

## Emergency Medical Service (EMS) Belt

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**Abstract: Background:** Emergency medical service has been a well-known subject of discussion in India where the population is vast and the health care system is inadequate. Essential drugs are a category of drugs that are needed during the golden hour of saving a patient's life. It becomes necessary that time, when a simple drug can save the life of a patient, a competent health care provider, is needed to administer the drug to the patient. In such a situation, any health care provider in the vicinity of the person who needs medical assistance must get an alert so that the health care provider can reach the site of the emergency and provide assistance. EMS belt is a system in which with the help of a mobile application, any person in case of a medical emergency can get service from a nearby health care provider within a few minutes. The concept is to raise an alarm alerting the nearby health care practitioners about the person in need of medical assistance. This concept is promising with the advantage that it doesn't need any special manufacturing of the device. Conducting trials on this concept shall yield good observations and produce hopes for a cost-effective EMS system in India. [Saxena R Natl J Integr Res Med, 2021; 12(5): 86 - 90]

**Key Words:** EMS Belt, Medical Assistance, Accessibility, Cost-Effectivity, Time-Bound, Availability, Emergency Drugs

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**Introduction:** The lancet published in their article that 1.6 million in India die every year due to inadequate healthcare<sup>1</sup>. As the world has gone through a shockwave of the COVID-19 pandemic, it has turned the eyes of the world towards the health of the population as a whole<sup>2</sup>. In a situation of a pandemic or during normal times, emergency medical service (EMS) carries a lot of weightage in the health care system not limited to hospital but extends to out-of-hospital emergency care (OHEC)<sup>3-5</sup>. The Emergency Medical Service (EMS) Belt can be a ray of hope to tackle the conditions of those lives which land up in medical emergencies and seek medical assistance in our country<sup>6-9</sup>. The EMS belt shall help to cover up almost all sorts of out-of-hospital medical emergencies in India. It may be a cost-effective method and may be easily used by a trained health care provider or a registered medical practitioner.

### The Rationale Of Using EMS Belt In India:

According to NCBI, the ratio of doctors to the population in India is 1 doctor per 1000 citizens<sup>1</sup>. This numerical data in itself shows the

inadequacy of the health care system in India. Furthermore, health care providers are specifically localized in their working institutions, and none are available outside their institutions for any medical emergencies! The EMS belt system shall increase the accessibility to immediate medical assistance irrespective of time and location, throughout the country.

**Proposed Concept:** The EMS belt consists of a pouch with cartridge space for ampules of emergency drugs. It is a bag with color coding and specific numbering. It is devised with a GPS to increase the visibility of emergency medical services on applications like Google maps. The EMS belt is associated with a mobile application that contains information about the availability of emergency health care providers in the vicinity.

The mobile application also contains an 'alarming system' to raise a signal to the nearby emergency health care provider about the incidence. To make the doctors or nurses or pharmacists about this concept training or hands-on workshop needs to be provided initially. The EMS belt is

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promptly applicable in the current situation of a medical emergency.

**Material & Methods:** Methodology Of Conducting A Trial Of EMS Belt System: Availability Of EMS Belts: Production of EMS belts does not need a specialized manufacturing system. It is merely an assembly of certain items.

Following Are The Contents Of An EMS Belt:

1. A bag or a pouch to hold the contents
2. Emergency drugs
3. User manual
4. Essential surgical items like a syringe, scissors, band-aids, tourniquets, etc.

Data Collection: Doctors shall be categorized into color codes. Red - Cardiologist, Neurologist, Pulmonologist, Intensivist, Blue - General Physicians, Orange- Nurses Or Pharmacists.

**Discussion:** Over the last few decades, India has made significant advancements in the way healthcare is delivered in the country. In terms of employment and revenue, it has been one of the largest sectors and is growing at a brisk pace.

Healthcare in India is delivered mainly either by public or private providers. Public healthcare focuses on delivering primary healthcare through community-level health programs mainly focusing on reducing mortality and morbidity caused by various communicable and non-communicable diseases. It follows a tiered system of infrastructure wherein basic health services are provided through sub-centers and primary health centers, while secondary and tertiary care is delivered at better-equipped establishments such as community health centers, district hospitals, and medical colleges that are mostly at district headquarters. The private sector largely has its presence concentrated in tier I and II cities. The disparities and the challenges to equitable, accessible, and quality healthcare get exposed when compared geographically<sup>10</sup>. Although in India healthcare providing systems and institutions are evolving at a greater pace.

