



Observational study

Acute pain in the emergency department: Effect of an educational intervention



Kristian Dahl Friesgaard^{a*}, Charlotte Paltved^b, Lone Nikolajsen^{c,d}

^a Department of Anesthesiology, Horsens Regional Hospital, Denmark

^b Midtsim Corporate HR, Central Denmark Region, Denmark

^c Danish Pain Research Center, Department of Clinical Medicine, Aarhus University, Aarhus, Denmark

^d Department of Anesthesiology, Aarhus University Hospital, Aarhus, Denmark

HIGHLIGHTS

- A 2-h educational program increased the knowledge of pain management.
- The increased knowledge was not transferred into clinical practice.
- Acute pain is common in the emergency department.

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ABSTRACT

Background and aims: Pain management is often inadequate in emergency departments (ED) despite the availability of effective analgesics. Interventions to change professional behavior may therefore help to improve the management of pain within the ED. We hypothesized that a 2-h educational intervention combining e-learning and simulation would result in improved pain treatment of ED patients with pain.

Methods: Data were collected at the ED of Horsens Regional Hospital during a 3-week study period in March 2015. Pain intensity (NRS, 0–10) and analgesic administration were recorded 24 h a day for all patients who were admitted to the ED during the first and third study weeks. Fifty-three ED nurses and 14 ED residents participated in the educational intervention, which took place in the second study week.

Results: In total, 247 of 796 patients had pain >3 on the NRS at the admission to the ED and were included in the data analysis. The theoretical knowledge of pain management among nurses and residents increased as assessed by a multiple choice test performed before and after the educational intervention ($P=0.001$), but no change in clinical practice could be observed: The administration for analgesics [OR: 1.79 (0.97–3.33)] and for opioids [2.02 (0.79–5.18)] were similar before and after the educational intervention, as was the rate of clinically meaningful pain reduction (NRS >2) during the ED stay [OR: 0.81 (CI 0.45–1.44)].

Conclusions: Conduction of a 2-h educational intervention combining interactive case-based e-learning with simulation-based training in an ED setting was feasible with a high participation rate of nurses and residents. Their knowledge of pain management increased after completion of the program, but transfer of the new knowledge into clinical practice could not be found. Future research should explore the effects of repeated education of healthcare providers on pain management.

Implications: It is essential for nurses and residents in emergency departments to have the basic theoretical and practical skills to treat acute pain properly. A modern approach including e-learning and simulation lead to increased knowledge of acute pain management. Further studies are needed to show how this increased knowledge is transferred into clinical practice.

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Abbreviations: NRS, Numeric rating scale; ED, Emergency department; EP, Educational program; MCQ, Multiple choice questionnaire; CI, 95% Confidence interval; IQR, Interquartile range.

* Corresponding author at: Department of Anesthesiology, Horsens Regional Hospital, Sundvej 30, 8700 Horsens, Denmark.

E-mail addresses: k.friesgaard@clin.au.dk (K.D. Friesgaard), paltved@dadlnet.dk (C. Paltved), lone.nikolajsen@clin.au.dk (L. Nikolajsen).

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1. Introduction

Involving up to 60% of all patients, acute pain represents a considerable problem in the emergency department (ED) [1–3]. Undertreatment of acute pain has been extensively documented over the past decades and may have negative psychological and physiological consequences for the patients [4]. The reasons for undertreatment in the ED are numerous and involve some of the following: inadequate recognition and assessment of pain, narrow focus on the diagnosis and less attention of the painful condition, inadequate knowledge of and training in acute pain management of healthcare providers [5–8], and, in particular, the prejudice against prescription of opioid analgesics [9]. Consequently, one obvious strategy to reduce undertreatment is to educate ED nurses and residents in pain management.

Most educational research has focused on the implementation of new pain management guidelines and protocols, and only few studies have evaluated the effects of modern teaching methods such as e-learning and simulation [10–16]. Given the paucity of research in this field, we therefore decided to create an educational program (EP) combining interactive case-based electronic learning (e-learning) with simulation-based training. We hypothesized that (1) the EP would increase the knowledge of nurses and residents about acute pain management, and that (2) this increased knowledge would result in improved acute pain management in the ED.

