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Epidemiology and Practice of Emergency Medicine in India and Developed countries

[1]Dr. Ishika soni, [2] Dr Myle Akshay Kiran

[1](Department of Oncology (Medical officer) : Rajasthan (india)

[2]Ceo Director Medsravts. Department of Scientific Medicine. Clinical Research and Pharmacology and Hospital administration Specialist. Andhra. India

Correspondence:
[1]Dr. Ishika soni, [1]Department of Oncology (Medical officer): Rajasthan (india)

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ABSTRACT

The rapid assessment and treatment of patients who arrive with acute diseases or injuries falls within the specialty of emergency medicine. Emergency medical care (EM) is still mostly uncontrolled and a poorly defined specialty in India and many other low- and middle-income countries (LMICs). We anticipate a physician shortage in most medical professions. Obstacles encountered in the practice of emergency medicine in industrialized nations such as India include a shortage of qualified emergency medicine experts and a lack of standardization in emergency treatment.

Keywords: Emergency medicine (EM), low-middle income countries (LMICs), Emergency department (ED), emergency medical services (EMS), Medical Emergency Management System (MEMS).

BACKGROUND

The rapid assessment and treatment of patients who arrive with acute diseases or injuries falls within the specialty of emergency medicine.

With roots in the early 1990s, emergency medicine is an emerging field in India. Prior to emergency medicine's establishment as a distinct field of study, emergency treatment was often given by specialists or general practitioners who lacked emergency medicine training. This lack of specialized training frequently resulted in improper treatments, delayed diagnosis, and worse patient outcomes. In India, emergency medicine was formally recognized as a specialty in 1995.

The goal of this program is to provide doctors with the information and abilities needed to handle traumatic and acute medical emergencies, including heart attacks, strokes, serious infections, severe injuries, and other life-threatening illnesses. Emergency medicine has become more recognized and accepted in India since it was first introduced as a specialty. Emergency medicine has grown in significance within the Indian healthcare system throughout time.

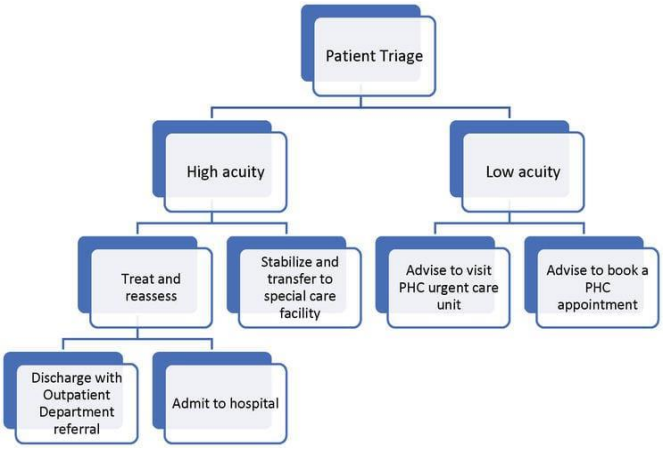
Prior to the 1990s, emergency care in Indian hospitals lacked a system or procedure for handling severely ill or injured patients, which led to subpar treatment and increased death rates. Consequently, the implementation of a formal emergency course was deemed imperative in order to enhance emergency treatment and lower death rates (1). Over the past ten years, emergency medicine has become a highly sought-after specialty in low- and middle-income nations. This has resulted in a need for expanded emergency departments, pre-hospital services, new training programs, and legislative changes (2).

INTRODUCTION

Emergency medicine (EM) is still mostly unregulated and a poorly defined specialty in clinical practice in India and many other low- and middle-income countries (LMICs) (3, 4). The idea that the emergency department (ED) is a place to treat those who are seriously injured or unwell is still relatively new in these contexts. The sustained growth of EM as a specialty will depend critically on a deeper comprehension of patient characteristics as well as an awareness of the attitudes, comprehension, and expectations of the ED population in India. Access to emergency treatment is hampered by both cultural and practical factors, according to earlier research done in LMICs (5, 6).

