



## Facilitators and barriers in pain management for trauma patients in the chain of emergency care

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### ABSTRACT

**Introduction:** The aim of the study is to give insight into facilitators and barriers in pain management in trauma patients in the chain of emergency care in the Netherlands.

**Patients and methods:** A qualitative approach was adopted with the use of the implementation Model of Change of Clinical Practice. The chain of emergency care concerned prehospital Emergency Medical Services (EMS) and Emergency Departments (EDs). We included two EMS ambulance services and three EDs and conducted five focus groups and 10 individual interviews. Stakeholders and managers of organisations were interviewed individually. Focus group participants were selected based on availability and general characteristics. Transcripts of the audio recordings and field notes were analysed in consecutive steps, based on thematic content analysis. Each step was independently performed by the researchers, and was discussed afterwards. We analysed differences and similarities supported by software for qualitative analysis MaxQDA.

**Results:** This study identified five concepts as facilitators and barriers in pain management for trauma patients in the chain of emergency care. We described the concepts of knowledge, attitude, professional communication, organisational aspects and patient input, illustrated with quotes from the interviews and focus group sessions. Furthermore, we identified whether the themes occurred in the chain of care. Knowledge deficits, attitude problems and patient input were similar for the EMS and ED settings, despite the different positions, backgrounds and educational levels of respondents. In the chain of care a lack of professional communication and organisational feedback occurred as new themes, and were specifically related to the organisational structure of the prehospital EMS and EDs.

**Conclusion:** Identified organisational aspects stressed the importance of organisational embedding of improvement of pain management. However, change of clinical practice requires a comprehensive approach focused at all five concepts. We think a shift in attitudes is needed, together with constant surveillance and feedback to emergency care providers. Implementation efforts need to be aimed at the identified barriers and facilitators, tailored to the chain of emergency care and the multi-professional group of emergency care providers.

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### Introduction

Acute pain and trauma are closely related, as noxious stimuli are transmitted from the injured areas to the nociceptor pathway, which results in pain perception.<sup>11</sup> Pain is also the main complaint

of patients seeking help in emergency care.<sup>2</sup> However, it has shown to be undertreated, in prehospital ambulance Emergency Medical Services (EMSs)<sup>9,12</sup> as well as in the Emergency Department (ED).<sup>1,20</sup> As a consequence, patients suffer pain unnecessarily, and adverse physiological and psychological effects occur.<sup>13</sup> Furthermore, chronic pain is reported in 63% of the patients 1 year after major trauma.<sup>14,16</sup>

In the Netherlands, there is no appropriate systematic approach to acute pain management in trauma patients in prehospital EMS and EDs. As a result, pain management is sometimes not started, is not continued consistently or is sometimes even conflicting.

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Besides the development of a clinical guideline on this topic,<sup>23</sup> we studied the literature on barriers and facilitators in pain management in emergency care. Furthermore, we were interested in the continuity and the follow-up of pain management between the EMS and the EDs: 'the chain of emergency care'.

In general, several barriers for effective pain management have been studied separately within the EMS or ED setting. From the patients' perspective, ethnicity,<sup>19</sup> reluctance to report pain<sup>7</sup> and refusal of pharmacological treatment have been reported.<sup>17</sup> Knowledge deficits<sup>18</sup> and the need for change of attitudes of emergency physicians have been identified.<sup>4</sup> Facilitating factors were the implementation of a pain protocol,<sup>22</sup> a quality control programme for emergency medicine,<sup>15</sup> high triage scores in the ED<sup>17</sup> and education of emergency nurses.<sup>3</sup>

Although several barriers and facilitators have been described in general, it is not clear what specifically hinders or facilitates pain management in 'trauma patients' in 'the chain of emergency care'. The aim of this study is to give insight into facilitators and barriers in pain management in trauma patients in the chain of emergency care (EMS and ED) in the Netherlands. With this insight, tailored implementation strategies for change of clinical practice can be explored and developed.

