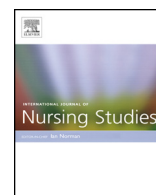




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Postoperative patients' perspectives on rating pain: A qualitative study

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ABSTRACT

Background: In postoperative pain treatment patients are asked to rate their pain experience on a single uni-dimensional pain scale. Such pain scores are also used as indicator to assess the quality of pain treatment. However, patients may differ in how they interpret the Numeric Rating Scale (NRS) score.

Objectives: This study examines how patients assign a number to their currently experienced postoperative pain and which considerations influence this process.

Methods: A qualitative approach according to grounded theory was used. Twenty-seven patients were interviewed one day after surgery.

Results: Three main themes emerged that influenced the Numeric Rating Scale scores (0–10) that patients actually reported to professionals: score-related factors, intrapersonal factors, and the anticipated consequences of a given pain score. Anticipated consequences were analgesic administration—which could be desired or undesired—and possible judgements by professionals. We also propose a conceptual model for the relationship between factors that influence the pain rating process. Based on patients' score-related and intrapersonal factors, a preliminary pain score was “internally” set. Before reporting the pain score to the healthcare professional, patients considered the anticipated consequences (i.e., expected judgements by professionals and anticipation of analgesic administration) of current Numeric Rating Scale scores.

Conclusions: This study provides insight into the process of how patients translate their current postoperative pain into a numeric rating score. The proposed model may help professionals to understand the factors that influence a given Numeric Rating Scale score and suggest the most appropriate questions for clarification. In this way, patients and professionals may arrive at a shared understanding of the pain score, resulting in a tailored decision regarding the most appropriate treatment of current postoperative pain, particularly the dosing and timing of opioid administration.

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What is already known about the topic?

- Patients are asked to rate their pain experience on a single uni-dimensional pain scale.
- Patients' pain scores are the leading indicator in postoperative pain treatment.
- It is unknown how patients interpret the NRS scores.

What this paper adds

- Three main themes emerged that influenced patients' NRS scores actually reported to professionals: score-related factors, intrapersonal factors and the anticipated consequences of assigning a particular NRS score.
- A conceptual model emerged for the relationship between factors that influence the pain rating process. When assigning an NRS score to their pain, patients process the first two themes in stages: They first weigh score-related factors and intrapersonal factors. Some patients go through a last stage before telling the professional: weighing the judgements by healthcare professionals and the anticipated consequences of reporting a particular NRS score against their actual desire for more or less analgesics.
- The proposed model could help professionals to better understand the complex process by which patients assign pain scores and could serve as a basis for a dialogue beyond the given pain scores.

1. Introduction

The adequacy of pain treatment is an important healthcare quality indicator. Many patients still experience severe pain after surgery, suggesting that there is considerable room for improvement in postoperative pain management (Apfelbaum et al., 2003; Sommer et al., 2008). The quality of pain management is in many quality systems operationalized in terms of measuring patients' pain scores.

Pain is subjective, and nociception cannot be measured directly. In clinical practice, patients are asked to rate their (sometimes complex) pain experience on a single uni-dimensional pain scale. However, in contrast to the high number of quantitative studies using the Numeric Rating Scale (NRS), only one study is found how chronic pain patients use the NRS (Williams et al., 2000) but no study has explored how postoperative patients interpret the NRS, how they assign a number from 0 to 10 to their pain, and what considerations come into play when translating a highly subjective pain experience into a single number.

