, this is insufficient. For instance, South Carolina has 478 ambulances and 2542 active state-certified EMTs to serve a population of 3.1 million. Instead of using ambulances from the Saudi Red Crescent (SRC), the majority of emergencies in Saudi Arabia are either delivered by volunteers or police cars. There is a lack of dependence on the SRC, which could be a result of lack of trust in the service or ignorance of its function. Only 3% of people surveyed in an SRC poll (Magazine of SRC Society, 1998) realized that SRC's emergency phone number is 997, while 70% said 911, which they learned from the well-known 911 US television program (Al-Ghamdi, 2002).

Although Saudi Arabia has a system for air medical evacuation between cities, this service is only available to some very ill patients and is insufficient to cover severe injuries. Furthermore, using the service requires a lengthy and complex process; as a result, a structured helicopter emergency rescue service is being researched. The prompt transportation of badly injured victims to the proper trauma units makes this service more crucial. For instance, in Germany, a major injury patient's helicopter evacuation to a trauma center is typically completed in less than 15 minutes (Hinkelbein et al., 2006).

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The aim of the study is to collect existing research, studies, and publications in order to carry out a comprehensive evaluation of the first aid for surgical cases, injuries, and transfer of disease after accidents to the emergency department.

1.2 Study Questions

The problem of the current study can be summarized in the following questions**:**

1. How effective is an emergency medical service management during accidents in Saudi Arabia?
2. What is the Essential components of a trauma system that use during accidents in Saudi Arabia?
3. What is the classification of injuries in emergency departments during accidents in Saudi Arabia?

1.3 Study Objectives

The main objective of the study is to evaluate the first aid for surgical cases, injuries, and transfer of disease after accidents to emergency departments in the kingdom of Saudi Arabia.

The problem of the current study can be summarized in the following sub-objectives:

1. To discuss the effectiveness of emergency medical service management during accidents in Saudi Arabia.
2. To discuss the Essential components of a trauma system that use during accidents in Saudi Arabia.

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3. To discuss the classification of injuries in emergency departments during accidents in Saudi Arabia.

2. Methodology

The study uses the qualitative research; this method aims to first ascertain the current state of a specific occurrence before attempting to explain it. As a result, it is dependent on the study of reality or the event as it actually occurs and is concerned with accurately portraying it (Creswell, 2003).

Because it is regarded as a fundamental tenet of scientific inquiry and is widely regarded as the sole approach capable of studying many human fields, the qualitative method is significant in research. According to its definition, the qualitative method entails treating the phenomenon as it actually is and is concerned with accurately defining it and communicating it both qualitatively and statistically (Williams, 2007).

The study followed the qualitative approach to evaluate the first aid for surgical cases, injuries, and transfer of disease after accidents to emergency departments in The Kingdom of Saudi Arabia through the literature review.

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3. The Requirement for Better Trauma Care

It is clear that trauma care needs to be improved. According to statistics, trauma is the leading cause of death in Saudi Arabia (Ansari et al., 2000). 80 to 85 percent of these traumas are caused by RTAs. 15 RTA-related deaths were reported to be responsible for 26.5 per 10,000 residents' deaths in 1986 (Bener and Jadaan, 1992). In Saudi Arabia, there were 283684 road traffic accidents in 2005, and 5883 people died as a result (Annual Traffic Statistical Report, 2006). Prehospital care is not at its best nationwide, with the exception of a few facilities on busy highways and in large cities. With the exception of a few institutes, rehabilitation services are similarly inadequate. More attention needs to be placed on prevention, communication, transportation, hospital care, training, and public education (Al-Naami et al., 2010).

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4. The Solution to Death That Occurs Because of Trauma

After examining the severity of the RTA issue in Saudi Arabia, it is clear that the country's standards for treating injured persons fall short. To save lives and resources, there have been calls for quick and forceful actions. RTAs involve a variety of variables that all facilities associated with this growing issue must handle jointly (Al-Naami et al., 2010).

Based on the effectiveness of the system, research and studies in some countries have demonstrated that the installation of trauma systems can dramatically reduce mortality and morbidity—and even the expense associated with trauma (Miller and Levy, 1995). For these reasons, it has been determined that Saudi Arabia needs to establish and deploy trauma care systems in order to enhance trauma care and outcomes. Sectors and organizations with an interest in trauma and associated issues should collaborate to research and analyze the viability of creating and implementing such a system (Celso et al., 2006; Chiara et al., 2006; Juillard et al., 2009; West et al., 1988; Moore, 1995; World report on road traffic injury prevention, 2004; Health resources and services administration, 2014).

