Early prehospital assessment of non-urgent patients and outcomes at the appropriate level of care: A prospective exploratory study

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ABSTRACT

Introduction: The Ambulance Organization of Sweden provides qualified medical assessment and treatment by ambulance nurses based on patient needs regarding appropriate levels of care. A new model for patients with non-urgent medical conditions has been introduced. The main objective of this study was to examine early prehospital assessment of non-urgent patients, and its impact on the choice of the appropriate level of care.
Methods: The study design was a 1-year, prospective study, involving an ambulance district in south-western Sweden with a population of 78,000. Eligible patients were from18 years of age, assessed as priority GREEN by Rapid Emergency Triage and Treatment System (RETTS). Ambulance nurses contacted primary care physicians on decisions on whether a patient should be transported to a primary healthcare unit or an A&E. Data was collected from electronic health records from April 2014 to July 2015. A comparison was made with a retrospective control group without consulting a physician concerning the appropriate level of care.
Results: 394 patients were included, 184 in the intervention group, and 210 in the control group. There were statistically significant differences in favor of the study group (p < 0.001) regarding no transport, or transport and admission to an A&E. The groups did not differ significantly regarding transport to a primary care unit.
Conclusion: This prehospital assessment model indicates a decrease in ambulance transports to an A&E and admissions to a hospital ward. Collaboration between ambulance nurses and primary physicians affects the decision for the appropriate level of care for patients with a non-urgent condition.

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1. Introduction

The Ambulance Organization of Sweden provides qualified medical assessment and treatment by ambulance nurses [1]. Standard procedure for a mission is transport to an Accident and Emergency Ward (A&E), regardless of the patient's medical condition [2]. However, patients with non-urgent medical conditions constitute both a significant proportion of ambulance transports to an A&E, and a significant challenge to the healthcare system, regarding the appropriate level of care. [3].

Several studies describe the factors influencing patients to call an ambulance in non-emergency situations, resulting in unnecessary ambulance transports to the A&E [4,5]. Studies in Sweden

and England, however, have reported positive experiences of ambulance nurses capable of assessing patients for alternative levels of care instead of transporting them directly to an A&E [6–8]. Nevertheless, there is another study from England describing uncertainty in elderly patients not granted ambulance transport to the A&E [9].

A majority of Swedish ambulance and A&E organizations have implemented the RETTS, Rapid Emergency Triage and Treatment System [10]. The RETTS is a triage and priority instrument for the assessment of a patient's medical condition. This implies that ambulance nurses assess the patient's medical priorities according to vital signs and reasons for calling an ambulance, then transporting them to the A&E for further assessment of the appropriate level of care.

The Ambulance organization of southwestern Sweden has introduced a model of prehospital care for all adult patients with

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varying non-urgent medical problems. Ambulance nurses in collaboration with primary healthcare physicians assess patients at the scene to choose the appropriate level of care. A decision is made as to whether a patient should be transported by ambulance either to a primary healthcare unit, an A&E, or remain at home.

Prehospital measures are governed by clinical guidelines, and are carried out by registered nurses [1,11]. However, very little is known about structured assessments and outcomes involving collaboration between ambulance nurses and physicians in primary care, when managing patients with non-urgent medical conditions.

The main objective of this study was, therefore, to examine early prehospital assessment of non-urgent patients, and investigate outcomes on the appropriate level of care with collaboration between ambulance personnel and physicians in primary health care.

2. Methods

The design was a quantitative exploratory study based on a consecutive and retrospective review of patient records. The study was conducted from April 2014 to July 2015 involving one ambulance district in southwestern Sweden, with a population of 78,000 inhabitants. The ambulance organization in the district includes four units, and provides prehospital emergency care with transport to the emergency hospital within 50 km of ten primary care units in this district.

2.1. Patients in the study

All patients studied were assessed with the RETTS according to the ambulance organization's guidelines. The RETTS is a triage and priority model, consisting of two parts, which in combination result in a priority assessment of the patients. It is based on vital signs and an Emergency Symptoms and Signs (ESS) code, depending on why the patient called for help. Objective vital signs, including blood pressure, oxygen saturation, respiratory and heart rate, body temperature, and degree of consciousness, result in a triage color: red, orange, yellow, or green. Red symbolizes a life-threatening condition, orange, a possible life-threatening condition, yellow, a non-life-threatening condition requiring emergency hospital care, and green, meaning no need of transport to an emergency hospital at the present time [10]. Eligible patients were patients from 18 years of age assessed as GREEN priority according to the RETTS.

2.2. Study group

The patients were consecutively assessed and included by ambulance nurses during a period of 14 months. All patients received written and oral information from the ambulance nurse, and if patients gave their consent, the ambulance nurse obtained informed written consent. If patients were unable to grant their consent because of dementia or cognitive deficits, a relative could reply on the patient's behalf.

2.3. Inclusion criteria

2.3.1. Patients18 years of age or older
If the patient's condition was priority GREEN according to the RETTS, the ambulance nurse contacted a primary care physician for dialogue and decision concerning the appropriate level of care. There are three levels of care: 1. The patient is well enough to stay at home under the supervision of primary healthcare. 2. The patient is transported to the primary healthcare unit for assess-

ment. 3. The patient is transported by ambulance to an emergency ward.

2.4. Exclusion criteria

All patients under 18 years of age were excluded from the study group. All patients assessed and triaged as priority RED, ORANGE or YELLOW according to the RETTS were also excluded from the study group (Fig. 1).

2.5. Reference group

The study group was compared to a reference group, consisting of patients retrospectively recruited 14 months prior to the start of recruitment of the study group, in April 2014. The reference group received care between February 2013 and April 2014 according to the previous emergency care model of ambulance transport, but without prehospital triage or treatment. The patients in the study group, on the other hand, were prospectively included during the 14 months beginning in April 2014. They were assessed and triaged by an ambulance nurse to appropriate levels of care. No contact was made with physicians. Patients in both groups were triaged as priority GREEN according to the RETTS.

2.6. Data collection

Data for all patients was collected from various systems. Data from ambulance patient care included records on time, date, gender, age, place, reason for calling an ambulance, and the decision on level of care. Secondary transports within 24 h were registered to assess whether a patient's condition deteriorated, with further need of ambulance care. Data for admission to a hospital ward and mortality came from primary healthcare and electronic hospital medical records.

2.7. Ethics

This study was approved by the Regional Ethical Review Board of Lund, Sweden, Dnr 2014/41.

2.8. Sample size and power calculations

The expected sample size was 36 patients in each group to detect a reduction from 80% to 50% of patient transports to an A&E, with a statistical power of 80% with Type I error of 5%. It was decided to include 200 patients in each group to account for dropouts.

2.9. Statistical analyses

Outcome data for the intervention and control groups, respectively, was summarized by descriptive statistics. For group comparisons, i.e. tests of the null hypothesis of no difference, the t-test was used for continuous variables (age and ambulance time). The Chi-2 test was used for binary/categorical variables such as gender, time of day (8–17, 17–24, 24–8), reason for calling an ambulance, place, decision on level of care, secondary transfer within 24 h, and admission to a hospital ward. We also compared patient outcomes between the intervention and control group for subgroups of patients according to gender, age, time of day, and reasons for calling an ambulance. P-values less than 5% were regarded as significant. IBM SPSS 20.0.2 was used for the statistical analyses.