



## Research Article

# Some aspects of quality of ambulance care and completeness of information in the transfer forms of emergency patients who arrived in ambulances at the National Hospital of Sri Lanka

Gangadevi Nandasena<sup>1</sup> and Chrishantha Abeysena<sup>2\*</sup><sup>1</sup>Medical Officer of Health, Ministry of Health, Sri Lanka<sup>2</sup>Professor, 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-abeyseena@kln.ac.lk

Submitted: 29 October 2018

Approved: 19 November 2018

Published: 20 November 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:** Ambulance; Quality; Patient charts; Transportation



## Abstract

**Objective:** To describe some aspects of the quality of ambulance care and completeness of information in the transfer forms of emergency patients who arrived in ambulances to the National Hospital of Sri Lanka (NHSL).

**Methods:** This was a descriptive study. All ambulances arrived at the NHSL during the study period with an emergency patient were selected (n=409) and from those 250 transfer forms, which could be traced were taken. An interviewer-administered questionnaire was used for ambulance staff. A Checklist, which has been derived from the standard patient chart, was used to determine the availability of information on transfer forms.

**Results:** Of the 409 ambulances, the patient was accompanied by a doctor in 4% (n=16), a nurse in 4% (n=15) and Emergency Medical Technicians (EMTs) in 1% (n= 4), and there were 675 minor employees and 409 drivers. Twenty six percent (n= 4) of doctors, 12.5% (n= 2) of nurses, 100% (n=4) of EMTs, 56.9% (n=189) of drivers and 24.3% (n=164) of minor employees had received training in emergency medicine/pre-hospital care.

The time interval between receipt of the message and loading the patient to the ambulance was >15 minutes on 19% (n= 75) of the occasions and from the latter time to commencement of the journey was >15 minutes on 7% (n=27) of the occasions.

The call number of sending facility 0.4% (n=1) and sending time 33.2% (n=83) were poorly documented. The past surgical histories 20.8% (n=52), chronic diseases 48% (n=120), psychological problems 13.2% (n=33) and allergies 9.2% (n=23) were poorly documented. Details of physical examination findings except cardio-vascular system were not documented in >50% of transfer forms. Medications had been documented fairly (>60%) in most of the transfer forms and however, the procedures (IV fluids, ECG) were poorly documented (<30%).

**Conclusion:** The completeness of information in the transfer form was not up to standards. This emphasizes for need of well-structured standard transfer form in the country.

## Introduction

The Institute of Medicine defines health care quality as 'the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge' [1]. The structure, process, and outcome are assessed to measure the quality of care in any setting and this implies to ambulance care too. This encompasses infrastructure for pre-hospital care and emergency medicine including human resources for ambulance care and management of patients during transportation including proper handover of the patients to the destination institution.

Response time in ambulances generally refers to the time taken for an ambulance to respond for a call. One study reported that more distance to the hospital was associated with an increased risk of mortality [2]. Time for an action is an important determinant of quality in pre-hospital care. That is why in emergency medical training, emergency medical service (EMS) personnel are convinced in the importance of golden hour rule. The 'golden hour' is the first hour after an injury or event, where appropriate intervention can save the life. Seconds and minutes of delay can cause lifelong disability, morbidity and even mortality of a person who faces for an emergency, causing lifelong suffering of the patient and/or dependents.

Information provides in the patient chart is important, because, at the place of definitive care, the care provider most of the time need the details of treatment already provided. The treatment provided to the patient at the place of definitive care can improve to a greater extent by knowing details of patient, process, and illness properly, that is why transfer form (patient chart) is important. Risks of adverse medical outcomes are much fold when transferring critically ill patients [3]. Poor communication compromise patient care and unnecessarily increase the workload of staff [4]. Good handover of patients is associated with improvements in patient safety, continuity of patient care, and improved decision making [5].

The rules, standards, guidelines, and advancements in technology in ambulance services are aimed to provide good quality of care to the patient, at the scene and during transportation and to minimize pre-hospital morbidity and mortality as well as to improve the overall outcome of the patient preventing disabilities, as much as possible.

No studies published on quality of ambulance care in Sri Lanka. The objective of this study was to describe some aspects of quality of ambulance care and completeness of information in the patient charts (transfer forms) of emergency patients who arrived in ambulances to the National Hospital of Sri Lanka (NHSL).

