CHAPTER 01

INTRODUCTION
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1.1 It is estimated that approximately sixty percent of World Population lives in urban settings. The increased population density in these areas often leads to a rise in traumatic injuries, motor vehicle accidents, cardiorespiratory illness and violent crime. Approximately five million people die every year from injuries of various sorts and millions more are permanently disabled\(^1\). The economic burden of such deaths and injuries is staggering. The impact of intentional and accidental injury is highest in the developing world due largely to hazardous and improperly regulated work environments, unsafe roads and motor vehicles and lack of well-trained emergency medical personnel\(^1\). The World Bank predicts that South Asia will see a One hundred forty four percent increase in road deaths by 2020. Fatalities due to road accidents form twenty five percent of the total global injury-related mortality.\(^1\)

This creates a need for pre hospital care and often spurs the development of this care in areas where it is rudimentary or nonexistent.

1.1.1 In India, every four minutes, a person dies on the road. While seven to ten percent are critically injured, twenty to thirty percent are seriously hurt; of these about thirty percent are disabled for life, either partially or totally\(^1\). Forty four percent of all road deaths occur in the Asia Pacific region, despite a sixteen percent share of all global vehicles.

1.1.2 The World Health Organization (WHO) in its landmark 2005 treatise on EMS and pre hospital trauma care systems has established the importance of EMS and pre hospital trauma care systems in reducing morbidity and mortality from injury and violence and therefore the need and priority for development of EMS system worldwide\(^2\).

1.1.3 To underscore this importance, the WHO drafted a document outlining the key concepts for developing pre hospital trauma care systems. According to the WHO, an effective pre hospital care system should contain minimally following
elements. “Prompt communication and activation of the system, prompt response of the system and the assessment, treatment and transport of injured patients regardless of country or terrain in which their injuries occur and regardless of the economic status of the country or municipality rendering care and treatment.”

Death rate can be reduced by thirty percent if better medical aid is provided in the first hour after accident.

1.1.4 Proper wound care, immobilization of fractures, availability of Oxygen, intravenous fluid, prompt recognition of life-threatening conditions and transport to definitive care can all reduce morbidity and mortality. Unfortunately, in much of the developing World such services are unavailable and care and transport of the sick and injured patient are carried out by lay people.

1.2 The father of Trauma Medicine Dr. Adams Cowley, Baltimore, Maryland the legend of early trauma care has coined the term “Golden Hour” about three decades back. His coinage of the term has since become the mantra of Trauma care, Emergency medicine and EMS.

1.2.1 The term ‘Golden Hour’ has been in existence in rescue for two decades and even one sees different explanations in relation to its breakdown in books and papers. In reality one should hope that it is a flexible time-frame which rescuers strive to meet in getting their patient to a definitive care facility in the first hour after a crash. Of course this cannot be achieved in remote outlying areas unless the emergency services are adequately geared up to meet the response and patient transport times.

1.2.2 Golden Hour may be defined as the period during which all efforts are made to save a life before irreversible pathological changes can occur thereby reducing or preventing death in the second and third phase. This period may extend from the time of injury to definitive treatment in a hospital.
**The Platinum Ten** - Platinum Ten is the first ten minutes following the arrival of the key players in the rescue team.

1.2.3 Therefore, the Platinum Ten or first ten minutes must be realized and practiced for, as the goal for casualty retrieval and setting up life support after arrival on scene. Whether it is done in-vehicle or in the back of an ambulance should only be dictated by circumstances. A more in depth understanding of critical crash response is required if we are to appreciate the significance of the ‘Platinum Ten’ philosophy. Crashes can be categorized by severity, distance and time.

- **Severity** – The life threatening injuries sustained by the casualty and deterioration in the minutes that follow.
- **Distance** – The actual road miles to the incident and the subsequent transport time to hospital.
- **Time** – the time taken for the whole rescue team to respond to the incident and extricate the casualty.

1.2.4 For ‘the Platinum Ten’ to become a reality an interactive rescue team is a must. One cannot hope to save a larger percentage of casualties without the intervention of a well-practiced efficient rescue team whose members are well versed in working together. Firefighters must know what the paramedic needs to practice and the paramedic should know what he can reasonably expect from the fire service. The Platinum Ten along with suitable and efficient rapid extrication will in future be seen as a real life-saving initiative.

The first platinum ten minutes becomes important to make this golden hour effective and should be distributed as follows to make it fruitful.
TABLE NO. 1

**Distribution of Platinum Ten Minutes**

<table>
<thead>
<tr>
<th>Assessment of the victim and primary survey</th>
<th>1 minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resuscitation and stabilization</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Immobilization and transport to nearby hospital</td>
<td>4 minutes</td>
</tr>
</tbody>
</table>

**1.2.5** Although the Platinum Ten was not part of events, the concept of rapid extrication addresses the more seriously injured entrapped casualty, whose vital signs cannot be stabilized or maintained outside the Emergency Room (ER).

