

## Original Research Article

# Need for teleconsultation among the emergency medicine and critical care personnel during pre-hospital transport in a tertiary care unit

V. Karunai Kadhir<sup>1</sup>, T. Hemalatha<sup>2\*</sup>, V. P. Chandrasekaran<sup>1</sup>

<sup>1</sup>Department of Accident and Critical Care Medicine, Vinayaka Missions Medical College, Salem, Tamil Nadu, India

<sup>2</sup>Department of Pharmacology, Government Medical College, Kozhikode, Kerala, India

**Received:** 06 October 2016

**Accepted:** 05 November 2016

### \*Correspondence:

Dr. Hemalatha T.,

E-mail: hemalini11@gmail.com

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### ABSTRACT

**Background:** Time being the most crucial factors in emergency medicine, teleconsultation enables patient assessment by specialists, immediate reception of appropriate treatment guidelines until the patient's arrival at hospital.

**Methods:** Our study evaluated the need for teleconsultation among the emergency physicians (EP) and emergency technicians (ET) in a tertiary care hospital. Cross-sectional study conducted in Department of Emergency Medicine, a tertiary care setting. Pretested semi-structured questionnaire was given to EP and ET. Various parameters like the need for teleconsultation, the minimum time required for EMS (emergency medical services) to arrive at the scene and to the hospital, effectiveness of teleconsultation in prehospital care were evaluated.

**Results:** SPSS version 18.0 was used. 24 EP and 36 ET participated in the study. The minimum time required for the EMS to arrive at the scene and then to hospital was calculated indirectly to be > 30 min. There was a significant difference among the EP and ET in interpreting common emergency condition  $p = 0.029$  and criticality assessment  $p = 0.035$ . The training of EMS staffs was adequate. Both EP and ET were able to adhere recent guidelines during prehospital transport. All the study participants (100%) felt the need for teleconsultation which would improve the patient management during the prehospital period.

**Conclusions:** Teleconsultation has the potential to improve patient safety and quality of treatment in a prehospital setting and should be further evaluated.

**Keywords:** Emergency medical services, Prehospital period, Teleconsultation

### INTRODUCTION

Providing adequate and timely emergency care in prehospital and in-hospital situation is very important in reducing the mortality. Due to global shortage of healthcare professionals, qualified professionals may not be physically present particularly in the under-resourced regions and during prehospital transport. This can be tackled by providing teleconsultation and specialist medical services using information and communication technologies to remotely located patients where such expertise is not immediately available. Teleconsultation employs telemedicine which is “The delivery of

healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities”.<sup>1-3</sup>

Delay in hospital arrival (pre-hospital delay) is an important cause of increasing early and also late mortality in various emergency conditions like acute MI, stroke etc. the proliferation of smart phones, tablets and other

mobile electronic devices creates an opportunity to extend standard professional health care particularly in medical emergencies where urgent intervention could reduce mortality and improve quality of life. Telemedicine could enhance emergency medical services by helping expedite urgent patient transfer, improve remote consultation, and enhance supervision of paramedics and nurses. Teleconsultation has a positive impact on emergency medical care. It improves the pre-hospital diagnosis of stroke and myocardial infarction and enhanced the supervision of delivery of tissue thromboplasminogen activator in acute ischemic stroke. Telemedicine presents an opportunity to enhance patient management.<sup>4,5</sup>

The main aim of this study was to assess the need for teleconsultation among the Emergency care personnel during prehospital transport in our hospital. The objectives of this study was to assess the need for teleconsultation among emergency medicine physicians (EP) and emergency medicine technicians (ET) during prehospital transport in our hospital and to suggest recommendations based on the results of the study.

## METHODS

This study was designed as a cross-sectional study. The study was approved by the Institutional Ethics Committee and was conducted in the Department of Accident and Critical Care medicine and also in the Department of Emergency Medicine in a tertiary care unit in Salem, Tamil Nadu, India.

A non-probability random sampling technique was followed during the study. No external funding agency involved. Study duration was for one year. Study participants were recruited from the Department of accident and critical care medicine and from the Department of Emergency Medicine at a tertiary care unit in Salem, Tamil Nadu, India.

Written informed consent was obtained from all the study participants. The study participants were Critical care physicians and emergency medicine physicians (EP) and critical care and emergency medicine technicians (ET) working in the tertiary care hospital. Physicians working in departments other than critical care medicine and emergency medicine were not included in the study.

All the study participants were selected based on the inclusion and exclusion criteria. The study participants were briefed about the purpose of the study. The study participants were then given detailed pre tested semi-structured questionnaire on the need for teleconsultation during pre-hospital transport. About thirty minutes was given to each study participant to answer the questionnaire.

Various parameters like minimum time taken for the emergency medicine services (EMS) to arrive at the

scene, minimum prehospital time were interpreted from the responses made in the questionnaire. From this the total time taken for the EMS to arrive at the scene and then to the hospital was calculated indirectly.

