



Research Article

Knowledge, attitudes and skills of doctors, nurses and emergency medical technicians in pre-hospital care and emergency medicine who accompany patients in ambulances which arrive at the National Hospital of Sri Lanka

Gangadevi Nandasena¹ and Chrishantha Abeysena^{2*}

¹Medical Officer of Health, Ministry of Health, Sri Lanka

²Professor, Department of Public Health, Faculty of Medicine, University of Kelaniya, Sri Lanka

***Address for Correspondence:** Chrishantha Abeysena, Professor, Department of Public Health, Faculty of Medicine, University of Kelaniya, Sri Lanka, Tel: 0094777591715; Email: chrishanthaabeysena@yahoo.com; chrishantha-abeyesena@kln.ac.lk

Submitted: 19 November 2018

Approved: 18 December 2018

Published: 19 December 2018

Copyright: © 2018 Abeysena C, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

Keywords: Emergency care; Ambulance; Attitudes; Knowledge; Skills



Abstract

Objective: To assess the knowledge, attitudes, and skills in pre-hospital care and emergency medicine of doctors, nurses and Emergency Medical Technicians (EMT), who accompanied emergency patients in ambulances?

Methods: A descriptive cross-sectional study was conducted among the doctors, nurses, and EMT who accompanied emergency patients in ambulances to the National Hospital. All ambulances arriving from August to October 2008 (n=409) were screened. A self-administered questionnaire with 30 items was used to assess knowledge, attitudes, and skills. The knowledge was categorized into three levels, EMT-basic level, EMT-intermediate level, and EMT-paramedic level and the scores were converted into the percentages.

Results: The overall knowledge score on basic, intermediate and paramedic level were 57.5%, 42.9%, and 33.9% respectively. The knowledge on airway management (84.3%), bleeding control (82.9%), patient transport (71%) and first aids (61%) at the EMT-basic level were higher, however oxygen administration (37.1%) and basic life support (38.6%), spinal immobilization (45.7%), traction splinting (47%) and triage (48.6%) were lower. For the EMT-intermediate level, knowledge on endotracheal intubation (41.4%) and initial cardiac drug therapy (44.3%) were low. For the EMT-paramedic level, the knowledge on the advanced respiratory support (53%), ECG interpretation (37%), pharmacology (13%) and paediatric life support (20%) were lower.

Most staff showed positive attitudes towards the need of basic knowledge in pre-hospital care (97.1%,n=34), need for proper training (97.1%,n=34) and cost for pre-hospital care (77.1%,n=27), while they showed relatively negative attitudes towards the outcome of pre-hospital care (74.3%,n=26).

For the required skills for advanced life support, most of the staff showed skills in IV cannulation (71.4%,n=25) and IV drug administration (71.4%,n=25) however less skills were shown cricothyroidotomy (22.9%,n=8), pleural drainage (25.7%,n=9) and laryngoscopy and intubation (31.4%,n=11).

Conclusion: The knowledge at the EMT-basic level was average and intermediate and paramedic levels were lower than average. The attitudes were generally positive. However they lacked some specific skills.

Introduction

The staff (Doctors, Nurses and Emergency Medical Technicians [EMT]) working in emergency medical services and accompanying patients in ambulances should be appropriately trained pre-hospital and emergency care. They should have the necessary knowledge and skills to make the correct decision at the correct time in an emergency situation and provide appropriate care to a person until the person is

handed-off to a primary care team. Their attitudes should also be positive towards the benefits of pre-hospital and emergency care to do best for the patient, in an emergency.

Universally, most of the developed countries with well-established Emergency Medical Services (EMS) have adopted rules and guidelines to maintain the quality of EMS and/or ambulance services. The major component of an internationally accepted level of training for EMT is the provision of both knowledge and skills before recruiting into the service. Emergency physicians need knowledge and skills in principles of airway management, rapid sequence induction, pain relief, general, regional and local anesthesia, interface with intensive care, major trauma management, basic airway management, advanced airway management (tracheal intubation/alternatives), airway and ventilation techniques [1].

Until recent years there was no specific staff called EMT, and still, there are no well-established recruiting guidelines or formal training available in this field in Sri Lanka. Traumatic injuries are rising worldwide, where vital functions start to decline immediately after trauma, those patients have a chance to survive only in case if the first medical aid is provided without delay [2]. In Sri Lanka, traumatic injuries are the first leading cause for hospital admissions [3]. The awareness on response to an emergency, basic lifesaving methods, resuscitation techniques and transporting a patient to a hospital is poor among Sri Lankans. It shows the need of emergency and retrieval medical services with EMS personnel with required knowledge and skills. Therefore emergency medical and retrieval services managed by properly trained staff with good knowledge and skills in emergency medicine and pre-hospital care will significantly affect the quality of life of these people. The objective of this study was to assess the knowledge, attitudes, and skills of the ambulance major medical staff (doctors, nurses and EMT), in pre-hospital care and emergency medicine who accompany emergency patients in ambulances which arrive to the National Hospital of Sri Lanka.