Patients' pain scores are the leading indicator in postoperative pain treatment (Aubrun et al., 2003; Idvall et al., 2008; Gordon et al., 2005; Max et al., 1995; VMS, 2009). Clinical observations and physiological parameters used in pain treatment should be considered with caution. Nurses often underestimate patients' pain (Idvall et al., 2005; Sloman et al., 2005) and vital signs can be influenced by other factors besides pain (Arbour and Gelin, 2010; Gelin and Arbour, 2009). Several guidelines advise healthcare professionals to administer additional analgesics when patients report an NRS score greater than 3 or 4

(Gordon et al., 2005; Hartrick et al., 2003; Max et al., 1995; VMS, 2009). In a previous study, we reported that patients with NRS scores of 4, 5, or 6 vary in the interpretation of their score (Van Dijk et al., 2012). In that study, we observed that some patients reporting NRS scores between 4 and 6 considered their pain "bearable" and refused opioids, while other patients with identical NRS scores considered their pain "unbearable" and requested more opioids. This raises the question of whether simple thresholds such as "NRS > 3 or 4" are the most appropriate cut-off points upon which professionals should base their decisions regarding administering additional analgesics. In postoperative pain management, both undertreatment and overtreatment are undesirable. Unrelieved pain has adverse psychological and physiological consequences, including increased rates of postoperative complications and prolonged hospital stays (Watt-Watson, 1999). Conversely, unnecessary use of analgesics, especially opioids, increases the patient's discomfort due to the side effects (e.g., nausea, vomiting, and pruritus) and potentially harmful adverse effects (e.g., oversedation and respiratory depression) (Cashman and Dolin, 2004; Taylor et al., 2005). For optimal pain treatment, patients and professionals must communicate effectively and have a shared understanding of the burden of the patient's currently experienced pain.

The aim of this qualitative study was to explore how patients assign a number on the basis of the NRS to their currently experienced postoperative pain and which considerations influence this process.

2. Methods

2.1. Study design

The study was descriptive and qualitative in nature. The method used was based on grounded theory (Charmaz, 2014), a qualitative research method designed to aid in the systematic collection and analysis of data and the construction of a model. Individual interviews were used as the data-collection method. Guidelines for conducting qualitative studies established by the Consolidated Criteria for Reporting Qualitative Research (COREQ) were followed (Tong et al., 2007).

2.2. Participants

The study was conducted between November 2012 and July 2013 in a university hospital. Patients were eligible for selection if they had surgery the day before and currently experienced postoperative pain with a reported NRS score of at least 4. Patients were selected purposively by the researcher (JvD) and to create a diverse sample patients were selected with regard to sex, age, ethnicity, previous pain experiences, and previous experience with rating an NRS score. Theoretical sampling was used as much as possible; we started with a homogeneous sample of patients, and as the data collection proceeded and themes emerged, we turned to a more heterogeneous sample to see under what conditions the themes hold (Charmaz, 2014).

The researcher was not involved in the patients' care. Exclusion criteria were as follows: younger than 18 years, unable to read and understand Dutch, cognitive impairment, having impaired hearing, or not being well enough to be interviewed. The researcher identified eligible patients by consulting the Electronic Patient Dossiers (EPDs) and asked the nurse on the ward whether identified eligible patients could be interviewed. None of the eligible patients were unable to be interviewed. Thereafter, the researcher approached the patients, provided information about the study, and handed over an information letter. After reading the letter, patients were asked to consider participation in the study. All 27 patients who were asked agreed to participate, and written informed consent was obtained. The study was approved by the medical ethics committee of the University Medical Centre Utrecht in which the study took place.

2.3. Data collection

Data were collected using semi-structured, in-depth interviews on the day after surgery. The researcher's (JvD) interview technique (validity and reliability of the interview style) during the first two interviews was discussed with experts). The questions were open-ended, and all interviews started with, "The nurse regularly asks you to assign a number from 0 to 10 to your pain, where 0 is no pain and 10 is the 'worst imaginable' pain. We heard from some patients that they perceived it as difficult to assign a number to their pain. How is that for you? Can you tell me how you assign a number to your pain?" A topic guide for the interviews based on the literature, the knowledge of nursing experts, and preliminary studies of the research group was used (Table 1). The Dutch school grades were chosen as a topic because the meaning of these grades (where 1 is insufficient and 10 is excellent) are the opposite of meaning of the pain scores. Therefore, Dutch patients could be confused when they were asked to score their pain on the NRS.

