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REVIEW ARTICLE

ASSESSMENT OF EMS PRACTICES AND ACCURACY OF DOCUMENTATION (A COMPREHENSIVE STUDY)

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ABSTRACT

Concisely describe the aims of study, methodology, short- and long-term objective and the significance of the study to health problems in Saudi Arabia. The Emergency Medical Service (EMS) is a vital part of the any healthcare system. They are the first responders to any, and all emergency situations. Being charged with the vital task of initial assessment of the patient at the scene, they have to overcome the obstacles of safe and fast transport to the appropriate medical facility, and initiation of life saving measures to provide the patient of the highest possible standard of care. Protocols and guidelines have been developed all over the world to provide a working template for the paramedics exposed to cases in the field. In this study, we are hoping to investigate how closely our EMS providers are adhering to the set protocols, and how their adherence, or lack thereof impacting on the patient presenting to the emergency department in critical condition. In completing this study, we hope to uncover any shortcomings that we may find in the existing EMS system that are potentially correctable, and in doing so propose a solution to improve on the current service, be it through the provision of better or missing equipment or improving on the training level of our paramedics in service, to raise the standard of care to its maximum. We are not looking for blame, we are only looking for avenues of improvement.

INTRODUCTION

Background and Aims of the Study (*state the problem, briefly summarize relevant literatures and identify the need for the study*).

The aim of our study:

- To ensure proper and adequate medical assessment of patients at the scene and en route to the ED
- To ensure proper documentation of all red crescent cases
- To ensure proper application of immobilization equipment in trauma patients
- To ensure adherence of EMS providers to the set protocols in place
- To investigate the ability to detect medical status deterioration of patients by the paramedics while en route.
- To investigate the extent to which pre-hospital management is being initiated by the EMS personnel.
- To provide data upon which new protocols might be made or bases to improve the level of personnel training.
- To provide data for future quality assurance projects and policies

METHODOLOGY

- This study is a prospective study incorporating 600 subjects to get a confidence level of 95% and a confidence interval of 96%
- Upon arrival the initial assessment of the patient's medical condition will be considered the gold standard relative to which the EMS assessment will be measured
- The initial vitals and condition of the patient will be collected on the data sheet.
- The ambulance care report (ACR) will be collected and stapled to the data sheet.
- This study is a strictly data gathering study and will have no bearing whatsoever on the management of the subjects included in it

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Projections: (*briefly state expected outcome*)

It is our hypothesis that there is quite a lot of room for improvement of our EMS system. Whether it is in personnel training in the proper medical assessment of patients, the proper application of immobilization equipment in trauma cases, and the initiation of simple diagnostic and therapeutic measures in the pre-hospital setting that are simple and of great benefit to the person being transported

C.SPECIFIC AIMS OF PROJECT (*in point format, state the aims of the study*).

- To ensure that EMS personnel are capable of frequent medical assessment of any case en route such that any and all deteriorations in medical status is known and, in some cases, managed until definitive measures are implemented in the ED.
- To ensure that immobilization equipment is being applied correctly and properly to all trauma patients.
- To ensure that all serious injuries are documented at the scene by the EMS response team.
- To ensure proper documentation of the ACR
- To investigate the number of cases pre-hospital management is initiated.
- To uncover any avenue of improvement in the EMS system that can be pursued (e.g. Lack of equipment)
- To assess ability of the EMS personnel to properly execute diagnostic and therapeutic measures correctly in a pre-hospital setting (e.g. Perform an ECG properly , insert and IV cannula properly etc)

BACKGROUND INFORMATION and Literature Review: (*extensively and critically review related literature and state the need for the study*).

To date, and since the original implementation of the EMS system in the Kingdom of Saudi Arabia, there has been no data collected to assess the level of training and how close the EMS protocols and policies are being adhered to. And though there are statistical data provided by the Red Crescent on the number of deaths, trauma, and other medical emergencies, no data has ever been collected that can be used in the assessment of the implementation of the EMS protocols in terms that are objective and affecting patient care, such as medical status and vital readings. For us to pursue avenues of improvement in our current EMS system, it is absolutely vital that we find out how well our paramedics are doing. It is essential that in a trauma case, or a medical emergency case, that any deterioration in the patient condition while en route to the ED be picked up by the paramedic in charge of the case. Are these deteriorations being picked up, and if they are, are they being managed as best as possible? Are the EMS providers in the ambulances able to recognize worsening oxygen saturation and hence start BLS or ACLS protocols when called on to do so? Are our EMS teams able to recognize worsening ECG rhythms on the monitors and thus administer anti-anginal measures for the patient?