Methods

A descriptive cross-sectional study was carried out at the National Hospital of Sri Lanka from August to October 2008. All major medical staff that arrived at the National Hospital of Sri Lanka during the study period in an ambulance with an emergency patient were selected as the study sample. The study sample consisted of 35 major medical staff arrived in 409 ambulances, recruited for another component of the study [4]. The sample included 15 doctors, 16 nurses and 4 EMTs. The ambulances which brought patients to the routine clinics were excluded as those vehicles may use only for transport purpose.

A self-administered questionnaire was used to assess knowledge, skills, practices, and attitudes of the major medical staff arrived in ambulances with an emergency patient. All questionnaires were given to participants after handing over the patient/s to the place of definitive care to avoid negligence due to the urgency in handing over the patient. The knowledge was categorized into three levels, EMT level one or basic level, EMT level two or intermediate level, EMT level three or paramedic level [2,5]. The content area for EMT basic level knowledge and skill were triage, transporting patients, basic life support, first aid, airway management – primary level, oxygen administration, spinal immobilization, traction splinting and splinting and bleeding control. The content area for EMT - intermediate level was intravenous therapy, endotracheal intubation, and initial cardiac drug therapy. The content area for EMT – paramedic level was ECG interpretation, advanced respiratory support, airway skills, pharmacology, trauma resuscitation, pediatric life support, and advanced cardiac life support.

The questionnaire was designed to cover all knowledge and skills components in EMT–basic level, selected areas in EMT–intermediate level and EMT–paramedic level. Each component of knowledge was included with two questions. There were 18

questions in EMT basic level, four questions in the intermediate level, and eight questions in paramedic level. Each question was given one mark. We obtained cumulative marks for intermediate and paramedic levels because EMT-intermediate level requires knowledge on both basic level and intermediate level while EMT-paramedic level requires knowledge on all three levels (i.e basic level, intermediate level, and-paramedic level). More than 50% of the knowledge score was considered as good knowledge.

Four statements were used to gather information on attitudes regarding pre-hospital care and emergency medicine. Same questions were given to all staff categories (doctors, nurses, EMT). Five points Likert scale was used. Participants who have marked 'strongly agree or agree or undecided' were taken as "good attitude" and those who marked 'disagree or strongly disagree' as "bad attitude" for first and second statements. For the third and fourth statements, individuals who marked 'disagree or strongly disagree' were only taken as good attitudes, while all others were taken as poor attitudes. Perceived skills assessment was done by using five points Likert scale (best, fairly good, average, need to improve and none respectively) regarding the performance of particular skill related to advanced life support. The participant who marked 'best or fairly good or average' was taken as "above or average skills" and for the individuals who marked 'need to improve or none' was taken as "below average skills".

As the types of ambulances that arrive at the hospital vary in weekend from weekdays, data was collected at least on one out of the two days in a weekend. Data collectors always tried to collect data outside the busy environments that were present in admission or emergency unit to avoid participants deviating from focusing on the questionnaire. Also, data collectors were given the minimum and maximum target per day to maintain the quality of data and to achieve time targets to do the study in a timely manner.

Data were entered and the consistency was checked. Data were analyzed using SPSS version 16.0 and frequencies and percentages were calculated. Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Kelaniya,

Results

A total of 409 ambulances were selected to the study with 15 doctors, 16 nurses and four EMTs, who accompanied patients to the NHSL. From all major medical staff, 26 (75%) were females and more than 80% (29) was between 25–34 years age group. A majority of doctors (73.3%, n=11) and nurses (87.5%, n=14) had not participated for training programmes related to emergency medicine and pre-hospital care, however, all EMTs participated.

Knowledge of major medical staff in pre-hospital care and emergency medicine

Thirteen (86.6%) of doctors, 69% of nurses and 50% of EMTs had good knowledge on EMT basic level and on intermediate level (Table 1). For Paramedic level, 80% of doctors, 63% of nurses and 25% of EMTs have cumulative good knowledge.

The knowledge in triage, basic life support, oxygen administration, spinal immobilization and traction splinting were <50% for basic level (Table 2). The knowledge on endotracheal intubation and initial cardiac drug therapy was <50% for intermediate level. The knowledge in ECG interpretation, pharmacology, and paediatric life support was <50% for paramedic level (Table 2). From all of these components of knowledge, pediatric life support and pharmacology show very poor knowledge among major medical staff. From the three levels of knowledge in EMT – Basic level was the best, while EMT-Paramedic level shows poor knowledge among the major medical staff. The overall knowledge score on basic, intermediate and paramedic level were 57.5%, 42.9%, and 33.9% respectively.