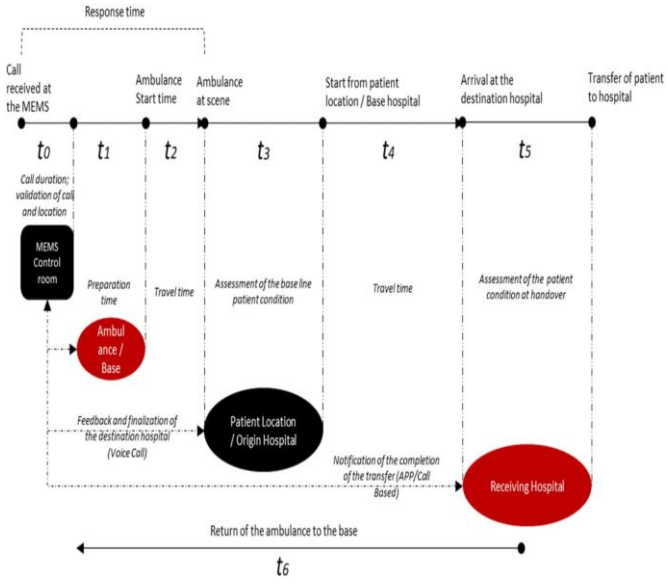
For the majority of medical specialties, physician shortages are anticipated. Even though the need for emergency treatment is growing, there is still a severe labour shortage in the field of emergency medicine (EM). A pressing and unaffordable patient care issue is being brought about by the shortage of emergency physicians, emergency nurses, and other resources (7).

- **SERVICES PROVIDED DURING EMERGENCY**



This flowchart provides a structured approach for triaging patients based on the severity of their conditions. After receiving emergency care, high-acuity patients are either hospitalized to the hospital or discharged with follow-up care, based on how well they respond to therapy. Patients with lower levels of acuity are sent to more suitable care environments, such as routine consultations for less urgent concerns or urgent care for more pressing ones. In accordance with the severity of their ailments, this guarantees that patients receive prompt and adequate care.

- **TIME TAKEN BY A PATIENT TO REACH HOSPITAL AND GET EMERGENCY TREATMENT**



The diagram outlines the process and timeline of emergency medical services (EMS) from the initial emergency call to the transfer of a patient to a receiving

hospital. Here's a detailed explanation of each step:

MEMS: Medical Emergency Management System

t0 to t6: Different time points in the process

Response time: The total time taken from call receipt to the arrival of the ambulance at the scene.

Timeline and Process Flow:

t0 - Call received at the MEMS Control Room:

Call duration involves validation of the call and location. MEMS Control Room processes the call. Information is passed to the ambulance/base.

t1 - Ambulance Start Time:

Preparation time for the ambulance crew. Feedback and finalization of the destination hospital via voice call. Ambulance departs the base.

t2 - Ambulance at Scene:

Travel time from the base to the scene. Assessment of the baseline patient condition at the scene. Patient condition is assessed and stabilized if necessary.

t3 - Start from Patient Location/Base Hospital:

Notification of the completion of the transfer (via APP/Call-based). Travel time from the patient location or base hospital to the receiving hospital. Ambulance departs for the receiving hospital.

t4 - Arrival at the Destination Hospital:

Travel time ends upon arrival at the receiving hospital. Assessment of the patient condition at handover to the hospital staff. Patient is transferred to the receiving hospital.

t5 - Transfer of Patient to Hospital:

Handover of the patient to the hospital staff. Assessment of patient condition during handover. Patient care is transferred to hospital staff.

t6 - Return of the Ambulance to the Base:

Ambulance returns to the base after patient transfer. Completion of the emergency response cycle.

Additional Notes:

Preparation Time: The time taken by the ambulance crew to get ready and start from the base.

Travel Time: The time taken by the ambulance to travel to the scene and from the scene to the receiving hospital.

Assessment: At both the scene and the receiving hospital, the patient's condition is assessed.

Feedback Loop: The MEMS Control Room stays in communication with the ambulance and receiving hospital to finalize the transfer process.

This flowchart provides a comprehensive view of the steps involved in an emergency medical response, detailing the interaction between different entities and the time taken at each step.

EPEDEMIOLOGY AND PRACTICE OF EMERGENCY MEDICINE

- **EPEDEMIOGY OF EMERGENCY MEDICINE IN INDIA:-**

With roots in the early 1990s, emergency medicine is a relatively new discipline in India. Prior to emergency medicine's establishment as a distinct field of study, emergency treatment was often given by specialists or general practitioners who lacked emergency medicine training. This lack of specialized training frequently resulted in improper treatments, delayed diagnosis, and worse patient outcomes. In India, emergency medicine was formally recognized as a specialty in 1995. The goal of this program is to provide doctors with the information and abilities needed to handle traumatic and acute medical emergencies, including heart attacks, strokes, serious infections, severe injuries, and other life-threatening ailments.

