

Emergency Medical Services in India: The Present and Future

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Abbreviations:

ALS: Advanced Life Support
BLS: Basic Life Support
CATS: Centralized Accident and Trauma Services
EMS: Emergency Medical Services
EMT: emergency medical technician
ERC: Emergency Response Center
GNM: General Nurse and Midwifery
GDP: gross domestic product
MI: myocardial infarction
NGO: nongovernmental organization

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Abstract

India is the second most populous country in the world. Currently, India does not have a centralized body which provides guidelines for training and operation of Emergency Medical Services (EMS). Emergency Medical Services are fragmented and not accessible throughout the country. Most people do not know the number to call in case of an emergency; services such as Dial 108/102/1298 Ambulances, Centralized Accident and Trauma Service (CATS), and private ambulance models exist with wide variability in their dispatch and transport capabilities. Variability also exists in EMS education standards with the recent establishment of courses like Emergency Medical Technician-Basic/Advanced, Paramedic, Prehospital Trauma Technician, Diploma Trauma Technician, and Postgraduate Diploma in EMS. This report highlights recommendations that have been put forth to help optimize the Indian prehospital emergency care system, including regionalization of EMS, better training opportunities, budgetary provisions, and improving awareness among the general community. The importance of public and private partnerships in implementing an organized prehospital care system in India discussed in the report may be a reasonable solution for improved EMS in other developing countries.

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Introduction

The Republic of India is the seventh largest in land mass and second most populous country in the world. It consists of 28 states and seven union territories. India is a nation of great economic contrast, with a vast gap between the rich and the poor. Although India's gross domestic product (GDP) stands at US \$4.5 trillion (third largest in the world based on purchasing power parity), GDP per capita is US \$3,650 (ranked 126th in the world).^{1,2} The crude birth rate is 22 per 1,000 population and only 57% of the births are attended by skilled health care personnel.³ Though India has undergone rapid urbanization during the past decade, it continues to be plagued by malnutrition and communicable diseases. The expanding middle class has increased the burden of lifestyle-related diseases.

The Indian health care system generally lacks modern infrastructure and coordination. Even though the National Health Policy was endorsed by the Parliament of India in 1983,⁴ the poor continue to lack access to quality health care. Low literacy levels, high population density, and widespread corruption have led to inadequate standards of prehospital and in-hospital care. Affluent citizens do not trust health services provided by the government and prefer medical treatment at private hospitals that often maintain standards comparable to the developed world.

This review provides an overview of the current state of Emergency Medical Services (EMS) in India and recommendations to optimize the system.

Prehospital Emergency Care in India

In 1989, Colohan et al reported that only 0.5% of head injury cases were transported by ambulances in New Delhi and no first aid was administered in 65% of cases.⁵ Additionally, only seven percent of head injury patients arrived at a hospital within the "first golden hour." Pandian et al reported in 2006 that only 12% of stroke patients used ambulances to reach a hospital in an urban city.⁶ Another study reported that 80% of trauma patients in India cannot get access to medical care within the first hour.⁷ A study conducted in an urban South Indian city reported that in 50% of cases, no prehospital care

or treatment was offered by qualified personnel when ambulances were used to transport patients to hospitals.⁸ In other words, the ambulance system has been ineffective due to poor infrastructure, the lack of trained prehospital personnel, and lack of access to services.

The World Health Organization National Commission on Macroeconomics and Health Report on India said that an average villager in India, who does not have a motor vehicle, needs to travel over two kilometers to get a tablet of paracetamol, over six kilometers for a blood test, and nearly 20 kilometers for hospital care.⁹ Improvements in EMS services are needed to effectively transport patients from limited resource sites. For example, hospital births are a challenge for villagers in India. Many deliver at home or in a vehicle while on their way to the hospital. This may contribute to the high maternity and infant mortality rates. Therefore, the need for an organized EMS system in India is important.

In India, there is no centralized EMS system. The gap formed by only a few government-sponsored ambulances is filled with ambulances owned by private hospitals. These ambulances, though well equipped, are very costly to the patient, and thus, beyond the reach of many in a country where 81% of the population lives on less than US \$2.50 a day.¹⁰ Over the years, many local agencies have come up with free or affordable prehospital emergency services. These ambulances are managed by social trusts, volunteer health organizations, and nongovernmental organizations (NGOs). Disadvantages of these services are that they are not uniform across the country, do not follow a standardized EMS protocol, and have very little or no coordination with the local police and fire departments. Often, patients do not know the telephone number to call for EMS assistance. Thus, there is a lot of variability in EMS performance.

Current EMS Operations

Dial 108 is a free ambulance service provided in public-private partnership with respective state governments for medical, police, and fire emergencies. Dial 1298 is similar to 108 in its operational aspects; the only difference is that 1298 is a paid service while 108 is free.

