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Prehospital emergency care model using short code access number for refining dispatching of ambulances and clinical communication for patient transfer—Insights from a Private Medical College and Hospital, Mysuru, India

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Abstract:

BACKGROUND: In healthcare, effective communication is essential, particularly in emergency situations, it is critical and important. This article suggests a prehospital emergency care model using short code access number, through which method of communication from dispatching of ambulances to arrival and handover of patients to hospital is facilitated in emergency instances. We also attempted to elaborate the procedure, we followed for establishing this emergency access number for this private medical college in South India. Practical recommendations are also provided for policymakers who wish to initiate such facilities.

OBJECTIVES: To strengthen our prehospital emergency care with ambulance short code, to guarantee that it is flawlessly incorporated into the healthcare system and to promote public responsiveness in prehospital Emergencies.

PROJECT METHODS: Establishment of in-hospital ambulance command center, using a project management cycle framework in the phases of planning, designing, training, and implementation. A needs assessment was conducted and a committee was developed with a multidisciplinary team for planning and implementing out this initiative.

RESULTS: It was possible to implement hospital emergency short code access number for hospital ambulance operations along with the establishment of ambulance command center with a trained interdisciplinary team and achieve best practices by participating on refining existing infrastructure and human resources.

CONCLUSION: Timely arrival of an ambulance can make the difference between survival and death, in life-threatening emergency situations in which every second counts. Our prehospital emergency care model will respond to the patient needs from the initial emergency request of ambulance and its dispatching to arrival of patient and his/her admission to the emergency medicine department of the hospital. Data generated by the program will be used to guide and design appropriate interventions.

Keywords:

Ambulances, communication, emergency access number, prehospital care

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Introduction

Access to emergency care in the shortest period of time is a key problem and more relevant in the Indian context. Prehospital emergency care system is one of the important parts of the health system. The prehospital care system of a nation is the mirror of its healthcare delivery system, capability, and attitude, a robust prehospital care system leads to robust healthcare system. Using their medical system and workforce, almost all countries operate a prehospital emergency service. Recent studies conclude that early and specialized prehospital management contributes to emergency case survival.^[1] However in Asian countries, the prehospital care services are not well established or still in infantile stage, only 10%–20% of patients are transported through prehospital care services.^[2]

Bringing the basic emergency service to the prehospital setting is of paramount importance for treating the patient in the golden hour. Time-sensitive illnesses such as acute myocardial infarction, cerebrovascular accidents, sepsis, pediatric emergencies, obstetric emergencies, motor vehicle accidents resulting severe head injury, or major vascular catastrophes are some of the significant contributors to the severe disability and premature mortality in developing countries because of nonavailability of ambulance services.^[3] Having a good prehospital care can significantly decrease the morbidity and mortality in such patients.

For starting life-saving measures even before patient arrival to the hospital, the ambulance itself can be the immediate patient saving site [Figure 1]. Because ambulance services have a capacity to provide wide range of services to optimize the patient’s clinical condition such as control of primary hemorrhage, management of fractures, and care of injuries such as wounds and lacerations patient transport and referrals to higher/alternative healthcare facilities in both emergency and nonemergency instances.^[4] With the advent of technology and modernization, ambulances can serve as initial point for emergency care access to patients.

In India, due to road traffic accidents/collisions >50% of the patients die within the first 15 min, as they suffer with early/immediate traumatic injuries which may lead to head injuries, heart and lung contusions, massive bleeding, multiple fractures or cuts, lacerations, and abrasions. The reason is that from roadside to critical care there are a series of discrete steps rather than being a continuum. These victims treated through conventional emergency services, the preventable death ranges up to 17%. Majority of the citizens use rickshaws or taxis for emergency transportation due to the unavailability

of ambulance. It is extremely vital to remember the emergency ambulance number 108 being the free emergency telephone number in India, is currently running in 25 states and Union territories of India.^[5]

Information, communication, and technologies can really impact and improve the quality of care that we render to our patients. An integrated computer-aided dispatch system is a structured and complex information system which is decision aid tool to recommend appropriate resources and be used to tracking events, people, vehicles, and other resources. It is a powerful management and reporting tool. The computer-aided dispatch systems improve efficiency and response time, improves the quality of information, and therefore the quality of decisions.