The curriculum was extensive, including subjects like emergency procedures, toxicology, trauma care, critical care, and resuscitation. Emergency medicine has been recognized and accepted more slowly but progressively since it was first introduced as a specialty in India. Prior to the 1990s, emergency care in Indian hospitals lacked a system or procedure for handling severely ill or injured patients, which led to subpar treatment and increased death rates. Consequently, the implementation of a formal emergency course was deemed imperative in order to enhance emergency treatment and lower death rates (1).

The role of emergency medicine (EM) professionals in combating COVID-19 has received a lot of attention throughout the pandemic. EM clinicians have been on the front lines, providing compassionate treatment for patients despite the risk of contracting the fatal virus. More than 660 doctors in India have lost their lives while treating COVID-19 patients, indicating that frontline healthcare personnel have also made a sacrifice in this regard (8). India has a huge demand for emergency treatment even prior to the outbreak. After age five, injuries are second in India's causes of mortality, behind only ischemic heart disease (9). According to estimates, road traffic injuries

claimed the lives of 415 persons in India every day in 2016 (10).

- **EMERGENCY MEDICINES IN US :-**

In the US, injury-related morbidity and death represent a significant public health and emergency medical concern. Emergency rooms serve as a sensitive indicator of the persistent influence of traumatic injury as a major contributor to morbidity and death in the United States (11). Individuals going through a mental health crisis are given inconsistent, lower-quality care than those going through a physical health crisis. There is a lack of information about the epidemiology, the care routes that follow mental health and self-harm crises that ambulance services respond to, and the eventual mortality from all causes, including suicide fatalities. The procedures and results of patients seen by ambulances for emergencies involving mental health or self-harm are being examined for the first time nationally by epidemiologists (12).

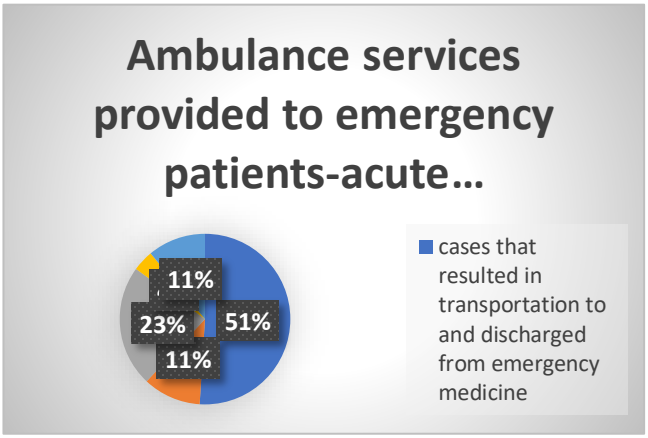
- **EMERGENCY MEDICINES IN ENGLAND AND SCOTLAND :-**

In England and Scotland, ambulance services received 9,700,000 emergency calls in 2014–2015. A significant fraction (10%) of these calls are from patients who are having a mental health emergency or who have self-harmed (13, 14). It is still unknown what the treatment plans and results are for those that the EMS service attends to during a mental health crisis. Although this hasn't been looked into before, it's possible that those who receive emergency medical attention for mental health issues are more likely to commit suicide. With a projected 804,000 deaths globally in 2012—or a standardized mortality rate (SMR) of 11.4 per 100,000—suicide is a serious global public health concern. In the UK, the SMR rate is 10.1 per 100,000 (15).

COUNTRY	Standardised Mortality Rate (SMR) IN 2012
SCOTLAND	11.4 per 100,000
UK	10.1 per 100,000

- **EMERGENCY MEDICINES IN SCOTLAND :-**

A one-year analysis of adult (16-year-old) Scottish ambulance service, emergency department, acute inpatient, and mortality data was carried out after an index ambulance visit in 2011. The ambulance service responded to 9014 coded cases of self-harm or mental health issues for 6802 individuals. This is equivalent to 11% of all calls made during that year. These attendances produced a variety of routes. Transportation to and release from the emergency department were the most common outcomes (n = 4566/9014; 51%). A portion of patients (n = 1003/9014 attendances, 11%) were left alone at home. 23 percent, or n = 2043/9014, were admitted to the hospital. 97 of the 279 patients (4%) who passed away within the first 12 months of treatment were reported as suicides (12).