Also, the importance given to healthcare is increasing day by day but still, there is a lack of any efficient system in a medical emergency, though we have an emergency or casual ward at hospital setup. But what about those emergencies that arise outside the hospital

setup, at common public places, roadside, etc. There is a lack of such a system in our country and this paper is a humble attempt towards informing the need and developing such a system for the betterment of human society and contributing to the national healthcare system. In emergencies, if critical life-saving medicines are given to the victim/patient, then there is a chance that the victim/patient may survive and maybe shifted to a nearby ICU setup of a hospital, then there is a chance that he/she will not die due to the non-availability of medical attention or services at that critical point. The operations of the health system in India have been divided between the union and the state governments.

The Union Ministry of Health & Family Welfare is responsible for the implementation of various programs on a national scale (National AIDS Control Program, Revised National Tuberculosis Program, to name a few). On the other hand, the areas of public health, hospitals, sanitation, and so on come under the purview of the state, making health a state subject. However, areas having wider ramifications at the national level, such as family welfare and population control, medical education, prevention of food adulteration, quality control in the manufacture of drugs, are governed jointly by the union and the state government<sup>11</sup>.

India has alarming statistics for medical and other emergencies. The Ministry of Road Transport and Highways, the Ministry of Home Affairs, and the National Crime Records Bureau estimated that in 2007, close to 300,000 emergencies occurred in India every day, with 9.5 percent of the population being affected by an emergency each year. Of these, 80 percent were medical emergencies, 18 percent were police emergencies, and the remaining 2 percent were fire emergencies.

As late as 2005, India had just a semblance of an emergency response system in the form of three toll-free numbers: 100 for police emergencies, 101 for fire emergencies, and 102 for medical emergencies. These numbers were affiliated with government agencies that worked inconsistently and independently of each other, with little or no coordination in responding to an emergency. No one agency coordinated the various elements of trauma care and emergency response system at the national level<sup>12</sup>. An emergency medical

situation can arise for anybody at any time at any place. Following are the list of medical emergencies encountered in day-to-day life;

1. Vasovagal Or Neurovagal Syncope
2. Hypoglycemia
3. Angina (Chest Pain)
4. Road Traffic Accident
5. Burn Injury
6. Status Epilepticus
7. Status Asthmaticus
8. Uncontrolled Vomiting
9. Myocardial Infarction (Heart Attack)
10. Epistaxis (Nose Bleeding)

For example, the emergency medical condition may arise for diabetics. A country like India is a house for this disease. India has an estimated 77 million people with diabetes, which makes it the second most affected in the world, after China.

One in six people (17%) in the world with diabetes is from India<sup>13</sup>. A diabetic patient may suffer from sudden hypoglycemia and may faint and a life-threatening situation may arise and if prompt medical attention is not provided he/she may die. Low blood sugar can look a lot like the person is drunk and can be overlooked as being a real emergency<sup>14</sup>.

So if 25% dextrose injection is given to such victims in an emergency by emergency medical service providers or doctors, one can save the lives of many more such patients. Further complications (like brain damage) due to the delay in providing medical attention can also be prevented! The remaining treatment can be continued in hospitals under the supervision of medical professionals.

Stroke is the second most common cause of mortality worldwide and the third most common cause of disability. Hypertension is the most prevalent risk factor for stroke<sup>15</sup>.

The hypertensive individual may suffer from stroke and subsequent paralysis. If it is happening on a crisis basis, prompt medical attention could be of tremendous help to such patients. Also such critical emergency can arise during any private or public program.

For example, during a buffet lunch or dinner, if someone gets choked up, emergency medical services could be delivered.

When the individual is showing the signs of stroke, his/her respiratory muscles are getting choked we can give him steroids or anti-allergic relaxants and his/her life may be saved. Let us say, for example, a person A at some time and location encounters a myocardial infarction.

In such a situation, the patient will have to simply raise an alarm to doctors around using the button on the EMS belt app. The button will automatically search for emergency medical practitioners around and send them alerts. This process will help in saving a life within the golden hour.

India being a developing country, still encounters heavy traffic problems in daily life. So in such a situation, the doctors can play a major role in saving the lives of people who have landed up in a medical emergency.