Insights from the interim analyses were incorporated in the interview guidelines used in subsequent interviews. Interviews were conducted in a private room on the ward, digitally recorded and transcribed verbatim. Identifying details were removed from the transcripts. The interviews lasted between 5 and 32 min (mean 12 min). Information concerning age, gender, ethnicity, surgical procedure,

presence of chronic pain, and education was obtained using a structured questionnaire.

During data collection, memos were made containing impressions and thoughts about the themes and their relationships. Data collection stopped after saturation was reached (i.e., interviewees were selected until the new information obtained did not provide further insight into the themes or no further new themes emerged) (Charmaz, 2014).

2.4. Data analysis

The data analysis was conducted by two researchers (SV and JvD) and supported by NVivo 10 software (QSR International, Cambridge, MA, USA). Data were analysed applying constant comparison analysis. First the texts were read out in full to obtain an overall picture and then reread to elucidate the details. During open coding meaningful paragraphs were analysed and initial concepts identified leading to fragmentation of the data. Axial coding enabled the concepts to be aggregated according to their similarities leading to categories (themes). New data were compared with the evolved categories. Throughout selective coding relations between the categories were defined and a preliminary model was described (Boeije, 2010). The theoretical model in development was compared with the interview transcripts to verify the interpretation into the original interview texts. During the coding process, the researchers discussed the concepts and categories. When their opinions differed, they discussed the issue until consensus was reached. A third researcher (CK, an expert in the field of pain treatment with a different background), read the transcripts, checked the coding, and discussed his opinion if different, allowing us to verify the themes and the preliminary model. The research team reviewed the main categories and its relations and worked towards consensus about the interpretations and finally the theoretical model was developed.

2.5. Trustworthiness

The trustworthiness of the study was enhanced by the use of different techniques (Lincoln and Guba, 1985). The credibility was established by generating a non-judgemental atmosphere during interviews ensuring to learn from patients. Transcribing the interviews verbatim reduces the chances for bias. During data collection and data analysis memos were written supporting the research process and the creation of theoretical ideas and hypothesis. Researcher triangulation during data analysis and peer debriefing by the researchers team enhanced both the credibility and conformability of the interpretation. By means of peer debriefing broader perspectives and possible meanings were uncovered and reflexivity, guaranteed by the critical stance to the interview style and feedback of other researchers led to more depth which enhanced accurateness. To guarantee the transferability as much as possible, thick description was pursued by the amount of respondents, diversity of the sample, duration of interviews and describing the details for imitability.

Table 1

The topic guide for the interviews.

The value of the numbers from 0 to 10
Pain score at that moment
Bearable or unbearable pain
Assigning scores at the upper extreme of the scale
Previous experiences with pain
Upbringing
The role of the healthcare professional
Analgesics: when desiring light or strong analgesics fear of addiction and side effects
Grades at school from 1 to 10

3. Results

The age of the 14 men and 13 women who participated in the study was between 18 and 79 years old (mean 51). The severity of surgery varied from minor (e.g., thyroidectomy) to major (e.g., spinal fusion). Demographic and medical data are presented in Table 2.

Translating currently experienced pain into an NRS score between 0 and 10 appeared to be a complex process for the patients. From the analysis, three main themes emerged regarding the process of scoring one's pain experience: score-related factors, intrapersonal factors, and the anticipated consequences of rating one's pain with an NRS score. The latter theme comprised two subthemes: expected judgements by professionals and anticipation of analgesic administration, particularly opioids. Factors that were reported to influence the rating of pain using an NRS score are shown in Table 3.

A model emerged of the interrelation between the themes clarifying what underlies patients' rating of their pain on the NRS (Fig. 1). Patients went through consecutive stages wherein the themes were at play. However, not all patients were affected by the themes in the same way. Based on the patients' score-related and intrapersonal patient factors, a preliminary pain score was "internally" set. Before reporting the pain score to the healthcare professional, the patient considered the anticipated consequences of the current NRS score. Based on these expectations, this preliminary pain score was sometimes adjusted to a definitive pain score that was reported to the professional. First, patients expected that professionals would judge them regarding the magnitude of the reported pain score. Second, patients considered what pain treatment would likely be administered as a result of their reported pain score. Some patients wanted to meet the expectations of the professional and considered what would be the most socially acceptable pain score. Based on these considerations, the "adjusted" pain score was then communicated to the healthcare professional.