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5. Trauma System

Trauma is broadly defined as any act of violence or external force that results in physical or psychological harm (Kurdin et al., 2018). Trauma systems provide cooperative connections between the neighborhood healthcare system and the emergency medical system or services to offer injured patients a comprehensive care strategy. The goal of the trauma system is to guarantee that injured persons receive the proper care, are adequately triaged, and are urgently moved to the appropriate facility. To ensure that care management is provided effectively, these processes must be carried out by qualified specialists (Alshamrani et al., 2020).

A trauma system is an organized, thorough, and coordinated network of institutions and sectors with the ability to care for the injured that is connected with the neighborhood public health care system. This system includes society's participation and includes elements related to trauma prevention, prehospital care, hospital care, rehabilitation of the disabled, disaster medical planning, systems administration, education and training in trauma care, evaluation of trauma care, and overall quality improvement (Al-Naami et al., 2010).

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According to the resources and facilities available, each nation or region should establish its own goals; a successful trauma system should involve the following goals (Department of Health and Human Services, 2014):

- To ensure that all trauma victims receive the best, most equitable, and most accessible care possible.
- To stop needless trauma-related fatalities and disabilities.
- To implement quality and performance improvements in trauma treatment across the system.
- To make sure that specifically designated facilities have adequate resources to address the needs of the injured.
- To control costs while maximizing efficiency.

6. Essential Components of a Trauma System

To ensure that care management is provided effectively, the trauma system must be performed by trained specialists. The fundamental trauma system components are shown in Figure1(Borgohain and Khonglah, 2013).

Identification of risk factors for injury is the first step in a trauma system,

Figure 1: Components of a trauma system (Borgohain and Khonglah, 2013)

and it requires evaluation through data collecting and study. Once it has been determined that better trauma care is necessary, public awareness and education campaigns are launched through prevention initiatives and the formation of a trauma advisory council. Leadership, legislation, and

planning for the trauma system will be done by a regional trauma advisory council, which will include representatives from all sectors involved in the care of the injured. Prehospital care includes standards for treatment, communication, triage, and transport to a trauma center. The management of patients in designated trauma care centers, facility-to-facility transfers, and injury rehabilitation are all examples of definitive care. Workforce resources and educational preparation give human resources. Through continual research conducted through a trauma registry and based on quality improvement data, system evaluation and monitoring are accomplished.

6.1 Injury Prevention

A trauma care system's initial element is injury prevention, which significantly lowers mortality and disability (Borgohain and Khonglah, 2013). A high grade of trauma care was combined with updated traffic laws to boost driver and passenger safety as part of the Saudi Government's preventative strategy for minimizing traffic accidents. Haddon's Matrix, which tries to comprehend the injuries caused and the epidemiological approach to their control, identifies the elements influencing traffic accidents. Haddon's Matrix demonstrates how three variables—people, machines, and the environment—interact with one another (Haddon, 1980). These facts suggest that Saudi Arabia should have fewer traffic accidents than other nations. Since alcohol is prohibited among human factors, driving while intoxicated is much less common. According to the literature, drinking alcohol while driving carries a significant risk of injury (Gruenewald and Nephew, 1994).

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Saudi Arabia's environmental conditions are primarily dry and clear, with snow and black ice being uncommon. The likelihood of accidents rises when driving in the snow or on black ice (Pawłowski et al., 2018). Regulations were enacted by the Saudi government, including the requirement that all drivers and passengers wear seatbelts. Many deaths and serious injuries among Saudi drivers have been linked to high speeds and inadequate seatbelt usage. Speed camera restrictions were put into place by the government in 2010, and those who violate them face fines. The use of speed cameras drastically decreased road traffic accident fatalities and injury severity (Mansuri et al., 2015).

6.2 Pre-hospital Care

The second element of an efficient trauma system is pre-hospital care. The system used in the Kingdom of Saudi Arabia in Pre-hospital care is emergency medical service (EMS).