It is exactly these questions that we need answered if we are to know our weaknesses and attempt to remedy them. Hence, the completion of this study will allow us to assess what is needed to improve our level of care. Whether we find that problems are due to improper equipment, such as not having the right C- collar size available to apply in a trauma case, or due to inadequate training, such as being unable to insert and properly secure an IV cannula, it is study that will initially point out which areas we need to focus on.

Finally, future data collection studies should be made as a follow up to this project, to find out to what extent we were successful in correcting any problems found in our EMS system

METHODS**Subjects / Patients****Exclusion criteria**

- All patient transported to the hospital by EMS due to difficult transportation issues, that are not in need of ED services (e.g. Transporting a bedridden patient to the OPD)
- All patients arriving to the ED in non-red crescent ambulances (e.g. From other hospitals)
- All patients arriving to the ED with signs of prolonged arrest i.e. DOA (e.g. Rigor mortis etc, hypothermia due to prolonged death etc)
- All and any medical emergency or trauma not arriving by EMS (e.g. MVA arriving by private car)

Inclusion criteria:

- Patients not meeting exclusion criteria.
- All major trauma patients in the KAMC-MNGH catchment area
- All medical emergencies (whether eligible or not) arriving in KAMC-MNGH ED
- Patients arriving in cardiopulmonary arrest without signs of prolonged arrest

Materials / Medication

- Data collection sheets
- ACR

Protocol / Experimental Details (attach workplan / study booklet / questionnaire etc. if available).

Data collection will be done by the nurse in charge at the time of reception of the ambulance.

Statistical Analysis: Statistical analysis will be done to ascertain if

- There is a significant statistical difference between the EMS patient evaluation and the ED clinical evaluation which would reflect the adequacy of clinical evaluation of the patient being transported by the EMS personnel
- The percentage of occult fractures, bleeding etc. no noticed by the ambulance crew
- Time of journey analysis
- Proper use of restraining equipment e.g. spinal boards, C-Collars
- Proper execution of simple diagnostic steps e.g. obtaining a blood glucose level in an altered mental status patient

A comprehensive study was conducted to analyze the effectiveness and deficiencies of the Emergency Medical Services (EMS) provided by King Abdulaziz Medical City (KAMC) in Jeddah. The study was led by Dr. Adeen Bukhari, with assistance from co-investigator Dr. Anas Hamam & Dr. sami baarimah. The research encompassed a total of 256 subjects, consisting of 73% males and 27% females, with ages ranging from 3 to 101 years. The patients were primarily categorized into two main groups based on the nature of their emergency; 40% were trauma-related cases, and the rest were non-trauma related. Various factors were measured and recorded, including heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), respiratory rate (RR), and Glasgow Coma Scale (GCS).

The analysis also assessed the frequency of alerting the Emergency Department (ED), the time taken to reach the scene, and the journey time from emergency site to ED. Results revealed that the ED was only notified in a mere 3% of the cases. In terms of journey times, the most frequent scene time was 17 minutes, while the most frequent journey time was 7 minutes (table3). Complications in the EMS management were indicated, particularly in trauma cases, such as incorrect, improper, and wrong-sized C-Collars, which were registered in 44%, 3%, and 2% of the cases respectively.

Table 1. Number of subjects

Total number of subjects	256	100%
Trauma	103	40%
Non trauma	153	60%
Male	186	73%
Female	70	27%

Table 2. Age of cases

Age	
Minimum	3
Maximum	101
Mean	49.6
SD	23.27

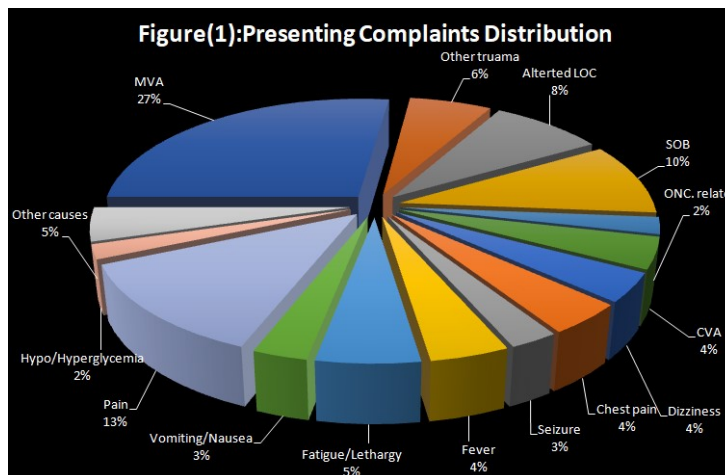


Table 3. Scene, Journey Times.