## Patients and methods

### Theoretical model of the problem

Changes of clinical practice are not self-implementing. Pain management in the chain of emergency care will only improve with implementation efforts aimed at barriers and facilitators. In this study, we used step 2 of the model of Grol et al.<sup>6</sup> This implementation model of change of clinical practice consists of five steps: step 1 involves the development of targets for improvement (recommended care); step 2 analyses the target group and setting – both current practice and the barriers and facilitators are explored in this step; step 3 concerns the development of the implementation strategy and measures to change practice; and steps 4 and 5 subsequently apply, evaluate and adapt the implementation plan. Step 1 has been carried out by another study focussed on the development of a national evidence-based guideline.<sup>23</sup>

### Study design

A qualitative approach with the use of individual interviews and focus groups meetings was adopted. This study focussed on the professional and organisational perspective.<sup>6</sup> Based on the study protocol, the regional Committee on Research Involving Human Subjects waived the need for a review of the study.

### Setting

In the Netherlands, paramedics provide emergency care in EMS ambulance services. Following a national training course, they are qualified as Emergency Medical Technicians level 4. All paramedics receive preparatory training as Registered Nurses, as this is the mandatory level to become a paramedic. Their competencies in trauma and pain management are regulated by national protocols, as they work autonomously and mostly unassisted in the prehospital setting.

Dutch EDs work with multidisciplinary teams. Not all EDs have emergency physicians available for 24 h a day, 7 days a week. Although final medical accountability is shifting towards emergency physicians, most EDs are controlled by the surgical department. A recent study revealed that 56% of the Dutch EDs do not have a protocol for pain management in adults.<sup>5</sup>

**Table 1**

Overview of participants in individual and focus group interviews.

	Individual interviews	Focus group interviews
EMS	Medical managers (n=2) Stakeholders national EMS analgesia protocol (n=2)	Focus group 1: (n=4) Paramedics Focus group 2: (n=4) Paramedics
ED	Medical managers (n=3) Nurse managers (n=3)	Focus group 1 (n=4) Emergency nurses, emergency physician, physician no in training for a specialty Focus group 2 (n=6) Emergency nurses, emergency physician, orthopaedic trauma surgeon resident Focus group 3 (n=5) Emergency nurses, emergency physician, trauma surgeon resident.
Total	n = 10	n = 23

### Selection of participants

Two EMS ambulance services (EMS GelderlandMidden and EMS GelderlandZuid) and three EDs were included in the sample. For the EDs, we selected an academic trauma centre (Radboud University Nijmegen Medical Centre), a teaching hospital (Canisius Wilhelmina Hospital) and a regional general hospital (Hospital Bernhoven).

Five focus group interviews were conducted with staff responsible for the actual pain management (Table 1). Four to six people were invited for each focus group. All staff members received an invitation by e-mail with a short introduction to the study as well as the procedure of confidentiality. Professionals who were willing to contribute replied to the researchers. We selected the sample based on availability of the respondents for the potential interview dates. We further selected the respondents for a variety in general characteristics such as gender, professional background and years of experience. With this mix, we aimed to include a representative sample for both settings. Due to changes in acute shifts and other work-related problems, five selected respondents (EMS n = 2, ED n = 3) did not participate. Table 1 shows the number of interviewed persons.

We decided to explore the perspectives of managers through individual interviews, because their hierarchical positions regarding the staff could hinder other participants in saying what they thought or felt. Furthermore, the number of managers was too small to compose a separate focus group (Table 1). In addition, stakeholders of the national EMS analgesia protocol were not invited to the focus group of paramedics, because they had rather advanced levels of expertise compared with the paramedics. Participants who were interviewed individually were not included in the focus group discussions.

### Methods of measurement

We developed specific questioning routes for the individual interviews and focus groups.<sup>10</sup> General topics in each interview or discussion included attitude towards pain management, pain assessment, pain treatment, and facilitators and barriers in pain management.

We used independent moderators (with a medical background) for the interviews and focus groups. These moderators were well trained with respect to moderator skills. All the interviews and focus group meetings were audio recorded and the moderators took field notes. Every meeting was prepared, organised and debriefed with the researchers (SB, TM). Individual and focus group interviews were typed out verbatim by the moderator of that particular meeting.