## Methods

A descriptive study was carried out at the NHSL from August to October 2008. All ambulances that arrived during the study period with an emergency patient were selected. The details of the methods have been published elsewhere [6].

An interviewer administered questionnaire was used to assess the background information of major health staff (doctors, nurses and EMT) (n=35), the response time and reasons for delay throughout the transfer process by the ambulance drivers (n=409) and the training of the minor employees (n=675). A checklist was used to assess the availability of necessary information in transfer forms. It was derived from the guidelines of regions hospitals EMS serves [7]. The checklist for patient chart has been filled by the first author. All the wards were visited on the following day and the Bed Head Ticket were traced for the transfer forms.

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

## Results

During the study period, 409 ambulances were assessed and 250 (61%) transfer forms were able to trace. A majority (64.5%, n=264) of ambulances had arrived at the NHSL from outside of the Colombo District. Only 33 (8%) of ambulances were from the private sector or non-health ministry.

The total number of staff who accompanied the patients was 1119 of the 409 ambulances (Table 1). A majority of the staff accompany the patients in ambulances were minor employees (60.3%, n=675). The major medical staff accompanied only

**Table 1:** Distribution of staff and their training of the ambulances accompanied patients.

Designation	Number (%)	% of total crew arrived in all ambulances N = 1119	Number of staff members per ambulance N = 409	Participation for training programmes	
				Yes Number (%)	No Number (%)
Minor employees	675	60.3	1.65	164 (24.3)	511 (75.7)
Drivers	409	36.6	01	196 (58.5)	139 (41.5)
Nurses Nursing officer Student nurse	16 14 2	1.4	0.04	2 (12.5)	14 (87.5)
Doctors Intern Medical officer Registrar	15 12 02 01	1.3	0.04	4 (26.7)	11 (73.3)
EMT	04	0.4	0.01	4 (100)	0 (0)

with 25 (6.1%) ambulances out of 409. On average, there were only 0.09 major medical staff and 1.65 minor employees per ambulance accompanied the emergency patients. Majority of doctors 13 (88%) who accompanied patients in ambulances had experienced for less than one year in their present post and for nurses, 12 (75%) of them had experienced more than one year. Among the minor employees, 540 (80%) had more than two years of service in ambulances. One hundred and ninety six (58.5%) drivers and 164 (24.3%) minor employees had participated for training programmes in emergency medicine and pre-hospital care (Table 1). Majority of the minor staff (84.8%, n=139) had used their knowledge they gained from the training programmes to assist other staff in ambulances in emergencies.

Problems experienced by major medical staff during transportation were, traffic delays in 40% (n=10), non-availability of necessary equipment/drugs/facilities in the ambulance to manage the patient in 28% (n=7), lack of knowledge and skills regarding patient management in 36% (n=9) and deterioration of patients condition during transportation in 36% (n=9). The time interval between receipt of the message and loading the patient to the ambulance was >15 minutes on 18% (n= 75) of the occasions and from the latter time to commencement of the journey was >15 minutes on 7% (n=27) of the occasions.

The major reasons for delay were minor employees at NHSL are not helpful in handing over the patient (33%), documentation takes much time at NHSL (21%), long time taken to take patient from ward/scene to ambulance (11.5%), delay in documentation at sending hospital (9.8%), barriers in the road (8.6%), delay in staff coming to the ambulance (7.4%) and had to transport long distance (6.4%) (Table 2).

From the general information that should be available in the transfer form, call number of sending facility (0.4%), sending time (33.2%), and informed details before sending (8.4%), were poorly documented. In 50% of patient charts, the responding unit was not mentioned (Table 3). From the patient information that should be available in the patient chart, telephone number (0.4%), birth date (0.8%), personal physician (0.4%), were poorly documented (Table 3).

The date of the symptoms appear, information on pain and history of previous episodes were poorly documented. The patients with injuries, mechanism of injury, the date and time of occurrence, information on accident and usage of safety equipment were documented poorly. The past surgical details, (76.4%), details about chronic diseases (50%), psychological problems (71%) and allergies (87.6%) were documented rarely. The information on physical examinations was not documented of more than 50% of transfer forms (Table 4).