A toll-free 108/1298 call is received by a communications officer who collects and records all facts regarding the emergency. The information is then transferred to the dispatch officer who identifies the closest Global Positioning System-enabled ambulance to the scene of emergency and gives instructions for dispatch of the ambulance. Medical emergencies such as fracture, fever, and syncope are responded to by Basic Life Support (BLS) ambulances; emergencies such as cardiac arrest, seizures, snake bite, unconsciousness, burns, and pregnancy-related emergencies are usually managed by an Advanced Life Support (ALS) ambulance. A sample of 108 Ambulance operations in the state of Rajasthan for the month of September 2013 has been tabulated in Table 1.¹¹

In some cases, the caller is placed in a conference call with an emergency medical technician (EMT), or a physician in the Emergency Response Centre (ERC) who supports EMTs when required. Prehospital care records are maintained, and include details of drugs and disposables consumed. The time or receipt of call, time of arrival at the site, and time of hospital arrival is captured either manually or automatically in a log register or dispatch software.

The medical equipment onboard for a BLS ambulance is an oxygen cylinder, blood pressure apparatus, and a stethoscope.

Chief Complaints	n (%)
Maternal Emergencies (Pregnancy-related, Postdelivery)	13,157 (47%)
Trauma (Vehicular)	5,404 (19%)
Others (Nonspecific Complaints)	2,439 (9%)
Fevers (Infections)	1,626 (6%)
Acute Abdomen	1,322 (5%)
Cardiac/Cardiovascular	796 (3%)
Unconscious	786 (3%)
Trauma (Nonvehicular)	741 (3%)
Assault	421 (2%)
Respiratory Problems	411 (2%)
Animal Bites	394 (1%)
Neonatal (up to 1 month of age)	231 (1%)
Poisoning/Drug Overdose	185 (<1%)
Fire/Burns	124 (<1%)
Stroke/Cerebrovascular Accidents	87 (<1%)
Pediatric (1-12 years of age)	46 (<1%)
Diabetes	33 (<1%)
Allergic Reactions	32 (<1%)
Behavioral	9 (<1%)
Environmental	5 (<1%)
Disasters Due to Natural Elements	3 (<1%)
Epilepsy	3 (<1%)
Hazardous Material	3 (<1%)
Intentional Self-harm (Suicide)	3 (<1%)
Industrial	1 (<1%)
Total Number of Patients	28,262

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Table 1. Chief Complaints of Patients Transported by 108 Ambulances in Rajasthan, India During the Month of September 2013¹¹

For ALS ambulances, in addition to the above equipment, there is a defibrillator-monitor, electrocardiogram, syringe pump, pulse oximeter, resuscitation kit, suction machine, and nebulizer.

Centralized Accident and Trauma Services (CATS) is funded by the Delhi government and was conceived in 1984 with plans of expansion throughout the country. Pilot operations were started in 1991 but the services have not yet become fully operational.¹² Currently, the government is planning to run CATS on a public-private partnership model (like 108). Centralized Accident and

Trauma Services receives calls from the toll free numbers "102" and "1099." Additionally, first responders (on motorcycles) are expected to be part of the CATS ambulance model.

All leading private hospitals own ground ambulances, and some maintain air ambulances. Most often, these services require an advance deposit ranging from US \$270-\$370. These ambulances respond to emergencies and also do interfacility transfers. Some hospitals maintain Mobile Coronary Care Units, which carry specialized care equipment including a ventilator, cardiac monitor, and intra-aortic balloon pump. These ambulances are usually manned by a physician, a nurse, and a technician.

EMS Training Standards

No standardized EMS training courses existed in India until recently, when some government-recognized training courses were developed; these courses provide training similar to the EMT or paramedic training in the US.

Emergency Medical Technician-Basic, EMT-Advanced, and Paramedic are three recognized levels of prehospital care. Some EMT courses are endorsed by the Australasian Registry of EMTs and are recognized in India, Australia, UK regions, Southeast Asia, and China. Emergency Medical Technician-Basic requires a 12-month course after higher secondary school. An additional four months of training in airway adjuncts, intravenous therapy, administration of selected emergency medications, electrocardiogram interpretation, and defibrillation is required to become an EMT-Advanced. Paramedics undergo a further four months of training beyond EMT-Advanced in airway management and drug therapy, as well as advanced training in patient assessments, clinical decision making, and field diagnosis. These courses are accredited by the Quality Council of India. Prehospital Trauma Technician is another course available in government medical centers across the country. This 9-month course has a curriculum similar to that of an EMT-Basic course. Many academic medical centers offer a 2-year Diploma Trauma Technician course in trauma care and emergency care. The curriculum involves theoretical as well as practical training on mannequins and an internship.

