the WINNOWER

MEDICINE

Emergency Physician Satisfaction and Accuracy of Paramedic Handover Information: A pilot study

TERESA M. CHAN [1], BRENDON TROTTER [2], SERENA SENNIK [1], CAILLIN LANGMANN [1], ANDREW WORSTER [1], MICHELLE WELSFORD [1]

1. Division of Emergency Medicine, Department of Medicine, McMaster University

2. St. Joseph's Healthcare Hamilton, Hamilton, ON

ABSTRACT

Effective and accurate communication is of critical importance when transferring patients between healthcare providers. The accuracy of handover information transmission during these encounters has not been well studied. From August 2010 to April 2011, a pilot study was completed to examine physician satisfaction and physician accuracy regarding the performance of prehospital interventions by paramedics. Our findings suggest that physician overall satisfaction (3/5 Likert score) and accuracy (16-44%) were low in our local milieu, suggesting the need for improvement processes.

CORRESPONDENCE:
teresamchan@gmail.com

DATE RECEIVED:
June 11, 2015

DOI:
10.15200/winn.142049.94873

ARCHIVED:
January 05, 2015

KEYWORDS:
paramedicine, handover, interprofessional care

CITATION:
Teresa M. Chan, Brendon Trotter, Serena Sennik, Caillin Langmann, Andrew Worster, Michelle Welsford, Emergency Physician Satisfaction and Accuracy of Paramedic Handover Information: A pilot study, *The Winnower* 2:e142049.94873 , 2015 , DOI: 10.15200/winn.142049.94873

INTRODUCTION

Handover of patient information is a vital component of clinical practice. Such communication is especially important in high-acuity environments, like the emergency department (ED), where it is often not possible to obtain useful information from patients directly.(Stiell, Forster, Stiell, Walraven 2003) Without an effective prehospital to ED handover process, much of this information may be lost.(Yong, Dent, Welland, 2008; Brenner, Hilton, Carr et al., 2008) Our pilot study's aim was to determine physician satisfaction with paramedic handover and the accuracy of the physician knowledge of prehospital events.

METHODS

From Aug. 2010 to Apr. 2011, a pilot study was conducted at two medium-volume (~50,000 visits were year) academic emergency departments in Hamilton, ON, Canada. Research ethics approval was granted by our regional research ethics board, and participants provided written, informed consent. A group of trained surveyors conducted in-person recruitment in the emergency departments at two sites. We recruited a convenience sample of 36 emergency medicine physicians and residents (postgraduate year-2 and above) managing three cardinal presentations: chest pain, shortness of breath, and altered level of consciousness/weakness. We asked EPs about: (a) their satisfaction with handover about prehospital interventions (5-point Likert scale), and (b) their knowledge of interventions that were performed in the prehospital phase. Upon completion of each individual survey and satisfaction Likert data were immediately transcribed. The online supplement (part 1) shows the questions asked during each survey. Satisfaction questions regarding involvement of nurses was tracked to determine the number of cases wherein the nurses were involved in the prehospital-to-hospital transfer process.

We later extracted the data from the Ambulance Call Records (ACRs). Up to three extractors located the paramedic records for cases that matched the recorded patient demographics, time and location of

arrival. For missing charts, a second extractor re-attempted a hand-search before declaring the ACR lost.

DATA ANALYSIS

We measured accuracy rates by comparing the answers rendered by the EPs on the survey to the official ACR documentation. We calculated the rate of EP accuracy regarding their awareness of prehospital interventions, with the ACR as the reference standard. If the EP answered that they "did not know" if an intervention was completed, this was considered an inaccurate response. 36 encounters were recorded and nine ACRs were lost to follow-up, thus 27 encounters had complete data. (See the online supplement part 2 for details)

DEMOGRAPHICS

The demographics of the types of handover encounters are noted in Table 1.
Table 1: Demographics of Handover Cases

Canadian Triage Acuity Score (CTAS) Proportions (n)	CTAS 1 8% (3) CTAS 2 42% (15) CTAS 3 47% (16) CTAS 4 3% (1) CTAS 5 0% (0)
Average Ambulance offload delay time	34 minutes (0 to 2:42)
Who was present at handover?	Charge Nurse (RN) present 40% (14) Bedside RN present 80% (28) Housestaff Present 11% (4) Attending Present 17% (6)
Types of Ambulance Crew	Advanced Care Paramedics 8% (2) Primary Care Paramedics 22% (8) Unknown 71% (25)
Mean age of Patients	69 (Range 32-98)
Enrollment	Enrollment at Site 1 42% (14) Enrollment at Site 2 58% (21)

NB: There was one patient in which two physician encounters were recorded for the same patient (one resident and one attending physician).

Overall emergency physician accuracy rates regarding awareness of prehospital interventions were as follows: chest pain 40% (95%CI: 6.7-73%); shortness of breath 33%(18-48%); altered level of consciousness 16% (7.4-25%) (Table 2). See Figure 1 for the cases recruited.