As mentioned earlier, in India, the doctor-patient ratio is less. Doctors are not available everywhere at all times. Even if the doctors are professionally active they are either at hospitals, medical institutions, or in their clinics. Furthermore, most of the time doctors don't keep emergency medicines or injections in the car or any other means of travelling or during their journey from one place to the other, because there is no such system available that is easy, user-friendly, simple, and yet effective.

Therefore, we propose/think that if an app along with this emergency medical belt is developed to cater to this specific emergency demand, a small revolutionary contribution can be made in the health care sector. By developing such a system, both patients in emergency and the doctors will be benefited.

The doctors should be paid their professional fees as they are saving the life of a patient in deep need. Later on, this can be made financially feasible by bringing in insurance policies or insurance finance providers and doctors can claim their fees accordingly.

For this emergency service, the proposed app can be made like we have apps local or outstation travel, where one can get access to available taxis or rickshaws nearby their locations for travelling purposes. On a similar ground, the app can show the availability of doctors in the nearest vicinity of patients in requirement of emergency services.

The app even can be handled by healthy people who come near the site of patients in an emergency or the accident area.

This will be a very easy and yet efficient tool to bridge the gap between the medical service provider like doctors and medical professionals and the receiver of emergency medical services, the patient or the victim. Although there are some doctor consultation apps available they are for consultation purposes only.

Where the patients need to book an appointment, pay the fees in advance, and wait for his/her turn for the availability of the doctor.

Such consultation apps are good for consultation, or for obtaining second opinions, etc. but do not cater to any emergency conditions. Our proposed app along with the critically equipped emergency belt may help increase the “critical presence” of the doctors.

This will be different from the routine presence of the doctors in hospital setup or their professional places. Also, it may be quite possible that the individuals in a medical emergency may not even know that a doctor is available nearby to him or her and may depend on the mercy of sensible citizens to take them to hospital setup or call an ambulance.

The number of ambulances was disproportionately low compared to the population of India, a situation worsened by poor or no coverage in remote areas. Government-run ambulances were few, with private trusts and hospitals only marginally supplementing this service. In rural areas, patients were often transported to health facilities<sup>12</sup>.

In a country like India, the availability of ambulances in an emergency is again the topic of debate that is beyond the scope of the present paper. In India, ‘food packets’ may be delivered ‘faster’ than the ambulance. Also, common people at the site of accidents are not motivated enough to take quick, sensible actions to help the victim due to the fear of law and police problems.

In this proposed app there will be a provision for a universal button so even illiterates can press that button, a message will be sent to doctors in the nearby vicinity, they will get an alert and may try to reach the place of incident.

So through this app, we are trying to increase the presence of doctors who are equipped with almost all the critical emergency medicines in one place. This seems to be possible or at least feasible than to increase the number of doctors.

Although national medical agencies, national and state governments are trying to increase the number of medical education institutes this may take time to produce efficient medical professionals or in other words, society may have to wait for another 5 to 6 years till the medical professionals pass out and start serving people.

Even after that, the doctors will be attached to either hospitals or their clinics. So simply by increasing the number of doctors the need for emergency medical help or need of medical help during emergencies outside hospital setup may not be catered. So the ‘critical presence’ of doctors may be possible through this proposed app 24 × 7 anywhere, anytime, and for anybody.

So we can save many lives which otherwise would be lost because of the non-availability of reaching emergency medical services. We are also trying to make a unique medical emergency pouch that may contain all the necessary critical/emergency medicines like injections, syringes, critical medicines, bandages, strips, glucometer, thermometer, oximeter, etc.

The EMS belt along with its app may help to cater to almost all sorts of out-of-hospital medical emergencies in India. It is a cost-effective method and can be easily used by a trained health care provider or registered medical practitioners.

This may help in bridging the gap between health care practitioners and the person in need of urgent medical assistance and may reduce the wastage of time taken in providing medical assistance in the golden hour period of emergencies.

**Conclusion:** The novelty of the concept of EMS belt is that the emergency drugs are arranged in a rational order with specific color codes. The EMS belt app has settings that automatically search for health care practitioners around the patient’s location. This concept should be practically tested by different health care research institutions. The results obtained from this project shall yield productive information and may help save many lives. EMS belt is a

promising concept and probably the need of the hour in our country.

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Conflict of interest: None
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Funding: None
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Cite this Article as: Saxena R, Aziz A, Attar R, Saxena A, Saxena D, Sankaran N, Wankhede S. Emergency Medical Service (EMS) Belt. <i>Natl J Integr Res Med</i> 2021; Vol.12(5): 86-90
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