Table 1: Knowledge of major medical staff in EMT – Basic level (level One), Intermediate level (level two) and EMT – level Three (paramedic)

Category	Good Knowledge		Poor Knowledge		Total	
	No	%	No	%	No	%
EMT – Basic level (level One)						
Medical officer	13	86.6	2	13.3	15	100.0
Nursing officer	11	68.7	5	31.2	16	100.0
EMTs	2	50.0	2	50.0	4	100.0
EMT - Intermediate level (level two)						
category	Good Knowledge		Poor Knowledge		Total	
	No	%	No	%	No	%
Medical officer	13	86.6	2	13.3	15	100.0
Nursing officer	11	68.7	5	31.2	16	100.0
EMTs	2	50.0	2	50.0	4	100.0
EMT – level Three (paramedic)						
category	Good Knowledge		Poor Knowledge		Total	
	no	%	no	%	no	%
Medical officer	12	80.0	3	20.0	15	100.0
Nursing officer	10	62.5	6	37.5	16	100.0
EMTs	1	25.0	3	75.0	4	100.0

Table 2: Knowledge of major medical staff in each component of EMT – Basic, intermediate and EMT – Paramedic levels.

Components in EMT	Total marks	%
EMT – Basic level		
Triage	34	48.6
Patient transport	50	71.4
Basic life support	27	38.6
First aid	43	61.4
Air way management	59	84.3
Oxygen administration	26	37.1
Spinal immobilization	32	45.7
Traction splinting	33	47.1
Bleeding control	58	82.9
Basic level all	362	57.5
EMT – intermediate level		
Endotracheal intubation	29	41.4
Initial cardiac drug therapy	31	44.3
Intermediate level all	60	42.9
EMT – Paramedic level		
ECG interpretation	26	37.1
Advanced respiratory support	37	52.9
Pharmacology	18	12.9
Pediatric life support	14	20.0
Paramedic level all	95	33.9

Attitudes among ambulance staff in pre-hospital care and emergency medicine

Majority of major medical staff had good attitudes towards first and second statements. For the third statement, more than 75% of staff had good attitudes, while for the fourth statement only 25% of the staff had good attitudes (Table 3).

Skills among major medical staff in pre-hospital care and emergency medicine

Less than 50% of the major medical staff had above average or average perceived skills on cricothyroidotomy, pleural drainage, puncture of the vein, laryngoscopy and intubation, and defibrillation (Table 4). Skills in IV drug administration, IV cannulation and monitoring and interpretation relatively high among staff. In some skill areas, nursing staff has shown better performance than doctors. (Ex. IV cannulation, IV drug administration, monitoring, and interpretation). While in some skill areas, doctors showed better performance than nurses, such as puncture of the vein, pleural drainage, laryngoscopy and intubation, and defibrillation.

Table 3: Attitudes among major medical staff in pre hospital care and emergency medicine.

Attitude	Major staff category N = 35			
	Good		Poor	
	no	%	no	%
All people in the community should have at least basic knowledge and skills in rescue and pre hospital care	34	97.1	1	2.9
Each and every person who work in accident and emergency services, should be provided with comprehensive, specialized training to act in emergencies	34	97.1	1	2.9
In an emergency, to save the life of a person, we have to do very costly and complicated procedures.	27	77.1	8	22.9
Even though we treat the patient in a proper way, in a life threatening condition, we can't minimize the deaths happening due to delay in going to hospital.	9	25.7	26	74.3

Table 4: Perceived Skills (above or average) in performing procedures related to advanced life support.

Clinical procedure related to advanced life support	MO N = 15		Nurse N = 16		EMT N = 4		Total N = 35	
	No	%	No	%	No	%	No	%
Intravenous drug administration	11	73.0	14	87.5	-	-	25	71.4
IV cannulation	12	80.0	13	81.3	-	-	25	71.4
Insertion of airways	9	60.0	10	62.5	1	25.0	20	57.1
Cricothyroidotomy	3	20.0	4	25.0	1	25.0	8	22.9
Puncture of the vein	10	66.7	7	43.8	-	-	17	48.6
Pleural drainage	5	33.3	4	25.0	-	-	9	25.7
Laryngoscopy and Intubation	7	46.7	4	25.0	-	-	11	31.4
Defibrillation	9	60.0	7	43.8	1	25.0	17	48.6
Monitoring and interpretation	9	60.0	13	81.3	1	25.0	23	65.7

Discussion

The overall knowledge score on basic, intermediate and paramedic EMT were 57.5%, 42.9%, and 33.9% respectively. The knowledge of doctors was slightly better than the other two categories. Some aspects of these three levels were low knowledge. (basic life support 39%, oxygen administration 37%, ECG interpretation 37%, pharmacology 13%, pediatric life support 20%). All staff categories showed good attitudes towards training and cost of care in pre-hospital care and emergency medicine (statement one to three), while most of the staff showed poor attitudes towards the outcome of pre-hospital care (statement four). Regarding the skills, there were some areas where the performance was poor such as cricothyroidotomy (23%), pleural drainage (26%) and laryngoscopy and intubation (31.4%).