Table 2
Demographic data.

N	27
Male, n	14
Age, mean (range)	51 (18–79)
Ethnicity, n	
Caucasian	23
Other	4
Surgical type, n	
Orthopaedic	16
General	5
Gynaecologic	3
Plastic surgery	2
Vascular surgery	1
Education, n	
Low	10
Median	10
High	7
Patients with chronic pain, n	6

3.1. Score-related factors

Unique pain experience: Patients found it difficult to rate their pain using an NRS score, because they felt they had an "unique" pain experience. They said it was difficult to explain to another person exactly what they felt or what their pain level was in relation to what they felt. Several patients said that everyone experiences pain differently and therefore will assign their own value from 0 to 10.

"It's difficult to measure. You've got your interpretation and I've got mine" (male, age 51).

"I think about worst pain as something I've never felt before and zero is no pain. I always find it a very difficult question to assign a number" (female, age 51).

Many patients perceived it as difficult to assign a number from 0 to 10 to their experienced pain, especially when it concerned the intermediate pain scores (NRS scores of 4 to 6). For some patients who had chronic pain in addition to acute postoperative pain, it was even more difficult to rate their current pain experience, because they often experienced different types of pain that differed in intensity.

Distinction between "bearable" and "unbearable" pain: To make it easier to rate their pain, some patients first created a cut-off point between bearable and unbearable pain, the latter often expressed as an NRS score of 6 or higher.

"I balance between bearable and severe. If it is bearable then it is a six, it is not good, but I can bear it. But when I feel it with any movement and it's really painful, then it is eight or sometimes nine" (female, age 79).

The number 5 was seen by many patients as a natural midpoint of the pain scale. Therefore, patients themselves often used an NRS score of 5 as a cut-off point: At 5 and below, the pain was considered bearable, and at above 5, the pain was called "real pain."

"Five' I would consider the average, that is bearable. Over five, then I'd say: give me something. That is not really bearable I think. So, as long it is up to five, I'd say I am doing OK" (female, age 45).

Patients concluded that there clearly was a difference between their interpretation of bearable and unbearable pain and that of professionals. In the patients' opinion, many professionals considered only NRS scores below 4 as representing bearable pain, while many patients considered an NRS score of 6 as indicating bearable pain. In the Netherlands school system, a grade system from 1 to 10 is traditionally used, where 1 means completely insufficient and 10 denotes excellent. In this system, a score of 6 is sufficient to pass an exam. One patient mentioned that this had an effect on how she used the NRS.

"The grades at school that is something you are familiar with, that is also a validation, that has an effect, because that's what you grew up with. Because it is also a kind of validation, when you give the pain a number then you also validate something, you know? Yes, I think so" (male, age 77).

Table 3

Three main themes and associated factors that emerged from the interview analyses.

Score-related factors	Intrapersonal patient factors	Anticipated consequences of assigning a particular NRS score	
		Judgements by professionals	Analgesic administration
<ul style="list-style-type: none">• Unique pain experience• Distinction between bearable and unbearable pain• Avoiding high extremes• Different pain level at rest and movement	<ul style="list-style-type: none">• Previous pain experiences• Being tough on oneself• Pain threshold• Holding oneself to one's own standards• Desiring confirmation from professionals	<ul style="list-style-type: none">• Being seen as a bother• Experiencing basic mistrust• Wish to meet the expectations of professionals	<ul style="list-style-type: none">• Encounter ambivalence• Suffering side effects• Variation on timing of opioids• Nurses have own point of view

Most patients said that they were not confused when rating their pain experience in relation to scores they were used to getting at Dutch schools.