An organized pre-hospital system called EMS works to treat injured and ill patients and, if necessary, transport them to a hospital. The Saudi Red Crescent Authority (SRCA), whose services are offered in all 13 regions of Saudi Arabia, provides pre-hospital care for the general public there. The SRCA covered all cities in 2015 with 384 facilities and more than 1965 vehicles (Alshamrani et al., 2020).

In military bases and industrial locations, which have their own facilities, trucks, and employees, separate pre-hospital care services are offered. All military locations are served by the pre-hospital and in-hospital treatment provided by personnel assigned to the Medical Service in the Armed

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Forces (MSD). For all medical care for military members, civilian defense professionals, and their families, the MSD has 24 hospitals and 147 clinics. In order to offer medical care during military training and war, the MSD also operates mobile hospitals (Alshamrani et al., 2020).

6.3 Acute Care Facilities

The third part of a trauma system is an acute care facility, which trauma centers can offer depending on their capacity. Trauma centers should be committed to programs, training, and research for injury prevention and should serve as the broader trauma system's leadership (American College of Surgeons, 1990). They are accountable for managing trauma patients with numerous injuries from the time of their arrival to the end of their recovery and rehabilitation by offering a variety of specialized medical measures (Alshamrani et al., 2020).

The Ministry of Health (MOH), together with other public and private organizations, is Saudi Arabia's primary healthcare supplier. In the nation, there are 494 hospitals with 75,225 beds, or one bed for every 445 citizens. In 2018, the MOH oversaw 284 hospitals with a $24 billion budget (or 9.20% of total government spending). In addition, 47 private hospitals and 163 hospitals run by various governmental entities were present. The trauma mortality was lower in trauma centers than in nontrauma centers (MacKenzie et al., 2006). One of the biggest hospitals in the city, King Abdulaziz Medical City (KAMC), has a capacity of more than 700 beds, 132 of which are in the emergency room. KAMC is comparable to a level 1 trauma facility (Alghnam et al., 2017).

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6.4 Post hospital Care

The final part of the trauma system's care, which tries to treat patients with serious and sometimes disabling injuries, is posthospital care. For patients and families, this stage of care is frequently the most protracted and challenging. Additionally, rehabilitation care frequently offers treatment for injuries with diverse and complex patterns, and the quality of this care can be difficult (World Health Organization global burden of disease, 2007; Robinson, 2006).

Despite the existence of posthospital rehabilitation units in Saudi Arabia, there is insufficient proof that these facilities are efficient in providing post-trauma care for patients. The creation of a data register or trauma registry is one potential remedy for enhancing post-hospital care and treatment for trauma systems; such registries are essential in assessing the efficacy of any intervention for patient care and outcome (Alshamrani et al., 2020).

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7. Classification of Injuries in The Emergency Department During Accidents in KSA

Prehospital providers in Saudi Arabia classify victims based on the type of medical attention they require during emergencies and disasters using the START fast triage system (Althunayyan et al., 2021). In less than 60 seconds, our method assesses every injured person older than eight years old. Walking ability, obedience to used commands, capillary filling, and radial pulse are the five determining elements (Bazyar et al., 2019).

Injury victims will be marked with the colors green, red, yellow, and black based on the findings of their inspection, and will receive medical attention in accordance with them (Bazyar et al., 2019) the figure 2 displays the start system's color scheme.