**Table 2:** Reasons for delays throughout the transfer process according to view of ambulance drivers (n=409).

Reasons for delays No %		
<b>If delay in message to take patient to the ambulance</b>		
No Ambulance	20	4.9
No Facilities	1	0.2
Late message to the driver	4	1.0
No Ambulance driver	2	0.5
Long time taken to take patient from ward/scene to ambulance	47	11.5
Resuscitation procedures at scene taken long time	1	0.25
Other	36	8.85
<b>If delay in dispatch of ambulance after taking patient to the ambulance</b>		
Delay in staff coming to the ambulance	30	7.4
Delay in documentation at sending hospital	40	9.8
Other reason	9	2.2
<b>If delay between departure from sending hospital to arrival at NHSL</b>		
Ambulance mechanical problem	1	0.2
Had to transport long distance	26	6.4
Barriers in the road	35	8.6
No support from public and security people	20	4.9
Other delay	12	2.9
<b>If delay from arrival at NHSL to hand over the patient to proper place</b>		
Documentation takes much time at NHSL	84	20.6
Relevant unit not informed prior to transfer	1	0.2
Relevant unit not prepared to accept the patient	3	0.7
No enough staff to treat patient	9	2.2
<b>If any delay throughout the transfer process</b>		
No communication facility	4	0.9
Patient and relations related reasons	1	0.2
National hospital minor employees are not helpful in handing over the patient	134	32.7

**Table 3:** Completeness of general and patient information in transfer form N = 250.

General information	Not mentioned		Mentioned	
	No	%	No	%
Sending facility	-	-	250	100.0
Sending unit	9	3.6	241	96.4
Receiving facility	5	2.0	245	98.0
Responding unit	124	49.6	126	50.4
Call number of sending facility	249	99.6	1	0.4
Name/s of sender/responsible person	41	16.4	209	83.6
Sending date	9	3.6	241	96.4
Sending time	167	66.8	83	33.2
Reason/s for transfer	7	2.8	243	97.2
Signature of sender	5	2.0	245	98.0
<b>Patient information</b>				
Patient name	-	-	250	100
Address	19	7.6	231	92.4
Telephone number	249	99.6	1	0.4
Age	9	3.6	241	96.4
Birth date	248	99.2	2	0.8
Sex	11	4.4	239	95.6
Personal physician	249	99.6	1	0.4

The information on medications, the differential diagnosis had been documented fairly (>60%) in most of the transfer forms (Table 5). The information on procedures was documented poorly in patient charts, (Oxygen, IV fluids, ECG). The details of the transfer process were not documented properly such as any changes of the condition during transport (96.4%), how the patient transported to the hospital (97.2%), instructions given to the patient (96.4%) and authorization for transfer process (81.2%) (Table 5).

## Discussion

The results showed that trained medical staff was not accompanied in the

**Table 4:** Completeness of presenting complaint, history of presenting complaint/injury and clinical examination in transfer form N = 250.

Presenting complaint and History of presenting complaint	Not mentioned		Mentioned		Not applicable	
	No	%	No	%	No	%
<b>Presenting complain</b>	38	15.2	211	84.4	1	0.4
What events led up to request for assistance?	35	14	201	80.4	14	5.6
When did symptoms begin?	100	40	134	53.6	16	6.4
If pain + severity	58	23.2	18	7.2	174	69.6
If pain + location	21	8.4	56	22.4	173	69.2
If pain + type	73	29.2	3	1.2	174	69.6
If pain + radiation	74	29.6	5	2.0	171	68.4
Have there been any previous episodes?	145	58	37	14.8	68	27.2
If pregnant include details of pregnancy	4	1.6	5	2.0	241	96.4
<b>History of present injury</b>						
What events led up to request for assistance?	10	4.0	27	10.8	213	85.2
What is the mechanism of injury?	17	6.8	18	7.2	215	86.0
When did it occur?	21	8.4	15	6.0	214	85.6
Include information on accident	25	10	10	4.0	215	86.0
Was safety equipment such as seat belts used?	18	7.2	-	-	232	92.8
<b>Past medical details</b>						
List pertinent history	99	39.6	145	58	6	2.4
Chronic diseases presence or absent	124	49.6	120	48	6	2.4
Past surgeries presence or absent	191	76.4	52	20.8	7	2.8
Psychological problems presence or absent	177	70.8	33	13.2	40	16
Allergies	219	87.6	23	9.2	8	3.2
All current medications if	90	36	157	62.8	3	1.2
<b>Physical examination</b>						
How the patient was first seen / found?	130	52	115	46	5	2
What was the initial level of consciousness?	136	54.4	61	24.4	53	21.2
Was patient oriented to person, place, and time?	173	69.2	51	20.4	26	10.4
General examination	136	54.4	114	45.6	-	-
Respiratory system examination	124	49.6	122	48.8	4	1.6
Cardiovascular examination	102	40.8	146	58.4	2	0.8
Abdominal examination	199	79.6	50	20	1	0.4
Central nervous system examination	203	81.2	46	18.4	1	0.4
If new born one and five min. APGAR score	3	1.2	2	0.8	245	98