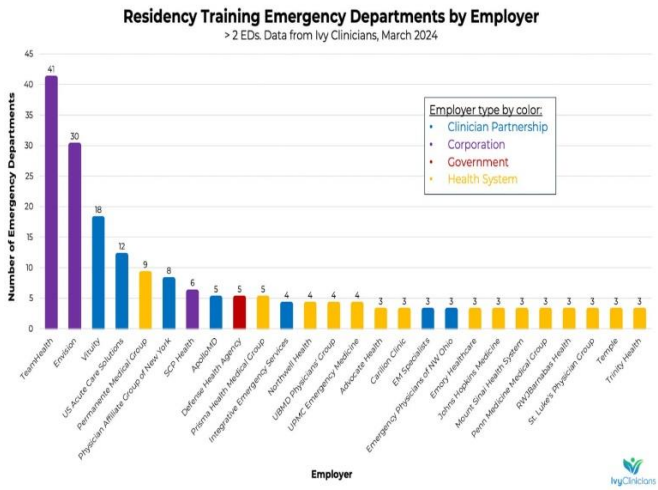


Singaporeans have benefited from high-quality healthcare at a reasonable cost, contributing just 3% of their GDP over the past three decades. The country's evolved standards of healthcare include an average life expectancy of 78.4 years and an infant mortality rate of 2 per 1000 births (16, 17, 18).

- **EMERGENCY MEDICINES IN SINGAPORE :-**

The Patient Acuity Category (PAC) Scale is a standard national triage method used by all emergency departments (EDs) in Singapore. In this approach, there are four priorities, P1–P4. All EDs use only certified nurses to do triage. SGH is one of the EDs with round-the-clock consultant coverage. General medical officers, trainees in surgery, medicine, and family medicine, as well as emergency medicine residents, make up the remaining physicians working in the EDs. For many disciplines, direct admission is available; however, for certain specialties, consultation with the on-call doctors is required. Cardiothoracic and neurosurgery experts are on call 24 hours a day at three of these institutions. The Burns Center for the entire island and the Burns Intensive Care Unit are also located at SGH. Instead of sending some cases to the closest hospital, paramedics can send them straight to the most suitable hospital, avoiding other hospitals in the process. Due to Singapore's small size and comparable travel distances to most hospitals, delays resulting from bypass choices are not typical (19).

- **DATA OF NO. OF EMERGENCY DEPARTMENTS AND THE NUMBER OF EMPLOYES :-**



The chart shows a wide range of employers with varying numbers of associated emergency departments.

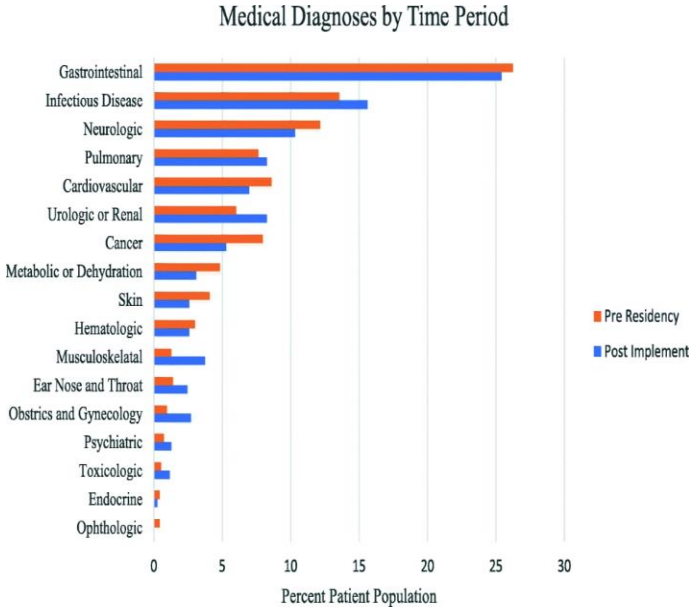
TeamHealth and Envision, both corporations, have the most EDs, indicating they are major players in this field.

There are relatively fewer government and clinician partnership employers compared to corporations and health systems.

Health systems generally have a moderate number of EDs, with many of them tied with 3 EDs each.

The chart provides a snapshot of how emergency department residency training programs are distributed among different types of employers, giving insights into the prevalence and distribution of these programs.