## Primary data analysis

The transcripts and field notes were analysed in consecutive steps,<sup>10</sup> using thematic content analysis. Each researcher selected the quotes and coded these text parts with keywords. We used an inductive approach to identify themes, and analysed interrelationships in the data. Recurrent themes were clustered and linked to transcending concepts. Each step was performed independently, and discussed with the other researcher(s) afterwards. We discussed disagreements in such a way that the next step in the analysis was based on consensus. We used the analytic framework of identifying key concepts and constant comparatives: to discover core ideas, to understand how participants viewed the topic and to identify patterns or trends.<sup>10</sup> The process of analysis was supported by software for qualitative analysis (MaxQDA).

As the interviews had been conducted and analysed in Dutch, the translation of the transcripts were verified by a translator (VH).

## Results

We identified five concepts in the chain of emergency care: knowledge, attitude, professional communication, organisational aspects and patient input. Table 2 presents an overview of these concepts and indicates which aspects were seen as facilitators or barriers. Furthermore, the overview describes whether the themes

**Table 2**  
Overview of facilitators and barriers in the chain of emergency care.

Concepts	EMS	ED
<b>1 Knowledge</b>		
Knowledge deficits on adequate pain management <sup>a</sup>	–	–
Pain assessment based on expert opinion	–	–
Pain treatment based on experience, not on protocols	–	–
Fear for adverse events when administering opioids	–	–
Knowledge on physiology of pain, new developments, and effect of undertreatment	+	+
Pain assessment based on validated instruments	+	+
<b>2 Attitude</b>		
Pain is not life-threatening for the patient	–	–
Pain is 'part of the deal' and a minor priority in trauma care	–	–
Resistance to the use of validated pain assessments	–	–
Doubts on the validity of patients' pain experience	–	–
Pain does not influence the choice of injury treatment	–	–
<b>3 Professional communication</b>		
Inadequate multidisciplinary communication on pain	.	–
Professional feedback on pain management	+	+
<b>4 Organisational aspects</b>		
Organisational feedback is lacking	–	–
National EMS analgesia protocol is inadequate	–	.
Protocol is not in use in the ED, or not evaluated	–	–
Triage assessment and pain assessment in the ED are intertwined, high pain scores result in inadequate urgent triage outcomes	.	–
No consensus shared perspective on pain management	–	–
Lack of follow-up in the chain of emergency care	.	–
ED culture is not primarily focused on patient comfort	.	–
Role model: surgeon is mainly focused on injury treatment	.	–
Role model: the emergency physician in the ED is a facilitator	.	+
One guideline on pain management for the chain of emergency care	+	+
<b>5 Patient input</b>		
Patient refuses pharmacological pain treatment	–	–
Patient input enhances effective pain management	+	+

<sup>a</sup> Facilitators are presented as '+'; barriers are presented as '-'; and absence of facilitators or barriers is presented as '.'.

occurred in the chain of care. In this paragraph, we describe the different themes of the five concepts, illustrated with quotes from the interviews and focus group sessions.

### Knowledge

#### Barriers

Respondents reported uncertainty in effective pain management in trauma patients based on 'knowledge deficits'. In general, there was limited attention for pain management during the initial training and in the advanced curriculum of emergency physicians, paramedics and nurses. They reported knowledge deficits regarding the physiological relationship between trauma and pain, the consequences of inadequate pain treatment and the effect of pain management on recovery and healing of the patient. In addition, the negative effects of inadequate pain management were reported to be unknown.

'Pain assessment' was often based on clinical observations and expert opinion and not on the use of validated pain instruments. Also, 'pain management' was based more on expert opinion and previous experiences than on available pain protocols. There was a 'fear for adverse effects' of administration of opioids. Respiratory depression was seen as a potential threat to patients' safety. Therefore, some paramedics did not administer fentanyl (prescribed in the national EMS analgesia protocol), or administered a low (less effective) dose during emergency transport. Further, emergency nurses were reluctant to give intravenous opioids when the physician was not present in the ED.