**Table 5:** Completeness of details of treatment and transfer process in transfer form N = 250.

Treatment given	Not mentioned		Mentioned		Not applicable	
	No	%	No	%	No	%
Oxygen liter flow and route	71	28.4	2	0.8	177	70.8
IV fluids - time	68	27.2	11	4.4	171	68.4
IV fluids - type	43	17.2	36	14.4	171	68.4
IV fluids - drip rate	71	28.4	8	3.2	171	68.4
IV fluids - amount	44	17.6	34	13.6	172	68.8
ECG - rhythm interpretation	70	28.0	62	24.8	118	47.2
ECG - rate	72	28.8	61	24.4	117	46.8
Medication - time	96	38.4	152	60.8	2	0.8
Medication - name	87	34.8	161	64.4	2	0.8
Medication - dosage	92	36.8	155	62.0	3	1.2
Medication - route	90	36.0	156	62.4	4	1.6
Advanced air way - type	2	0.8	3	1.2	245	98
Advanced air way - size	2	0.8	3	1.2	245	98
Advanced air way - evaluation	2	0.8	3	1.2	245	98
Defibrillation - time and joules	3	1.2	2	0.8	245	98
<b>Transport details (just before, during and just after Transport process)</b>						
How did patient respond to any treatment?	195	78	41	16.4	14	5.6
Were there any changes of condition during transport?	241	96.4	3	1.2	6	2.4
How the patient transported to hospital?	243	97.2	2	0.8	5	2
Whether vital signs recorded/not during transport	162	64.8	-	-	88	35.2
Differential diagnosis	66	26.4	184	73.6	-	-
Document/not instructions given to patient	241	96.4	5	2	4	1.6
Signature of patient/relative giving consent	115	46	120	48	15	6
If patient is minor guardians consent(signature)	5	2	18	7.2	227	90.8
Who request transfer - name / designation	7	2.8	243	97.2	-	-
Who had given authorization for transfer process?	203	81.2	47	18.8	-	-

transportation of emergency patients. There were some preventable reasons for the delays in transfers, which need to get action immediately to minimize them and to achieve a better outcome in pre-hospital care.

According to our study, 64.5% of ambulances had arrived at the NHSL from outside of the Colombo District. The time taken to arrive at the NHSL even from within the limit of Colombo District may take more than one hour. One study done in the UK, revealed increase journey distance to a hospital were associated with increased risk of mortality and 10-km increase in straight-line distance was associated with around a 1% absolute increase in mortality [2]. However, another study reported that there was no difference in mortality between all patients presenting early and those with more than one hour delay [8]. We could not assess the response times because there was no proper way of getting exact times.

It is usually recommended to have at least two competent personnel accompanying the patient to be transferred. The accompanying person should be suitably trained, competent and experienced and preferably should have done training in patient transfer and should have sufficient training in advanced cardiac life support, airway management, and critical care [9]. In our study we found that only 6.1% of patients were accompanied by at least one of a major medical staff. Even though they all were not knowledgeable or competent enough to manage emergency patients. According to an Indian study, 3.66% of the patients were accompanied by a paramedic or trained nurse [10]. Another study reported that 78% of medical doctors, 17% of paramedics, 3% of EMTs and 2% of nurses were accompanied with the patient in ambulances [11]. Another study reported that 11.5% of physicians and 68.9% of nurses were accompanied the patients [12].