Figure 1: Cases Recruited

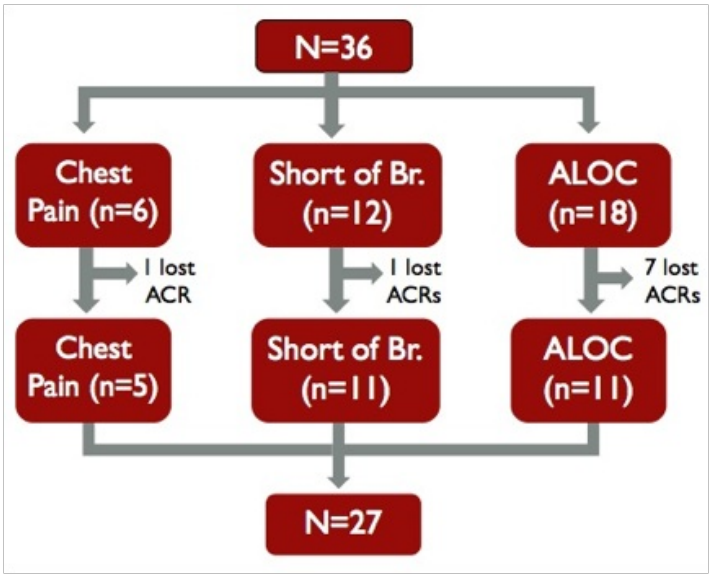

Table 2: Accuracy Rates for Physician Awareness of Prehospital interventions

Item	**Average Accuracy**	**95% Confidence Interval**
Chest Pain (n= 5; 5 items in checklist)	40%	6.7-73%
Shortness of Breath (n= 11; 6 items in checklist)	33%	18-48%
Altered LOC (n=11; 6 items in checklist)	16%	7.4-25%

The median satisfaction scores around each of the handover process components are shown in table 3.

Table 3: Satisfaction Scores for the Handover Process Components

Handover Process Components	**% (n)**	**Median**	**IQR (25-75%)**
Overall Satisfaction	100% (36)	3	2
Nursing Verbal	53% (19)	4	1
Nursing Written	72% (26)	4	1
EMS verbal Handover	19% (7)	4	0
EMS written Handover	2.7%** (1)	4	0

Key for Table 3: Key for satisfaction Likert scale:

1 = Highly Dissatisfied; 2 = Mildly Dissatisfied; 3 = Neutral, No Opinion; 4 = Satisfied; 5 = Highly Satisfied

** This is likely an erroneous score as the investigators did not find or note the ACR in the patient file.

None of the paramedic charts (ACRs) were available to physicians at the point-of-transfer of care, though one physician erroneously rated written communication by paramedics.

DISCUSSION:

Modern understanding of clinical competency is shifting toward the acknowledgement of the importance of healthcare teams, with less emphasis being placed on the individual (Lingard, 2012). Communication scenarios, such as transitioning patients from prehospital to ED settings, are a critical microcosm to examine team communication competencies.

In our pilot study of a convenience sample of EMS patient handovers we identified several issues to conducting a full scale study: these include a low enrolment and high lost-to-follow-up rates regarding paper-based ACRs.

Satisfaction scores

Previous studies have looked at satisfaction as a quality measure for handovers in the ED.(Yong, Dent, Welland, 2008; Brenner, Hilton, Carr et al., 2008) Brenner et al. (2008) concluded that 51% physicians were satisfied with paramedic handover in the ED, even though the physicians only received 44% of the relevant handover data points.(Brenner, Hilton, Carr et al., 2008) Our physicians reported a low overall satisfaction (average 3.03/5) versus component scores (ranging from 3.84-4.00). We hypothesize this may suggest some systems-level problems about which participants were not surveyed.

Of note, our study revealed a high dissatisfaction with EMS patient handover, which is very different from previous studies. While we are confident in the validity of this finding, the poor precision of our results due to the small sample size and high lost-to-follow-up rate support our intention for a modified, larger study.

Accuracy Rate

Our physicians were not accurate about prehospital interventions completed on their patients by the paramedics, which is shown in table 2. The accuracy scores for the three selected cardinal presentations ranged from 16-40%. These three cardinal presentations were selected because they were associated with the most interventions within our local prehospital paramedic protocols. We thought that these interventions were deemed to be highly clinically significant as they may immediately affect the ED management (online supplement, part 3). Even considering our small numbers and wide confidence intervals around, physicians were consistently inaccurate about prehospital actions.

LIMITATIONS:

This was a pilot study and the emphasis of the study was to determine feasibility of a larges scale project using the same method, as such, the small sample size and high lost-to-follow-up rate suggest that substantial modifications must be taken to ensure better ACR recovery and documentation. One of the key differences in our study was that the EPs did not have access to the written paramedic records prior to their direct patient encounter. The ACRs were available 0% of the time in this pilot, compared to a rate of 50% previously reported (Yong, Dent, Welland, 2008), Of note, one of the main limitations was the choice to enroll physicians, rather than patient-information transfer encounters. Since across the two sites, we only had roughly 60 candidate physicians, this decreased our ability to enroll into our study.