Globally, the demand for ambulance services has expanded quicker than populace growth alone can represent.^[6] It is imperative to have a good ambulance/paramedical services across the country given the Indian population scenario. A simple, easily recallable number for immediate access of the emergency ambulance services within the locality/across the nation is very much vital. In this regard, we planned and established an emergency access number for our hospital ambulance operations.

The emphasis of this article is to define the method of establishment of in-hospital ambulance command center with emergency short code access number in a

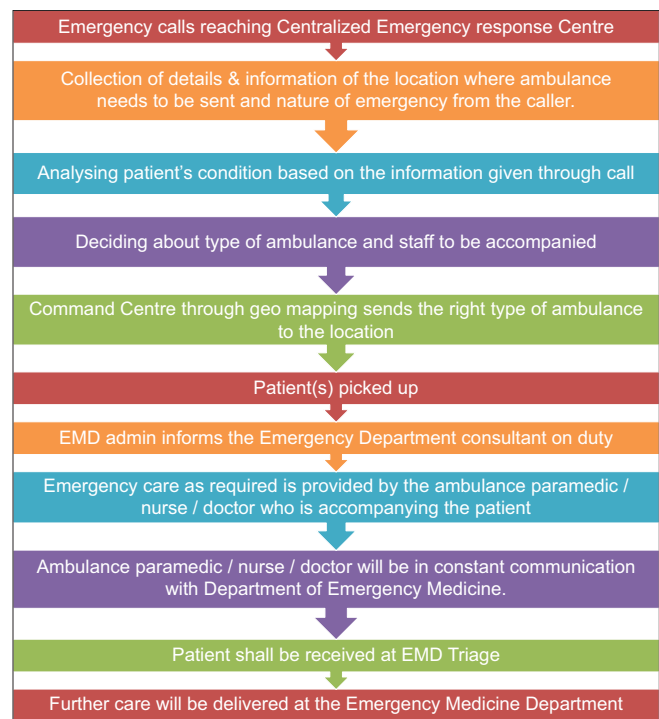


Figure 1: Work flow of ambulance command centre and emergency access number

private university-based medical college in Mysuru, India, using a project management cycle framework. The stages and major outcomes of our ambulance emergency access number project are reported here; performance and feedbacks following implementation are ongoing as part of the monitoring and evaluation phases and those findings will be published differently. The lessons learned and practical recommendations are also provided.

Project Methods

Setting

JSS Hospital is a tertiary care teaching hospital located in Mysuru City, Karnataka State in Southern India. Medical services of hospital are utilized by patients from within the state and also by neighboring states.

Idea conceptualization

The idea of implementing this short code access number initiative in our medical college, hospital resulted from a discussion between hospital and clinical administrator and emergency medicine physician during the quality improvement meeting.

Planning

The establishment of an emergency access number along with ambulance command center requires planning and close teamwork between hospital administrators and the departments of Emergency Medicine and Information Technology. Success in its implementation requires effort, money and time, defined organizational goals and objectives, alterations in support resources, and interdepartmental management and coordination. Selection of core planning team was critical, as it allowed for frequent meetings and proper decision-making. This stage included communications with the Hospital Director, Medical Superintendent (who is the Head of Clinical Services), Principal (Head of Medical College), and heads of Emergency Medicine, Information Technology, and also with the chief of Nursing Services. The chief administrative officer along with engineering and maintenance departments were also involved. Another key component of the planning process was to ensure compliance with legal requirements and liability guidelines.

A strengths, weaknesses, opportunities, and threats (SWOT) analysis of existing ambulance services in JSSH was undertaken. The results of the SWOT analysis provided evidence regarding gaps in ambulance services offered for accessing JSSH for prehospital emergency healthcare and provided some of the basis for developing the team's operating procedures. Potential members of interdisciplinary ambulance command center team were identified based on recommendations by their

supervisors and/or peers and were contacted at this stage. They were given the opportunity to consent or decline inclusion in the team; few declined with reasons ranging from their perceptions of the burden of work.