*'What is passed on is mostly technical knowledge on pain management rather than other things that affect pain reduction as well. During the training we were asked how much we administer, but they never question why and how'. (EMS, paramedic)*  
*'During my career I administered less of these substances (fentanyl and ketamine), than my colleagues who worked in an intensive care unit or in anaesthesiology... they are more into the intravenous syringes... I notice a difference there, I see much more obstacles than they do...'. (EMS, paramedic).*

#### Facilitators

'Adequate knowledge' was generally seen as a facilitator for improvement of pain management. Professionals in the chain of emergency medicine wanted to be educated on physiology of pain, new developments, the effect of insufficient treatment and discussions on case reports. Managers and stakeholders of the national EMS analgesia protocol discussed how research could play an important role in the development of a body of knowledge.

#### Attitude

#### Barriers

All respondents emphasised that the treatment of trauma patients was focussed on 'treat first, what kills first'. 'Pain is not life threatening' and it was perceived as 'part of the game'. Some respondents considered systematically validated pain assessments as a 'minor priority', which was in contrast to the opinion of managers in emergency care. Furthermore, 'pain did not primarily influence' the decision-making process of professionals on 'injury treatment'.

Practising emergency care providers expressed a general 'resistance to use validated pain scales' for trauma patients. They expressed that validated pain assessment is not necessary.

Some respondents expressed 'doubts about the patients' pain experience', and they questioned the patient's honesty when reporting pain.

*'In cardiology, of course pain has consequences for the treatment. But when the arm of a trauma patient is at an angle, well then that needs to be fixed and it does not matter whether the pain score is eight or four, because that is of no importance for the injury treatment' (ED, physician).*

*"To be honest, I hardly ever ask for a VAS-score. What I do ask is: what has happened, where does it hurt?" (ED, physician).*

*'...But if the patient says eight; I sometimes find that highly exaggerated! (Other focus group member: 'but that is your own interpretation, based on what you see'.) 'But, when a person is lying in the ambulance and I ask for a pain score and he says eight, which is unbearable pain, but he is smiling...'. Well, then I think: 'get lost!'. (EMS, paramedic).*

### Professional communication

#### Barriers

'Inadequate inter- and multidisciplinary communication' on pain hindered adequate pain management. Paramedics felt that interdisciplinary communication on pain management at the ambulance station was lacking. In the ED, there was a lack of communication between members of the multidisciplinary team, who had different responsibilities and perspectives, regarding pain management in trauma patients.

*I do not know whether it is wise to have a patient completely pain free, because then you run the risk that he will be too active once he is at home' (ED, physician). 'It would be nice though, if patients could leave the ED pain free' (ED, nurse). 'You mean completely pain free? (ED, physician). 'If I was a patient, I would prefer that' (ED, nurse).*

#### Facilitator

All respondents mentioned 'professional feedback' as a strategy to improve professional communication and adequate pain management.

### Organisational aspects

#### Barriers

All respondents reported a 'lack of organisational feedback' on pain management. Respondents in the EMS setting reported that adherence to the national EMS analgesia protocol and problems with the current protocol were not structurally monitored and evaluated. Paramedics brought up that the 'national EMS analgesia protocol was inadequate': it did not offer sufficient and adequate pharmacological options and gave limited room for the professional expertise of the paramedics. Medical managers and stakeholders of the national EMS analgesia protocol did not agree on this perspective and questioned the paramedics in the underpinning of protocol deviation.

There was no national protocol regarding pain management for the ED setting, although two out of three departments used a pain protocol for trauma patients. Although these protocols were introduced some time ago, the (implementation of the) 'ED protocols had not been evaluated' or structurally monitored.

'Triage assessment and pain assessment in the ED are intertwined' and respondents of the ED reported that they did not want high pain scores to result in high triage scores. A high pain score in the Manchester Triage System (MTS) results in high priority codes for the patients, whereas these patients may have lower urgency levels based on their clinical signs. Furthermore, when the ED was overcrowded and the workload was high, a systematic pain assessment and triage by MTS were both omitted.