Lifesupporters Institute of Health Sciences provides a 1-year postgraduate diploma in EMS in collaboration with New York Presbyterian Hospital EMS (New York, New York USA). The first six months are theoretical, with training on mannequins, and during the next six months, students undergo supervised internship training in the emergency department and intensive care unit at a private hospital. The course includes orientation, history taking and patient assessment, airway management, mechanisms of trauma, medical knowledge of various organ systems, special consideration in neonatology and geriatrics, crime scene awareness, hazardous material training and rescue operations. The government of India also recognizes those with General Nurse and Midwifery (GNM) certificates as prehospital care providers. As of 2012, there were 2,670 GNM programs in the country with over 100,000 students graduating every year. The GNM course is a 3-year course followed by a 6-month internship.¹³

Looking Forward

Learn by Example

To improve the current EMS system, India should take cues from established EMS systems. The United States National Highway Traffic Safety Administration determines the National

EMS Education Standards and National EMS Scope of Practice Model for the US.¹⁴ These guidelines are modified by each state's Department of EMS (usually under its Department of Health), and further altered by Regional Medical Advisory Committees.¹⁴

The first step in building a robust EMS system in India would be to develop enabling government policy. A centralized governing authority is required to set the standards of EMS training and operations throughout India. This also should result in the creation of a unique telephone number which can be dialed from any part of the country (like 911 in US or 999 in UK) and an emergency service available across the country.

Regionalization

In the present Indian scenario, a patient is taken to the nearest hospital, irrespective of its diagnostic and treatment capabilities. Multiple referrals result if the hospital does not have the resources to treat certain acute conditions (eg, ischemic stroke), wasting valuable time in trying to move the patient from one facility to another. It is imperative that the government regionalizes care and identifies specific facilities for the care of patients with trauma,¹⁵ myocardial infarction (MI),¹⁶ and stroke,¹⁷ and coordinates with EMS so that a patient is taken directly to the most appropriate facility at the time of emergency. American Heart Association/American Stroke Association guidelines support this action and state that an ambulance may bypass a hospital that does not have the resources or institutional commitment to treat patients with stroke if a more appropriate hospital is available within a reasonable transport interval.¹⁷ It is advisable that the Department of Health in India recognizes hospitals in each city that have the capability to provide disease-specific acute care and designates them as stroke centers, cardiac catheterization laboratory capable, neurosurgical centers, and trauma care capable.

Better Training

Prehospital care improved in Mexico after initiation of a prehospital trauma life support course with a minimal 16% increase in ambulance service budget.¹⁸ Therefore, more training courses should be funded by the Indian government and private institutions to generate a large workforce of prehospital care providers. It should be noted that these courses should be accredited by a national authority. Moreover, training programs in first aid and resuscitation should be initiated for police officials, college students, taxi drivers, working adults, or any interested citizen so that any trained member of the public who is present at the site of an emergency can initiate some form of first aid before an ambulance arrives at the scene.

Money Matters

Financial constraints impede the growth of EMS in India. The total expenditure on health in India as a percentage of GDP is four percent, compared with 18% in the US.¹⁹ Even when compared with other BRIC countries (Brazil, Russia, India and China), India spends the least on health care.²⁰ The Planning Commission Report of the Government of India recommended a budgetary provision of US \$916 million for the emergency response services, which includes one ambulance for 100,000 people (10% ALS and 90% BLS) and other operational costs.²¹ The government also should try to attract private investment to increase the budget, and set up regular audits to curb resource waste.

Moving in the Right Direction

The recent launch of the National Ambulance Code by the Ministry of Road Transport and Highways of India is a welcome step. This Code will dictate the minimum standards and guidelines for the construction and functionality of road ambulances in India.²²

Increasing awareness among the general population would be another step towards achieving high standards of prehospital emergency care. Malhotra et al reported in a study conducted in an urban North Indian city that those acute MI patients who did not know the symptoms of MI had prehospital delays of up to 12 hours.²³ Similarly, only 27% of the patients presenting for stroke services at a tertiary level hospital in India were aware they had had a stroke, and most of them did not know the importance

of the time window in acute stroke care.²⁴ Higher levels of public awareness might be a difficult task to achieve because of India's literacy rate of 74%, but efforts should be made by involving social welfare societies who work at the village level.

Conclusion

Emergency Medical Services in India is still in its infancy and is very fragmented. An organized EMS system can play an important role in saving lives when treatable conditions are involved. The importance of coordinated participation of EMS agencies, government, police and fire departments, private hospitals, and the community is stressed, with a hope of increased interest in prehospital care.

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