Model

Computer-aided/assisted ambulance dispatch system.

Design

In project management cycles, the design phase focused on meeting initially identified requirements. Having chosen the model for the proposed emergency access number and ambulance command center services, the layout of the existing space had to be modified to suit the new purpose: schematic diagrams of the proposed floor plan were drawn in collaboration with the head of clinical services and used for the purpose-tailored allocation of command center, and offices. Initial plans were later modified in collaboration with the interdisciplinary team and management staff as new needs arose.

Training and implementation

Training of the interdisciplinary team took place in the hospital. Facilitators for the training were drawn from the Departments of Hospital Administration and Emergency Medicine. Training program focused on call processes and information that needs to be collected by the caller executives in various situations etc., It was a cramped period of lectures, role plays, and video-assisted learning sessions. Computational tests using a simulation model were performed and after ensuring all the necessary requirements and compliances, we made our short code access number operational.

Results

The key emergency short code access number with ambulance command center in close proximity to the Department of Emergency Medicine, JSSH—was established which functions in the following manner:

Context of the ambulance command center

This ambulance command center was established near the Emergency Medicine Department of Tertiary Care Hospital in Mysuru. The hospital has all clinical and diagnostic services running inside its own premises. The emergency medicine services have a good consultation-liaison service and get a fair number of cases. Prior to the inception of the emergency access number along with ambulance command center, formal communications were sent to all nonclinical, clinical, and supportive departments and also to its sister institutions briefing them to its scope to ensure rapid usage in case of an ambulance requirement for any kind of emergency medical situation. Mass media communication was also utilized to sensitize the community regarding this

emergency short code access number. We also used social networking sites and flyers for promotion.

Structure of the ambulance command center

Our ambulance command center serves as the communication center for all activities of JSSH ambulances. The communication center currently serves communities with requests for service from in and around Mysuru region and it has facilities of caller identification, automatic tracking of location (address databases). There are computer-aided dispatch and monitoring of ambulance with global positioning system (GPS) navigation and tracing of the location. GPS tracker is setup in the ambulance so that the hospital ambulance command center can keep the track of all the ambulances and to ensure our patients get the closest, appropriate ambulance in response to their emergency. The ambulance command center has a manager for the emergency operations center, an operative manager, and a health professional manager. Technical submanagers and health care provider examining officers also are employed at the middle level.

Assessment and management of telephonic calls and requests

The ambulance dispatch center will receive all emergency phone calls through the designated emergency access number. The dispatcher plays a key role in allocating the proper resource to patients in cases of medical emergency. The call taker reviews the problem and establishes that there is medical emergency. Call taker notes the caller's relationship to the patient, caller's location, and the dispatcher's case priority. He/she then will dispatch a suitable ambulance and provide prearrival instructions to patient to begin care as per the situation. The call taker of ambulance command center has the duty to determine the emergency level and degree of urgency in the so-called triage process through performing a questionnaire. Accordingly, an ambulance is referred to instances only in the case the patient really needs this service. It is essential to have an emergency vehicle accessible for dispatch when required. As soon as the ambulance receives dispatch by radio a fully stocked ambulance leaves with expertly trained personnel. A GPS provides the location. Ambulance personnel arrives with patient, and then provides medical care report to hospital personnel, assists with care during handover to hospital personnel, and helps in completion of prehospital care report. The operator can also provide support to the caller such as cardiac arrest support or reduction of blood loss support until the ambulance arrives to the scene.

Discussion

The aim of emergency medical services (EMS) systems is

to deliver quick and appropriate treatment in emergency states.^[7,8] EMS systems usually consist of management and time-dependent transportation service to render the needed care within a local community-based healthcare system, such as hospitals. Likewise, the definitive goal is to decrease disability and mortality rates while at the same time promoting health.^[9]

The aspects of the emergency short code access number along with ambulance command center development described in this report prove that with teamwork and support from the institution, it is possible to implement in-hospital ambulance command center. Our project was based on providing medical facility to the people who need medical attention. It uses manual alert methods. This report additionally underscores the value of locally accessible specialized expertise which can outfit in building limit with respect to healthcare services.