In general, there was no 'consensus on a shared perspective regarding pain management'. There was discussion in the focus groups on the optimal level of pain reduction that could, or should, be achieved. Neither professionals nor organisations had a shared perspective. All respondents agreed that there was a 'lack of follow-up in pain management in the chain of emergency medicine'.

The 'ED culture was not primarily focussed on patient comfort'. Respondents of the ED characterised their environment as a stressful place, where traumatic and painful experiences for patients were regularly seen and were perceived as quite normal. Team members who were more patient centred were not easily heard or accepted. As coordinators of trauma care, trauma 'surgeons were mainly focussed on injury treatment' and not on pain management.

*'I find the consecutive steps in the national EMS analgesia protocol inadequate. We have either nothing... or opioids... Such steps are simply too big'. (EMS, paramedic)*

*'A patient with a broken wrist gives a pain score of ten. All right, you should not generalize, but a pain score of ten gets triage code orange (ed. very urgent). Naturally, that never happens. These patients mostly get the yellow code (ed. triage code urgent)'. (ED, triage nurse)*

*'The major trauma patients mostly received fentanyl in prehospital EMS and they arrive pain free at the ED. However, that only has a short-term effect. ... I believe we are waiting too long with adequate pain medication for the follow-up. We work with inexperienced physicians in the ED. ...'. (ED, physician)*

*'I have a patient with a fracture, and we are waiting for the orthopaedic surgeon... When I call him, he says: 'I first want to see the patient'. This causes a delay of at least 10–15 minutes, which later on forces me to give extra analgesia'. (ED, nurse).*

#### Facilitators

'One pain guideline for the chain of emergency care' was seen as a facilitator of effective pain management. For the ED setting, professionals suggested that and 'ED protocol with prescribed nurse initiated pain medication' could serve as a facilitator in pain treatment in an early stage of diagnosis and treatment in the ED.

The 'emergency physician' was generally seen 'as a facilitating factor' for the improvement of pain management in the ED. In the Netherlands, the role of the emergency physician is changing towards a more central role as a coordinator of the ED management. The emergency physician was seen as more focussed on the overall perspective of the patient.

## Patient input

### Barriers

All respondents described that sometimes ‘patients refused to accept pharmacological pain treatment’. This input was experienced as a frustrating and delaying factor in adequate pain management. Professionals suggested that the cultural background, the individual perspective and the fear of patients for unnecessary use of medication were possible reasons for the rejection of analgesia.

*‘Do you need anything against the pain? If they (ed. patients) say no, then I accept that. And, although I think I should say more often, I do not advise them to take medication after all’. (ED, nurse)*

### Facilitator

All respondents referred to the ‘patient input as a facilitator’ for the improvement of pain management. The patient’s perspective on adequate pain relief, for example, through the use of the systematic pain score (NRS or VAS), could play an important role in the systematically validated evaluation of pain treatment from an individual and a subjective perspective.

## Discussion

This study identified five concepts as facilitators and barriers in pain management for trauma patients: knowledge, attitude, professional communication, organisational aspects and patient input. We found that the three concepts, knowledge, attitude and patient input, covered shared themes in the chain of care, despite the different positions, backgrounds and educational levels of respondents. The two concepts, organisational aspects and professional communication, concerned barriers and facilitators that were specifically related to the organisational structure of the prehospital EMS and EDs. Before we further elaborate on the improvement of pain management in the chain of emergency medicine, some topics need to be discussed.

First, although barriers and facilitators within the concepts of knowledge, attitude and patient input have been described earlier,<sup>7,17,18,4,3</sup> it was not clear that similar themes were also present in the EMS and ED setting. Both professional as well as organisational feedback have previously not been identified as strategies for the improvement of pain management in emergency care. Organisational aspects identified in our study and previous literature,<sup>13,4,22,15,5</sup> stress the importance of embedding implementation plans for the change of clinical practice in the organisational structure of the EMS and the ED. In our opinion, these insights together create new possibilities for tailored implementation strategies for pain management in trauma patients in the chain of emergency care.