Common emergency condition attended during prehospital period, prehospital criticality assessment of the patient by using teleconsultation, adequacy of training of EMS staffs to practice teleconsultation, connectivity problems if any encountered during teleconsultation, time of response by the concerned specialist and the overall effectiveness of using teleconsultation during the prehospital transport period were assessed from the percentage of responses made for each question in the filled questionnaire form. Based on this, modifications if any required for the practice of teleconsultation were also assessed from the questionnaire. The filled questionnaire forms were collected and the results were analysed.

## RESULTS

The study results were analysed from the data acquired from the questionnaire. Statistical package for social sciences (SPSS) version 18.0 was used for statistical analysis. A detailed analysis of the questionnaire is given in Table 1.

## DISCUSSION

Medical direction is an essential component of a prehospital care system. Pre-hospital Emergency Medical care involves providing immediate medical care in what is often a resource limited and physically challenging setting. Telemedicine is a rapidly developing application of clinical medicine.

Telemedicine is essentially the use of both information technology and telecommunications to provide health services or support health service provision over a distance.<sup>6</sup> In this study, the need for teleconsultation among the EMS physicians and technicians was evaluated. The total time required for the EMS services to arrive at the hospital was > 30 min.

This delay in the prehospital period can be minimised by the use of teleconsultation and initiating the emergency medical care. Teleconsultation by the transmission of images can aid in the early diagnosis of the patient and improve the effectiveness of patient management. 88% of the study population responded that they did not encounter any connectivity problems during the prehospital period.

Such a favourable response encourages the use of teleconsultation during the prehospital period. All the study participants responded that use of teleconsultation during the prehospital period would improve the effectiveness of patient care and management.

Table 1: Questionnaire results.

Parameter	EP %	ET %	EP+ET %	P- value
No. of study subjects	40	60	100	-
Mean age	34.83	22.53	27.45	-
<b>Need For teleconsultation</b>				
Yes	100	100	100	
No	0	0	0	-
<b>ECG In prehospital transport</b>				
Taken	0	0	0	-
Not Taken	100	100	100	
<b>Time to arrive at the scene</b>				
< 30 min	100	83.3	90	
30 - 60 min	0	16.7	10	0.035
>60 min	0	0	0	
<b>Prehospital ambulance time</b>				
< 30 min	100	86.1	91.7	
30 - 60 min	0	13.9	8.3	0.058
>60 min	0	0	0	
<b>Common emergency condition attended</b>				
Trauma	100	80.6	88.3	
Angina	0	16.7	10.0	0.029
Stroke	0	2.8	1.7	
<b>Prehospital criticality assessment</b>				
Able to assess	100	83.3	90	
Unable to assess	0	16.7	10	0.035
<b>Adherence recent guidelines during prehospital transport</b>				
Able to adhere	91.7	77.8	83.3	0.157
Not able to adhere	8.3	22.2	16.7	
<b>Connectivity problems</b>				
Encountered	12.5	27.8	21.7	0.159
Not encountered	87.5	72.2	78.3	
<b>Time of response</b>				
Immediate	71.7			
Delayed	28.3			0.907
Not attending	0			
<b>Need for modifications in telecommunication (EP+ET)</b>				
Communication	73.3			0.240
Ambulance facilities	11.7			
Manpower	15.0			
<b>Management when unable to access teleconsultation (EP+ET) %</b>				
Proceed for own management	100			
Wait for response	0			
<b>Training for EMS staffs (EP+ET) %</b>				
Adequate	81.7			
Inadequate	18.3			
<b>Need for online medical direction (EP+ET) %</b>				
Required	100			
Not required	0			
<b>Effectiveness of teleconsultation in prehospital care (EP+ET) %</b>				
Improves	100			
Does not improve	0			

A systematic review conducted by Hasselberg M et al in their study on image-based medical expert teleconsultation in acute care of injuries. A systematic review of effects on information accuracy, diagnostic validity, clinical outcome, and user satisfaction concluded that Image-based telemedicine systems for injury emergency care tend to support valid diagnosis and influence patient management. Scalvini et al in their study on “assessment of prehospital chest pain using telecardiology” concluded that Telemedicine could serve as an useful tool in the patient management during prehospital period. Our study results were in accordance with the above mentioned studies. It was found that the practice of teleconsultation during prehospital transport would improve the effectiveness of patient care.<sup>7,8</sup>

Based on the conclusions of the study, following provisions can be made:

- Adopting a new method of enhancing skills and training activities on regular basis to all EMS staffs.
- Provision of ECG during prehospital transport.
- Management should consider the replacement of mobile handsets with one which support the blue tooth technology, 3rd Generation and 4th Generation services at free of cost to the Emergency department while performing essential skills.
- Up gradation of medical equipments and ambulance facilities.

#### ACKNOWLEDGEMENTS

Authors would like to acknowledge the study participants.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the institutional ethics committee*

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**Cite this article as:** Kadhir VK, Hemalatha T, Chandrasekaran VP. Need for teleconsultation among the emergency medicine and critical care personnel during pre-hospital transport in a tertiary care unit. *Int J Adv Med* 2017;4:176-9.