An EMS is a vast system in itself and requires conjoint functioning of many areas to run smoothly. There needs to be standardization of processes, facilities, and equipment to make sure that the complete system runs smoothly. To run an efficient system there is a need to understand the following concepts:-What and how it is important, role of EMS (triage/treat/transport), who needs transport, the relationship between structure (anatomy) and function (physiology), etc., It is very important to put together the structure and functioning of any service.

Dispatch and communication is important component as it is the central hub for coordination. Information system is important for implementation and improvement. For effectiveness and efficiency of ambulance-based emergency medical care system, two-way communication system should be used.^[10] Ambulance dispatch centers manage telephone calls of patient by utilizing a clinical triage framework to gather and record data in real-time and decide the requirement for an ambulance and the urgency of the need.^[11]

The purpose of our proposed structure is to enhance the performance and management of ambulance dispatching, to improve communication links between the ambulance and therefore the healthcare facility and also to reduce the time on ambulance diversion, which successively improves overall patient care.

GPS will enable the hospital act quicker in the first and most crucial hour for a victim after an accident. The GPS installed in the ambulances guarantees that operators at the base centre locate the patient's locality and inform the driver. The framework will likewise assist with checking the misuse of ambulances.^[12,13] and this framework has been productively utilized in India in different taxi cab services to ferry passengers.^[14]

Measuring reliability and accountability are key frameworks that take into account for minute-to-minute system modifications based on real-time performance data that is fundamental for success. Our call management processes are being assessed so that its results can be integrated into future training. Performance audits are ongoing, the results of which will be published separately. A daily after-action review processes will improve situational awareness, recognize trends and patterns, permit the institution to communicate, and will in the long run lead to improved performance. Preparedness is a method of assessing the capacity to serve expected patients with ambulances now and later on.^[15,16]

The project has been and is being built through multilevel, interdisciplinary support, guidance, and expertise throughout the implementation process. The team of hospital administration and emergency medicine and successive heads of Information Technology, Engineering and Maintenance have been fundamental to the accomplishments till day. We could also not have done without the initial and continuing support of our Chief Administrative Officer.

Feedbacks are ongoing. We have presented this report in the hope policymakers, emergency healthcare practitioners; will find the stimulus to establish dedicated in-hospital ambulance command center services to outfit for the needs of people who need ambulance for prehospital emergency care and hospital transfer. Feedbacks to team members, the head of the Emergency Medicine Department, the management and administrative staff of the hospital, and other relevant stakeholders have provided the basis for program modifications, infrastructural improvements, and for obtaining further assets for our new Emergency Response Medical Services.

Limitations

- The structural and functional organization of our ambulance command center with short code access number established here strictly applies to this hospital only
- It can be developed/replicated in other institutes after necessary modifications as per their needs, resources available, type and size of hospitals, and levels of care provided. They can also vary in location, shape, and site depending on the space availability.

Conclusion

In life-threatening emergency situations in which every second counts, the timely arrival of an ambulance can make the difference between survival and death It is possible to implement hospital emergency access number for hospital ambulance operations along with

the establishment of ambulance command center and achieve best practices by investing on improving available human resources and infrastructure. In planning, designing, and implementing the emergency access number along with ambulance command center in this Hospital, was possible only because of teamwork. Ambulance dispatch centers manage patient telephone calls by using a clinical triage system to collect and record information in real-time and determine the need for an ambulance and the urgency of the need. To assure an appropriate response and utilization and functioning, proper planning of EMS infrastructure is paramount.

Recommendations

- To study the utilization patterns and rates of our prehospital emergency care model
- To study the use of ambulance dispatch calls for surveillance of various clinical conditions
- To study the protocol compliance of the staff managing and attending
- To evaluate patient outcomes in all ambulance missions attended
- To analyze the efficiency and call response time and the factors influencing it.

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Conflicts of interest

There are no conflicts of interest.

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