Avoiding high extremes: Most patients assign an extreme score on the NRS as follows: 0 and 1 meaning no or light pain and 9 and 10 meaning the worst imaginable pain. Some patients explained that they would never use the highest pain score, because “10” is so extreme that they could not imagine having so much pain.

“If it hurts a little, then it is often two or three. Higher than five, then it has to hurt a lot. I would never give a ten. Yeah, ‘unbearable’ wouldn’t cross my mind” (male, age 36).

Other patients said that they would never assign a very high number to their pain, because they mentally compared their current situation to a more severe imagined situation.

Different pain level at rest and movement: When patients were asked how they assigned a number to their pain, many patients said they experienced a difference between pain at rest and pain at movement. Patients mostly assigned two different numbers to their pain: an NRS score below four at rest and an NRS score above six or seven at movement.

“If I lie very still and I have used the PCA pump then it is a three or four, and when I move it goes up to a seven, eight” (male, age 41).

Some patients consider their pain at rest as bearable and only move if necessary. Patients accepted a brief

moment of pain at movement and did not want additional analgesics for such short severe pain episodes.

3.2. Intrapersonal patient factors

Previous pain experiences: When rating their current pain using an NRS score, patients used past pain experiences as a benchmark to judge their current pain level. Patients who had experienced severe pain in the past tended to consider their current pain as less severe than patients who had not experienced severe pain before. They explained that they understood what “worst imaginable” pain was and accordingly recalibrated the NRS.

“I now rate it a three, almost no pain, but I’ve had surgery before and then they asked it as well. I’ve had a tonsillectomy and then you’re actually constantly in pain, so I had an eight or something, that’s really very painful, that’s not normal anymore” (female, age 18).

“My neuropathic pain was severe and then you know how ‘worst imaginable’ pain can be. And that’s quite irritating because I’ve had a lot of pain and if you have to compare then I say, ‘it’s a four’ and you compare it with a ten that is not as high as someone else’s, I always find it difficult to distinguish. And then they (the nurses) say, ‘oh, then it’s okay’. But they don’t know with what I’m comparing it” (female, age 26).

Being tough on oneself: Regarding their postoperative pain experience, many patients said that they were tough on themselves.

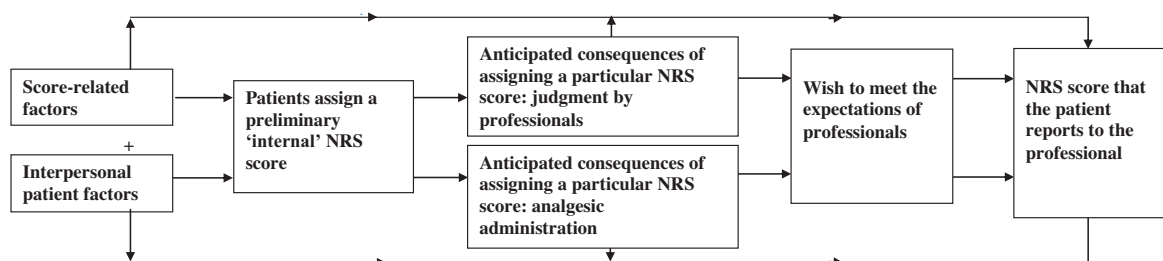


Fig. 1. The model for the patients' underlying process of rating an NRS score to their pain.

“They have often told me that I am very hard on myself. I didn’t allow myself to complain. I was very hard on myself” (male, age 41).

Patients said that they expected pain after surgery and that they could bear some pain. Moreover, patients indicated that postoperative pain is temporary. Sometimes, high NRS scores were given, yet patients considered the experienced pain bearable and did not want additional analgesic treatment. Several patients said that they thought it was appropriate to be tough on themselves, and they often traced that back to their own upbringing and the way they were taught to handle pain during childhood.

“I don’t moan quickly. I don’t often visit the doctor. I get that from my upbringing. Yeah, it has to be really necessary before I make a fuss” (female, age 45).