Scene, Journey Times	Time	Blanks
Most frequent Scene Time	17 mins	4
Most frequent Journey Time	7 mins	7
Most frequent time from EMS arrival to ED	25 min	7
Trauma Scene, Journey Times	Time	
Most frequent Scene Time	17 mins	
Most frequent Journey Time	17 mins	
Most frequent time from EMS arrival to ED	35 min	

Table 5. Oxygen use in EMS.

HR Data	No.	Perct.	No.	Perct.	
Concordant HR	142	55%	Concordant HR	181	71%
> 10 % change in HR	114	45%	> 15 % change in HR	75	29%
Missing data	0	0.00%	Missing data	0	0.00%
EMS > 100 + ER < 100	21	8.20%			
EMS < 100 + ER > 100	37	14.40%			
EMS >60 + ER < 60	5	1.90%			
EMS < 60 + ER >60	2	0.01%			

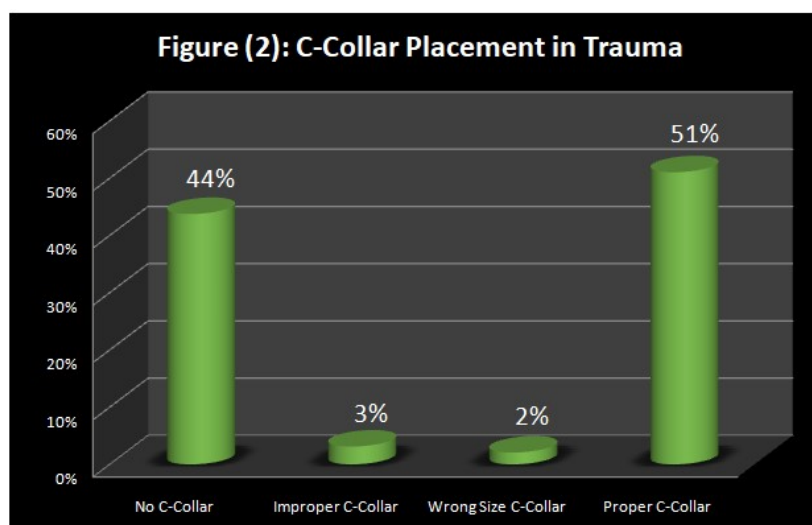
Additionally, 51.5% of all cases saw no management applied, and body immobilization was improperly carried out in 40% of cases. Oxygen usage in EMS was under scrutiny as well, revealing that an oxygen mask was only applied in 28% of cases where patients were complaining of Shortness of Breath (SOB). Furthermore, of the 14 cases that had an RR greater than 20, oxygen masks were only applied to 43% of patients.

Table 6. Systolic Blood Pressure (SBP) Data

SBP Data	No.	Perct.	No.	Perct.	
Concordant SBP	115	46%	Concordant SBP	154	62%
> 10 % SBP	134	54%	> 15 % SBP	95	38%
Missing data	7	2.73%	Missing data	7	2.73%
Changed by 15mmHg	118	46.00%			
EMS>100 + ER<100	16	6.25%			
EMS<100 + ER>100	7	2.70%			

Table 7. Traumatic dealing by EMS

	No.	Perct.
Traumatic Extremity bleeding noted by EMS		
Total=19		
Traumatic Extremity Fractures noted by EMS		
Total=11		
Tourniquet applied	6	31.58%
No Tourniquet	13	68.42%
Splint Applied	8	72.73%
No splint Applied	3	27.27%



The research revealed areas of significant discrepancy, mainly in HR and SBP readings. Concordant HR (Table 4) and SBP (Table 6) readings were only achieved in 55% and 46% of measurements, respectively. In terms of trauma management, there were issues identified in applying tourniquets and splints in traumatic extremity cases. Tourniquets were applied in just 31.58% of cases, while splints were only used in 72.73% of instances.

The findings of this study highlight a need for improvements, especially when it comes to actively alerting the ED, EMS management, trauma case handling, and providing oxygen support. This detailed analysis serves as a pivotal roadmap to the path of effectively improving and enhancing the EMS system in the Kingdom of Saudi Arabia, Jeddah. By addressing these gaps, KAMC could set higher standards for patient care and emergency services in the region. The data obtained from this study could be instrumental in influencing policy adjustments, allocating resources more efficiently and effectively, and in the ideal training and education of EMS personnel. Further research should focus on implementing interventions that target these identified discrepancies, and subsequent studies should then evaluate the effectiveness of these interventions in providing high-quality pre-hospital emergency care.

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