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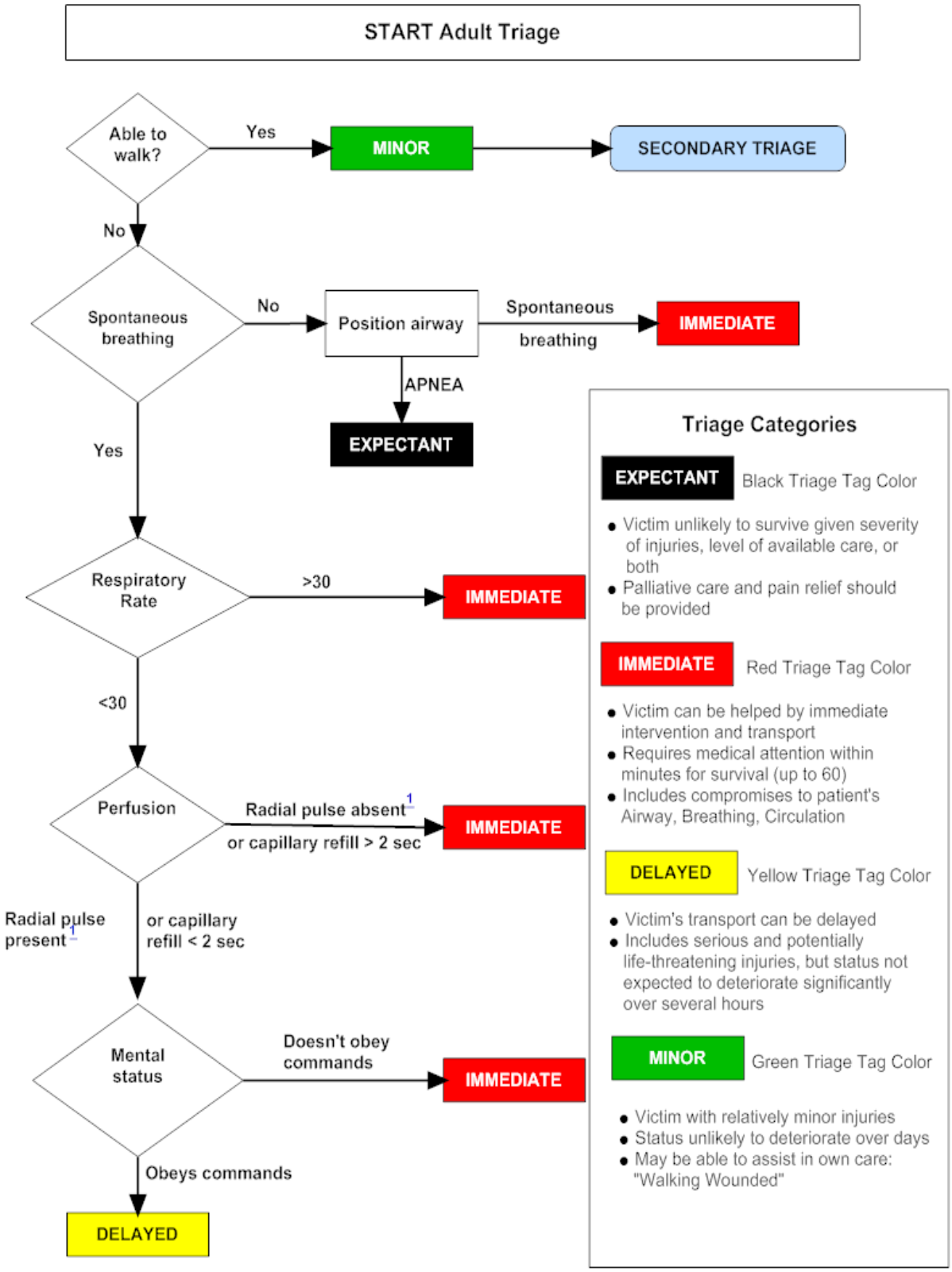

Figure 2START Triage Algorithm (Elbaih & Alnasser, 2020)

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8. Conclusion and Recommendation

The study's objective is to compile existing research, studies, and publications in order to conduct a thorough evaluation of the first assistance provided for surgical cases, injuries, and disease transmission following accidents at the emergency department. Previous studies have found that the emergency medical system in the Kingdom of Saudi Arabia is effective when accidents occur. According to studies, the Kingdom of Saudi Arabia has a comprehensive trauma system that is organized by organizations and sectors with the capacity to provide medical care for the injured. Community involvement is a feature of this system, which also includes components for trauma prevention, prehospital care, hospital care, rehabilitation of the disabled, planning for medical emergencies, systems management, education and training in trauma care, assessment of trauma care, and enhancement of overall quality.

The research recommends the following:

1. Using a mix of qualitative and quantitative methods to get accurate results and numerical results.
2. Increasing the number of ambulances and ambulance stations in Saudi Arabia.
3. Using the air medical evacuation system between cities for moderately ill cases also with serious cases, improving trauma care due to the large increase in traffic accidents annually in Saudi Arabia, and improving trauma care and results.
4. Saudi Arabia must set up and implement trauma care systems. Organizations and sectors with an interest in trauma and related problems should work together to investigate and assess whether such a system may be developed and implemented.

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