- **EPEDEMIOLOGY OF PATIENTS GETTING MEDICAL DIAGNOSIS ON THE BASIS OF TIME PERIOD IN EMERGENCY MEDICINE:-**



The chart illustrates how the distribution of medical diagnoses has changed between the two periods. Notably, the "Post Implementation" period shows an increase in infectious diseases, neurologic, cardiovascular, urologic or renal, and endocrine diagnoses, while there is a decrease in pulmonary, metabolic or dehydration, hematologic, and obstetrics and gynaecology diagnoses. The gastrointestinal category remains the highest and relatively stable across both periods.

CHALLENGES FACED DURING PRACTICING OF EMERGENCY MEDICINES IN INDIA AND OTHER DEVELOPED COUNTRIES:-

1. A scarcity of emergency medicine experts with training: Most emergency rooms are still manned by general practitioners or other experts who are not educated, especially in emergency care; in certain situations, even specialists in alternative medicine lack the qualifications required by the allopathic medical system. Only 36 MD/DNB emergency medicine training programs exist in India, admitting 158 candidates annually. Additionally, 300–400 candidates enroll in various certificate programs offered by societies, foreign universities, and colleges. All told, this means that only 250 trained or certified emergency physicians are available in India annually, not nearly enough to meet the enormous demand for

emergency physicians. This information comes from a recent survey conducted by SEMI. At this rate, the Society for Emergency Medicine India predicts that it might take us forty more years to meet the nation's current need for emergency medicine. Patients who are really ill or injured may not receive timely or effective care as a result of this acute scarcity of qualified experts, which might be fatal.

2. Lack of standardization in emergency treatment: The standard of care varies greatly throughout institutions and geographical areas. Numerous variables, such as a lack of established emergency care practices, poor infrastructure, and a staffing shortfall, might be blamed for this heterogeneity. Furthermore, variables including socioeconomic position, geography, and resource availability frequently have an impact on the quality of emergency treatment.

3. Insufficient communication across medical facilities: For seriously ill or injured patients, this lack of coordination may result in treatment delays and needless hospital stays, which may have dire repercussions.

4. Lack of necessary medical supplies and equipment: Defibrillators, oxygen cylinders, ventilators, and other critical medical supplies are in low supply in India's emergency medical services. In the midst of the COVID-19 epidemic, more than 80% of physicians reported a PPE shortage, according to an Indian Medical Association study. For patients who are very injured or unwell, this scarcity might have dire repercussions, especially in the event of a pandemic.

5. Although over 70% of Indians reside in rural regions, there is a dearth of access to qualified healthcare professionals in these locations. Many Indians living in rural areas must travel long distances to receive medical treatment because around 77% of the country's certified allopathic doctors reside in urban areas.

6. Talk about the lack of ambulances and staff.

7. Accelerating and optimizing response times

8. Improving our paramedics' abilities

9. Using affordable technologies in regular operations.

10. Suicidal patients and mental disease require special attention (1, 20).

CONCLUSION

When the epidemiology and emergency medical practices of industrialized and developing nations are compared, notable distinctions are revealed, determined by several variables. Epidemiological Disparities: Strong emergency response systems are essential in India due to the country's high rates of cardiovascular events, infectious infections, and trauma, particularly in rural and underdeveloped areas. Developed nations deal with a distinct set of issues, such as aging populations and chronic illnesses, as well as mental illness, which calls for alternative emergency treatment strategies.

Infrastructure and Resources: Advanced medical infrastructure, superior training, and greater resources are all advantageous to emergency care in industrialized nations. Better patient outcomes and increased efficiency are the effects of this.

Even with its recent improvements, India still has a long way to go in terms of its infrastructure, the availability of emergency workers with the necessary training, and the prompt delivery of healthcare, especially in rural areas. Integration of the Healthcare System: Emergency medical services (EMS) in developed nations are frequently well integrated, enabling prompt response and coordination amongst different healthcare professionals.

Although attempts to standardize, enhance response times, and coordinate efforts are occurring in India's EMS systems, gaps still exist between urban and rural locations. Prospective Courses: The following must be done in order to improve emergency medicine in India: Fund medical facilities and training initiatives to develop qualified staff. Establish standardized procedures and frameworks to guarantee an efficient and well-coordinated emergency response.

Educate and raise public knowledge of emergency response and prevention.

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