The information provided in the transfer form also showed wide variations, while most of the information was not documented. In our study cardiovascular examination was documented only in 58% of transfer forms. Another study reported that documentation of pulse rate was 13.1%, blood pressure was 9.8%, and respiratory rate was 9.8% [12]. Since this is the first study in the country to assess the ambulance services there was rarely any literature to compare the study within Sri Lanka.

The most important quality indicator is the outcomes of the patients in ambulance transfers. We could not assess the outcomes of the patients. Any complication has occurred during the transportation of the patient, the crew has to take the ambulance to the closest hospital. A patient was died or had a complication during transport may not arrive to NHSL. The other limitation was that difficulty in finding all transfer forms. Searching for BHTs at medical record office was also very difficult because some wards they had not sent the BHTs to the record office for more than three months. The private sector ambulances had no structured patient transfer forms to record the details of the patient, only they provided a referral letter which is the other reason for the missing data.

The completeness of information in the transfer forms was not up to the standards, some important details were also lacking, most probably due to lack of well-structured standard transfer form in the country. It is high time to consider implementing an electronic handover system which is a viable, sustainable and safe solution to the handover of patient care [4,13], that improves quality of ambulance care and patient safety.

### 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. Institute Of Medicine (IOM). To err is human: Building a safer healthier system. Washington DC: The national Academic press 2000. **Ref.:** <https://goo.gl/LdTz8>
2. Nicholl J, West J, Goodacre S, Turner J. The relationship between distance to hospital and patient mortality in emergencies: an observational study. *Emerg Med J.* 2007; 24: 665–668. **Ref.:** <https://goo.gl/Sg3GB6>
3. Waydhas C. Intra-hospital transport of critically ill patients. *Crit Care.* 1999; 3: R83–89. **Ref.:** <https://goo.gl/ojFKYW>
4. Till A, Sall H, Wilkinson J. Safe Handover: Safe Patients - The Electronic Handover System. *BMJ Quality Improvement Reports* 2014; 2: u2029.w1359. **Ref.:** <https://goo.gl/63ByL2>
5. Wood K, Crouch R, Rowland E, Pope C. Clinical handovers between pre hospital and hospital staff: literature review. *Emerg Med J.* 2015; 32: 577-581. **Ref.:** <https://goo.gl/jQNcDf>
6. Gangadevi Nandasena, Chrishantha Abeyseena. Availability of facilities and equipment to provide emergency care in ambulances, which transport patients to the National Hospital of Sri Lanka. *Journal of College of Community Physicians of Sri Lanka.* 2018 In press.
7. Professional guidance on the structure and content of ambulance records. Royal College of Physicians. 2014. **Ref.:** <https://www.england.nhs.uk/wp-content/uploads/2014/12/amblnce-rec-guid.pdf>
8. Khan A, Zafar H, Naeem SN, Raza SA. Transfer delay and in-hospital mortality of trauma patients in Pakistan. *International Journal of Surgery.* 2010; 8: 155–158. **Ref.:** <https://goo.gl/WVIFwW>
9. Kulshrestha A, Singh J. Inter-hospital and intra-hospital patient transfer: Recent concepts. *Indian J Anaesth.* 2016; 60: 451–457. **Ref.:** <https://goo.gl/4AMuqa>
10. Verma V, Singh GK, Carvello EJ, Kumar S, Singh CM, et al. Inter-hospital transfer of trauma patients in a developing country: A prospective descriptive study. *Indian J Community Health.* 2013; 25: 309–315. **Ref.:** <https://goo.gl/PwtY9g>
11. Paker SA, Dagar S, Gunay E, Cebeci ZT, Aksaye E. Assessment of prehospital medical care for the patients transported to emergency department by ambulance. *Turk J Emerg Med.* 2015; 15: 122–125. **Ref.:** <https://goo.gl/wB2XZk>
12. Crandon IW, Harding HE, Williams EW, Cawich SO. Inter-hospital transfer of trauma patients in a developing country: A prospective descriptive study. *Int J Surg.* 2008; 6: 387–391. **Ref.:** <https://goo.gl/mvkfxE>
13. Shelton D, Sinclair P. Availability of ambulance patient care reports in the emergency department. *BMJ Quality Improvement Reports* 2016; 5: u209478.w3889. **Ref.:** <https://goo.gl/v9CMZ8>