It is terms like ‘The Golden Hour’ and the ‘Platinum Ten Minutes’ that typify the importance of Emergency Medical Services (EMS) all over the world³.
1.3 EMS system

1.3.1 Emergency healthcare consists of two broad areas, Emergency Medical Services (EMS) and Emergency Departments (ED). EMS is responsible for delivery of emergency care in the pre-hospital or out-of-hospital environment, like ambulance and on-scene care. Emergency Department (ED) also known as accident and emergency (A and E), emergency room (ER), or casualty department (CD), is a medical treatment facility specializing in acute care of patients who present without prior appointment, either by their own means or by ambulance. The ED is usually found in a hospital or other primary care center.

1.3.2 Emergency Medical Service (EMS) is a branch of emergency services dedicated to providing pre hospital/out-of-hospital acute medical care and/or transport to definitive care, to patients with illnesses and injuries which the patient or the medical practitioner believes constitutes a medical emergency.

1.3.3 The goal of emergency medical services is to either provide treatment to those in need of urgent medical care, with the goal of satisfactorily treating the malady or arranging for timely removal of the patient to the next point of definitive care. This is most likely a Casualty/Emergency Room at a hospital or another place where physicians are available.

   The term Emergency Medical Services (EMS) evolved to reflect a change from a simple transportation system (ambulance service) to a system in which actual medical care occurred in addition to mere transportation.

1.4 Models of Emergency Medical Services

1.4.1 While designing an Emergency Medical Service, the essential fundamental decision in pre-hospital care is whether the patient should be immediately taken to the hospital, or advanced care resources are administered to the patient where they lie.
1.4.2 The Anglo-American model of EMS delivery is based around “scoop and run” philosophy. The aim of this model is to rapidly bring patients to the hospital with less pre-hospital interventions. It is usually allied with public safety services such as police or fire departments rather than public health services and hospitals. Trained paramedics and Emergency Medical Technicians (EMTs) run the system.5

1.4.3 The aim in “Scoop and Run” treatment is generally to transport the patient within ten minutes of arrival, hence the birth of the phrase, “The Platinum Ten Minute” (In addition to the Golden Hour) now commonly used in EMT training program. The “Scoop and Run” is a method developed to deal with trauma, rather than strictly medical situations (e.g. cardiac or respiratory emergencies).

Countries such as United States, Canada, New Zealand, South Africa, Hong Kong, Singapore, Pakistan, Afghanistan, Bangladesh, Sudan and Nepal follow this Anglo-American EMS systems.5

1.4.4 The Franco-German model of EMS delivery is based on the “stay and stabilize” philosophy. The aim of this model is to bring the hospital to patients. It is usually run by physicians and they have extensive scope of practice with very advanced technology5.

1.4.5 In this system doctors respond directly to all major emergencies requiring more than simple first aid. The team’s physicians and in some cases nurses provide all medical interventions for the patient and nonmedical members of team simply provide the driving and heavy lifting services.

1.4.6 Ambulances in this model tend to be better equipped with more advanced medical devices, in essence bringing the emergency department
to the advanced medical devices. High-speed transport to hospitals is considered in most cases to be unnecessarily unsafe and the preference is to remain and provide definitive care to the patient until they are medically stable and then accomplish transport.⁵

Countries such as United Kingdom, Germany, France, Sri Lanka and Kenya follows this Franco - German EMS systems.

1.5 Ambulance Services

1.5.1 Ambulance Service is provided by a variety of individuals, using a variety of methods. To some extent, these are determined by country and location with each individual country having its own 'approach' to how EMS should be provided and by whom⁶.

➢ 1.5.2 Government Ambulance Service – Ambulances operating separately from (although alongside) the fire and police service of the area. These ambulances are funded by local, provincial or national government.

➢ 1.5.3 Fire or Police Linked Service – Ambulances operated by the local fire or police service. This is particularly common in rural areas, where maintaining a separate service is not necessarily cost effective.

➢ 1.5.4 Volunteers Ambulance Service – Ambulances operated by charities or not for profit companies, both in an emergency and patient transport function. They may be linked to a voluntary fire service with volunteers providing both services.
1.5.5 Private Ambulance Service – Ambulance operated by commercial companies with paid employees, but often on contract to the local or national government.

1.5.6 Combined Emergency Service – Ambulance operated by emergency service agencies which may be found in places such as airports.