2. Methods

2.1. The setting

The study was carried out in the ED of Horsens Regional Hospital (Denmark), which is one of five hospitals in the Central Region of Denmark receiving acute patients. The population of the Horsens area is approximately 208,000 out of a total population of 1,282,000 in the Central Denmark Region. The ED receives only patients referred from general practitioners and patients who have called 1-1-2 (a total of 34,000 patients annually). Patients are either treated and discharged immediately (e.g. in case of minor injuries) or hospitalized in the ED. Hospitalized ED patients are treated and discharged from the ED within 48 h or referred to other departments, if necessary (e.g. surgical or medical patients requiring specialized treatment). Acute patients with a clear tentative cardiologic diagnosis are not treated in the ED but are referred directly to the department of cardiology. At the time of the intervention, 58 nurses, 6 attending physicians, and 15 residents were employed in the ED. The attending physicians did not participate in the study. The educational intervention was conducted at the hospital in a separate department organized especially for simulation, education, and practical teaching.

The study was approved by the Danish Data Protection Agency (2007-58-0010). We consulted the local ethics committee and they replied that ethical approval was not required for this study according to the Scientific Ethical Committees Act (section 14, subsection 1). Written informed consent was obtained from all participating patients.

As presented in Fig. 1, the study period consisted of three consecutive weeks: Patient data were collected during the first and third weeks and the intervention was carried out in the second week.

2.2. Patient data

Eight research assistants screened all consecutive patients for the presence of acute pain at the admission to the ED. This was done 24 h a day during the first and third study weeks, i.e., before

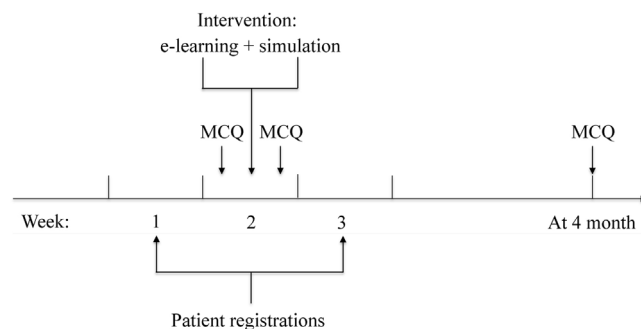


Fig. 1. Timeline of study period. MCQ: multiple choice questionnaire.

and after the intervention. The pain was evaluated on an 11-point numeric rating scale (NRS, 0–10), where 0 indicated no pain and 10 indicated the worst imaginable pain. Patients with moderate to severe pain (NRS >3) at admission were included in the study. Exclusion criteria were as follows: severe trauma or medical illness causing activation of Trauma Team or Medical Emergency Team, age less than 15 years, or inability to rate pain intensity on the NRS. The research assistants also recorded pain intensity at discharge from the ED, i.e., hospital discharge, referral to other departments, or transfer to the operating room. If the patients had received analgesic treatment, the research assistants verified the drug's name, dose, and administration form in the electronic patient journal. Pharmacological treatment options were paracetamol (Pinex[®]), nonsteroidal anti-inflammatory drugs (Burana[®]), tramadol (Dolol[®]) and morphine. The research assistants were trained thoroughly by the investigators prior to the study. Tentative diagnosis, occupancy rates, and time measures were subsequently extracted from the electronic patient journal. The research assistants were instructed not to interfere with the patient care or the nurses' work, and they did not pass information on to any employee in the ED.

2.3. Educational program

During the second study week, the attending nurses and residents in the ED completed an EP consisting of interactive case-based e-learning and subsequent simulation training. One or two residents and 2–4 nurses typically participated in each EP session, which lasted approximately 2 h. The EP session was repeated 4 times daily for 5 continuous days in order to educate all nurses and residents in the ED.

Prior to the design of the EP, we identified barriers to sufficient pain management among nurses and residents during open discussions at staff meetings. The main barriers identified included inadequate knowledge about pain assessment and proper opioid dosing, a fear of inducing opioid-related adverse effects, and a general lack of attention to pain management. The nurses emphasized that the latter challenge occurred primarily during ED crowding. The authors formulated the content of the EP, and three pain management experts and two experts in simulation-based training from the Central Denmark Region carried out a critical revision. Graphic designers and experts in information technology managed the layout and technical composition of the e-learning module [17]. The e-learning module used an interactive case-based format and focused on pain assessment, administration and titration of commonly used analgesics, including opioids, and dose calculations based on patient age, weight, and comorbidities. (See Appendix or <https://rm.plan2learn.dk/kursusvalg.aspx?id=32949&lang=en> for details).

The simulation training session began with an initial briefing of the participants, continued with a simulation scenario, and ended

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