Second, barriers and facilitators that were only identified within the EMS or ED setting were closely related to the organisational and the national context of these settings, for instance, the facilitating role of the emergency physician in the EDs in the Netherlands.<sup>8</sup> It remains to be seen whether these concepts should, and could, be addressed in the chain of emergency medicine. Knowing that effective pain management in prehospital EMS enhances early ED pain management,<sup>21</sup> a combined strategy for the EMS and ED setting in the chain of emergency care could possibly result in a triple positive effect regarding pain management.

Third, although the five concepts in the ‘Results’ section were presented solitarily, it is obvious that there are inter-concept

relationships. Barriers and facilitators can be improved, strengthened or accelerated by other concepts depending on the nature of the underlying relationships. Due to the interrelated nature of the five concepts, we suggest that a tailored implementation strategy will have to address all concepts together in order to improve pain management in the chain of emergency care.

Fourth, better education, implementation of guidelines and systematic feedback are important strategies to improve pain management in the chain of emergency care. However, the fact that healthcare providers do not believe that patients who claim to be in pain is alarming. On the one hand, professionals appear to be uncomfortable with providing narcotic analgesics; on the other hand, they freely deviate from protocols or guidelines, because they think they know better. Curiously, they report that the guidelines are not working even though they are adhering to them. Therefore, we think that a dramatic attitudinal shift is needed, together with constant surveillance and feedback to healthcare providers on adherence to the evidence-based guidelines.

### Limitations

This study has some limitations in the context of the theoretical model of Grol et al.<sup>6</sup> Due to the qualitative approach chosen, we gained insight into perceived barriers and facilitators, although the frequency and impact of these barriers were not quantitatively addressed.

Another limitation of the study is the issue of the selected sample and the related question on whether we reached adequate saturation. We decided to invite ED respondents from many different professional groups together in one focus group, because they are all involved in pain management and we were interested in the multidisciplinary perspective on pain management. In order to attain feasible and representative respondents for these focus groups within the time frame of the study, we opted for the selective sampling.

We cannot fully assure that we reached saturation on all themes. Particularly the input of (orthopaedic) trauma surgeons was limited, due to the small number of representatives in the focus group. We tried to optimise the variety of reflections of participants by choosing well-trained and independent moderators and planned three focus groups. An analysis of the meetings showed recurrent ideas, and many concepts that emerged were also described in the literature before, so they partially confirm a certain level of saturation.

We advise further study to gain insight into differences between groups, for instance, the attitudes of emergency physician residents and senior physicians. This study should be repeated in other regions in the Netherlands in larger groups in order to solve the (potential) saturation problem and confirm that no issues have been missed out.

Finally, one could question the external validity of this study. Whilst the interdisciplinary discussion gave new insight into barriers and facilitators in the chain of emergency care and the follow-up of pain management, the general application of results in other settings could be discussed.

In order to develop an implementation strategy on a national level or in other countries, a quantitative study on the frequency and impact of identified themes and concepts in this study is recommended.

## Conclusion

This study identified five concepts as facilitators and barriers in pain management for trauma patients. Knowledge deficits, attitude problems and patient input were similar for the EMS and ED setting, despite the different positions, backgrounds and



educational levels of respondents. The lack of professional and organisational feedback occurred as new themes. Identified organisational aspects stressed the importance of the organisational embedding of the improvement of pain management. Change of clinical practice requires a comprehensive approach at different levels. However, we think a shift in attitudes is needed, together with constant surveillance and feedback to healthcare providers on adherence to the evidence-based guidelines. Strategies to improve pain management need to be tailored to the chain of emergency care and the multi-professional group of emergency care providers.

### Conflict of interest statement

Sivera A.A. Berben, Tineke H.J.M. Meijs, Pierre M. van Grunsven, Lisette Schoonhoven and Theo van Achterberg disclose any financial and personal relationships with other people or organisations that could inappropriately influence (bias) our work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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