1.5.7 Hospital Based Service – Ambulance operated by hospitals as a service to the community or where ambulance care is unreliable or chargeable.

1.5.8 Company Ambulance – Ambulance operated by large factories and other industrial centers such as chemical plants, oil refineries, breweries and distilleries as a means of protecting interest and the welfare of the staff.

Generally speaking the levels of ambulance service available fall into one of the following three categories:

1.5.9 Basic Life Support (BLS) Ambulance:
A vehicle ergonomically designed suitably equipped and appropriately staffed for the transport and treatment of patients requiring noninvasive airway management/basic monitoring.  
BLS ambulance is used to transport relatively stable patients.

1.5.10 Advanced Life Support (ALS) Ambulance:
A vehicle ergonomically designed suitably equipped and appropriately staffed for the transport and treatment of patients requiring invasive airway management/intensive monitoring.  
ALS ambulance contains all emergency equipment and drugs necessary to manage any kind of patient emergency.
1.5.11 Intermediate Life Support (ILS) Ambulance:
ILS Ambulance is a BLS provider with a moderately expanded skill set, but this level rarely functions independently and where it is present may replace BLS in the emergency part of the service. When this occurs, any remaining staff at the BLS level is usually relegated to the non-emergency transportation function.6

1.6 Overview of the EMS Profession
1.6.1 The National EMS Scope of Practice Model defines the scope of practice of EMS personnel. EMS personnel are unique health care professionals in that they provide medical care and transportation in an out-of-hospital/pre hospital setting with medical oversight. EMS personnel are not independent practitioners. While the practice is not independent, it is relatively unsupervised and often has little backup. Therefore, EMS personnel must be able to exercise considerable judgment and have problem-solving and decision-making skills. Most EMS personnel work in emergency medical organizations that respond to emergency calls. EMS personnel respond and provide care to the patient in the setting in which the patient becomes ill or injured, including the home, field, work, industrial, and recreational settings. In the case of emergency calls, EMS personnel are unique in that they typically have a “duty to act.”7

1.6.2 Emergency Medical Services delivers care as part of a system intended to reduce the morbidity and mortality associated with sudden illnesses and injury. The positive effects of EMS care are enhanced by linkages with other community health resources and integration within the health care system.

1.6.3 Emergency Medical Responder
The primary focus of the Emergency Medical Responder is to initiate immediate lifesaving care to critical patients who access the emergency medical system. This individual possesses the basic knowledge and skills necessary to provide lifesaving interventions while awaiting additional EMS response and to assist
higher level personnel at the scene and during transport. Emergency Medical Responders perform basic interventions with minimal equipment.  

1.6.4 Emergency Medical Technician (EMT)  
The primary focus of the Emergency Medical Technician (EMT) is to provide basic emergency medical care and transportation for critical and emergent patients who access the emergency medical system. This individual possesses the basic knowledge and skills necessary to provide patient care and transportation. Emergency Medical Technicians perform interventions with the basic equipment typically found on an ambulance. The Emergency Medical Technician is a link from the scene to the emergency health care system.

1.6.5 Advanced Emergency Medical Technician  
The primary focus of the Advanced Emergency Medical Technician is to provide basic and limited advanced emergency medical care and transportation for critical and emergent patients who access the emergency medical system. This individual possesses the advanced knowledge and skills necessary to provide patient care and transportation. Advanced Emergency Medical Technicians perform interventions with the basic and advanced equipment typically found on an ambulance.

1.6.6 Paramedic  
The Paramedic is an allied health professional whose primary focus is to provide advanced emergency medical care for critical and emergent patients who access the emergency medical system. This individual possesses the complex knowledge and skills necessary to provide patient care and transportation. Paramedics perform interventions with the basic and advanced equipment typically found on an ambulance. The Paramedic is a link from the scene into the health care system.
1.7 Scenario of EMS in India

1.7.1 In India, Emergency Medical Services is in the growing phase with the first State level EMS launched in the year 2005. Moreover, seventy per cent of the Indian population lives in rural areas that do not have access to EMS. Organized pre-hospital care is scanty.