A study that was done in Turkey to find out the level of knowledge of EMS physicians in basic life support techniques revealed that the mean level of knowledge was insufficient [6]. Another study that was carried out in India reported that knowledge on pre-hospital and emergency care among doctors was poor [7]. One study from Nepal reported that knowledge on basic life support was low among the medical and paramedical staff [8]. A study carried out in Indonesia reported that knowledge and skills on pre-hospital care among nurses were low [9]. One study reported that a majority of paramedics in the UK had good attitudes towards the outcome of pre-hospital care [10]. Consistent with our findings the attitudes on pre-hospital care was good among nurses in Indonesia [9].

We selected “The National Hospital of Sri Lanka” as the place of study as it is the major tertiary care hospital in Sri Lanka, it receives emergency patients from all over the country, so there is a higher chance of recruiting all categories of major medical staff from all over the country for our study, which thereby increases the generalizability of the study. The major limitation of this study was the limited sample size. We recommend a larger study then it would be able to assess the factors associated with knowledge, attitudes, and skills.

In conclusion, the majority of major medical staff had more than average knowledge required in patient management at all three levels, while some skills were lacking and some skills they have good performance. Most of them had good attitudes regarding training in pre-hospital care and cost of care in pre-hospital setting, while attitudes regarding the outcome of pre-hospital care were relatively negative. Then by an introduction of a good training program with all essential elements to all health personnel before they entering to service may give the good outcome in pre-hospital care.

Acknowledgement

We would like to thank the research assistants and ambulance staff for their support.

Author contribution

Conceptualization, GN., and CA; Methodology, GN., and CA; Analysis, GN., and CA.; Investigation, GN.; Writing – Original Draft, CA.; Supervision, CA.

References

1. Graham CA. Advanced airway management in the emergency department: what are the training and skills maintenance needs for UK emergency physicians? *Emerg Med J.* 2004; 21: 14-19. **Ref.:** <https://goo.gl/yfQbo4>
2. WHO. Pre hospital trauma care systems. Geneva. 2005; **Ref.:** <https://goo.gl/ndnJ8v>
3. Department of health service. Annual Health Bulletin. Sri Lanka 2003;
4. Gangadevi Nandasena, Selected aspects of quality in ambulance care that transfer, emergency patients to the National hospital of Sri Lanka. Dissertation in Community Medicine 2009;
5. Department of public health and environment, Health Facilities and Emergency Medical Services Division, 2008, Colorado department of public health, 6 CCR 1015-3, Rules pertaining to emergency medical services. 2008; **Ref.:** <https://goo.gl/WphLyo>
6. Şener S, Ersoy G, Özşaraç M, Aksay E, Koyuncu N. The current status and factors affecting the level of knowledge regarding basic life support measured in resident physicians. *Tip Fakültesi Dergisi.* 2006; 20: 95-101 **Ref.:** <https://goo.gl/H9iGcY>
7. Kumar S, Agarwal AK, Kumar A, Agrawal GG, Chaudhary S, et al. A study of knowledge, attitude and practice of hospital consultants, resident doctors and private practitioners with regard to pre-hospital and emergency care in Lucknow. *Indian J Surg.* 2008; 70: 14-18. **Ref.:** <https://goo.gl/MgFxBm>
8. Shrestha R, Batajoo KH, Piryani RM, Sharma MW. Basic life support: knowledge and attitude of medical/paramedical professionals. *World J Emerg Med.* 2012; 3: 141-145. **Ref.:** <https://goo.gl/Zmk3y8>
9. Suryantoa, Plummera V, Boyled M. Knowledge, attitude, and practice of ambulance nurses in prehospital care in Malang, Indonesia. *Australasian Emergency Care.* 2018;21: 8–12 **Ref.:** <https://goo.gl/mUxTvn>
10. Humphrey J, Walker A, Hassan TB. What are the beliefs and attitudes of paramedics to prehospital thrombolysis? A questionnaire study. *Emerg Med J.* 2005; 22: 450–451. **Ref.:** <https://goo.gl/U8Z6us>