CONCLUSIONS:

EPs are often be unaware of the interventions performed on patients in the prehospital setting. Physician inaccuracy in our study may be due to the lack of paramedic written record availability. Further study and multidisciplinary action is required to improve this vital clinical handover process.

ACKNOWLEDGEMENTS:

We would like to acknowledge the following reviewers for their comments and suggestions: Abdulaziz Alali, Aseem Bishnoi, Michael Longeway, Alim Pardhan, Minh Le Cong. We are incredibly grateful to their contributions as their open peer reviews helped to improve our paper substantially.

REFERENCES

Brenner J, Hilton J, Carr G, et al. Information transfer from prehospital to ED health care providers. American Journal of Emergency Medicine (2008) 26, 233–244. DOI: 10.1016/j.ajem.2007.04.003

Lingard, L. (2012). Rethinking competence in the context of teamwork. The Question of Competence: reconsidering medical education in the twenty-first century, 42.

Stiell A, Forster AJ, Stiell IG, van Walraven C. Prevalence of information gaps in the emergency department and the effect on patient outcomes. Canadian Medical Association Journal. (2003), 169(10), 1023-1028.

Yong G, Dent AW, Weiland TJ. Handover from paramedics: Observations and emergency department clinician perceptions. Emergency Medicine Australasia (2008) 20, 149–155. DOI: 10.1111/j.1742-6723.2007.01035.x

Appendix 1: Survey on EMS-to-ED Handover Communication

Physician Satisfaction

Prompt 1: *Considering all the information you have at this point (prior to speaking with the patient), how satisfied are you with your KNOWLEDGE of the interventions completed in the pre-hospital setting?*

Overall	1 (Highly Dissatisfied)	2 (Mildly Dissatisfied)	3 (Neutral, No Opinion)	4 (Satisfied)	5 (Highly Satisfied)

Prompt 2: *Considering all the information you have at this point, how satisfied are you with your knowledge of the interventions in the pre-hospital setting as articulated to you by the Paramedics VERBALLY?*

EMS Verbal Handover	1 (Highly Dissatisfied)	2 (Mildly Dissatisfied)	3 (Neutral, No Opinion)	4 (Satisfied)	5 (Highly Satisfied)	N/A (didn't speak with EMS)

Prompt 3: *Considering all the information you have at this point, how satisfied are you with your knowledge of the interventions in the pre-hospital setting as articulated to you by the Paramedics' WRITTEN NOTES?*

EMS Written Handover	1 (Highly Dissatisfied)	2 (Mildly Dissatisfied)	3 (Neutral, No Opinion)	4 (Satisfied)	5 (Highly Satisfied)	N/A (EMS notes were not available)	N/A (didn't read EMS notes)

Prompt 4: *Considering all the information you have at this point, how satisfied are you with your knowledge of the interventions in the pre-hospital setting as articulated to you by the Nurses VERBALLY?*

Nurses Verbal Handover	1 (Highly Dissatisfied)	2 (Mildly Dissatisfied)	3 (Neutral, No Opinion)	4 (Satisfied)	5 (Highly Satisfied)	N/A (didn't speak with Nurses)

Prompt 5: *Considering all the information you have at this point, how satisfied are you with your knowledge of the interventions in the pre-hospital setting from Nurses' WRITTEN NOTES?*

Nurses Written Handover	1 (Highly Dissatisfied)	2 (Mildly Dissatisfied)	3 (Neutral, No Opinion)	4 (Satisfied)	5 (Highly Satisfied)	N/A (didn't read the RN notes)

Prompt 6: *Consider the current system for communicating information about pre-hospital interventions. Do you have any suggestions to improve the process? (Please write on back of page if necessary)*

APPENDIX 2: QUESTIONS ABOUT INTERVENTIONS ASKED OF EMERGENCY PHYSICIANS FOR EACH OF THE THREE SELECTED "CARDINAL PRESENTATIONS"

Chest Pain	**Altered Level of Consciousness / Weakness**	**Shortness of Breath**
Was ASA given in the prehospital setting?	Was a Capillary Blood Glucose done by EMS?	Do you know the patient's initial O2 sat on Room Air (i.e. without supplemental oxygen)?
Was Nitro-spray given in the prehospital setting?	Was an initial Blood Pressure noted to be abnormal?	Was supplemental oxygen or Non-invasive Ventilation (BVM, CPAP) given?
Was a 12-lead ECG done in the prehospital setting?	Was any medication given (Naloxone, IV dextrose, oral carbohydrate, midazolam)?	Were any medications given? (ie inhaled ventolin/epinephrine, IM epinephrine, Nitrospray, etc)
Was there an ST-elevation MI noted prior to arrival at hospital?	Was there any neurological deficits (focal deficits, seizure-like activity) that prompted change in prehospital management (Calling BHP, Calling for ACP assistance, Stroke Bypass)?	Was there any change (improvement, deterioration) in pt symptoms with prehospital interventions?
Was there an abnormal rhythm (SVT, AFib, VT) during transfer?	Was there an abnormal rhythm during transfer?	Was there an abnormal rhythm during transfer?
	Was a 12 lead ECG done?	Was a 12-lead ECG done in the prehospital setting?