In India, one can call the emergency services by dialing: Police: 100; Fire: 101; Ambulance: 102

1.7.2 102 is the emergency telephone number for ambulances in parts of India. There are different emergency numbers in India’s twenty nine states and six Union Territories. Hospitals in the country provide different telephone numbers for ambulance services. The Centralized Accidents and Trauma Services (CATS) were set up by the Delhi Government in early 1990. This service was later expanded throughout the country. Unfortunately, it didn’t succeed despite having a toll free number 102 that was made available through various media. More recently Non - Governmental Organization (NGO’s) and hospitals have come forward to provide their own ambulance numbers. 8

1.7.3 There have been considerable efforts by states across India to develop emergency services. In 2007, with the extension of Ambulance Access for All (AAA)’s services, American Association of Physicians of Indian Origin (AAPI) founded Emergency Medical Service (EMS) for Mumbai. This agreement is to provide knowledge and technology transfer and provide EMS to develop healthcare facilities in India. Another such facility, Life Support Ambulance Service (LSAS) is operating in Mumbai for three years in association with London Ambulance Service UK and now has made inroads into Kerala and has five hundred ambulances that can be reached on a toll free number (1298). 8

Pune EMS (Pune Heart Brigade) with the number 1050 was started on 05th August 1999 at Pune. It includes networking of hospitals EMS training Institute and Emergency Number 1050.
1.7.4 Recently the Gujarat state government set up the Gujarat Emergency Medical Services Authority (GEMSA). Institute of Kidney Diseases and Research Centre (IKDRC), U.N. Mehta Institute of Cardiology and Research Centre, Gujarat Cancer Research Institute (GCRI), GVK EMRI and Public Health Institute, Gandhinagar have entered into several other PPP projects to improve the emergency services in the state.

1.8 Training

1.8.1 In India, many private hospitals and institutes have been providing emergency medicine training for doctors, nurses and paramedics since 1994. There are no formal guidelines on the standards of education that needs to be provided to Emergency Medicine Technicians in India. There are not many Paramedic Schools in India barring in few like Symbiosis Institute of Health Sciences, Vinayaka Mission University, Sri Ramchandra University.

1.9 Ambulances

1.9.1 In cities, ambulances are owned by private businesses and operate on a strictly fee-for-service basis that are usually little more than transport vehicles and may include just a bed and an oxygen tank.

They may or may not be staffed by personnel with little or no medical training. Even today, in India, pre-hospital care, including patient transport, is usually performed by bystanders without using ambulances. This shows there is a fragmented system in place to attend to emergencies in the rest of the country.8

1.10 Legislation for emergency services

The demand for legislation for EMS has been rising steadily in India. Supporters of such legislation opine that it would mandate a common access number, formation of an EMS council, trained paramedics, gradation of ambulance and hospitals, network of hospitals and define physical and human resources needed for the service. This could help save lives by making access easy for all the patients. Methods, technology, personal skills need to be standardized with
formation of legislation in emergency services to provide protection to the
providers. Associations like Society of Emergency Medicine-India (SEMI) and
American Association of Physicians of Indian Origin (AAPI) has
Submitted proposals for EMS legislation to the Central Government and
State Government of Gujarat, Maharashtra and Andhra Pradesh.

1.10.1 In light of the above opportunities and challenges, development in
healthcare sector, establishment of Emergency Medical Services across India is
therefore justified and questions relevant have been included by the researcher to
exemplify each of the categories.

- Availability of Emergency Medical Services – providing pre hospital/ out-
of-hospital acute medical care and/or transport to definitive care, to
patients with illnesses and injuries. Mere transport to hospitals with no
interventions is not EMS.
- Availability of Emergency Access Number – A three digit number which
can be called for all three types of emergencies (Police, Fire and
Ambulance) 24/7 from either landline or mobile.
- Availability of Emergency Response center (ERC) - ERC should be
capable to handle city level or state level calls.
- Availability of well-structured training program – Emergency medical
professionals on completion of training program should be able to work in
pre-hospital setting and must be able to handle emergencies in pre-hospital
sector.
- Availability of Ambulance Services – Ambulance should be either BLS or
ALS and en route medical intervention is done and should not be used as a
transport vehicle.
- Funding of Emergency Medical Services - Emergency Medical Services in
the state is either funded by Government/private companies/Non-
Governmental Organizations or as Public Private Partnership model. User should not bear the cost for services utilized.

Thus by taking the stock of developments pertaining to all of the above in India and comparing globally, researcher aims to recommend a good EMS model suitable to India.

1.11 Reasons for undertaking this study:

1.11.1 Having thus understood the close linkage between healthcare sector and Emergency Medical Services, the change in our understanding of concept of Emergency Medical Services, evolution of Emergency Medical Services, one needs to take stock of the developments pertaining to all of the above in our country, in light of global developments.

1.11.2 The researcher plans to study the different models operational nationally and learn from the other models operational in other countries. Such a comparative study has not been done so far. This comparative study is therefore exploratory in nature.

1.11.3 The findings and conclusion arrived at constitute the basis for policy recommendations, which would help implement the best practices in managing Emergency Medical Services in our country which in turn could revamp Emergency Medical Services and recommend good Emergency Medical Services model suitable to our country.

Hence the researcher undertook the present study.