Pain threshold: Many patients thought they had a high pain threshold, because they could bear a lot of pain.

“My pain threshold is quite high because I’ve been through a lot. My knees had to be bent three years ago. So, I can take quite a lot because that was very severe” (male, age 41).

One patient said that the individual pain threshold depends on the degree of resilience that one has and that this differs between people. Patients who also had chronic pain considered their postoperative pain intermediate but bearable, explaining that they were used to having pain. They explained that because they were accustomed to pain, they had a high pain threshold and could handle more pain than patients without chronic pain.

“You learn to live with it, but there are limits. Anyone else would already be screaming because of the pain, but my pain threshold is a bit higher” (male, age 45).

Few patients said they had a low pain threshold because they could not bear a lot of pain. One patient told the interviewer that after giving birth to her children, she could not bear pain anymore.

Holding oneself to one’s own standards: Many patients considered NRS scores of 4 and higher, especially scores between 4 and 6, still bearable. During the interviews, the researcher explained to the patients how professionals are taught that NRS scores of 4 and higher are unacceptable and require intervention. Even after this explanation, patients continued to maintain their own point of view (i.e., that NRS scores between 4 and 6 were bearable). They said they had their own standards about the meaning of the different numbers of the pain scale.

Interviewer: “You told me a six, seven is bearable. Would you alter it if I told you that nurses consider zero to four as bearable pain?”

Patient: “No, because I have got my own norm, I am more used to pain and I think it is bearable. If I’m in pain and I can handle it, it is bearable for me” (male, age 47).

Desiring confirmation from professionals: Patients sometimes doubt about the NRS score they assign to their pain.

Patients appreciated it when the professional confirmed their assignment of a high number to their pain. They were more convinced that they had correctly assigned a number to their pain experience if the doctor or nurse had said that a high level of pain was expected or normal.

“When I actually told him (the doctor), he said ‘yes I can imagine, because it’s all bruised’. So then I thought ‘see, I’m not exaggerating!’. I have the idea that they will then think I’m being a wimp” (female, age 63).

3.3. Anticipated consequences of assigning a particular NRS score

Patients appeared to take the anticipated consequences of a given NRS score into account before telling the professional a number. They sometimes purposefully assigned a lower NRS score than the pain actually experienced in anticipation of the reaction of healthcare professionals. Patients were sometimes reluctant to provide an NRS score, fearing it is “too high” or “too low” that possibly lead to a reaction of the professional they did not expect. With giving a particular score, patients tried to anticipate whether professionals will administer analgesics or not. Therefore, this distinction led to two subthemes: “judgment by care professionals” and “analgesic administration.”

3.3.1. Judgements by healthcare professionals

Being seen as a bother: Patients were worried that healthcare professionals would consider them being a bother if they reported high NRS scores.

“That is not because I want to be tough or anything, that is not the issue, but I just don’t want to be a bother. That’s the point, I just don’t want to be bothersome” (male, age 47).

“In the past, you didn’t complain, you just got on with it. That’s what’s in me and always will be” (female, age 63).

Patients fear that professionals think that they exaggerate pain. Consequently patients anticipated on the risk of being judged as bothersome by the professional and therefore do not want to complain. Many patients said they were afraid of being seen as troublesome while hospitalized. To avoid being seen as troublesome, they did not ask for analgesics, especially when they observed that the nurses were busy.

Interviewer: “Why did you wait two hours before you requested any analgesics?”

Patient: “Because I didn’t want to be troublesome” (male, age 70).

Experiencing basic mistrust: The expression of pain using a number from 0 to 10 was influenced by patients’ perception of professionals; some patients hesitated to report a high NRS score, thinking that healthcare professionals would not believe that they were really in so much pain.

“This week I gave a high pain score and I noticed that they (the nurses) looked at me as if to say, ‘mmm, that is a very high score’. They almost don’t believe you. Probably because it is rare that the pain score is that high. Like they can’t handle it that the pain is so severe, I think, I noticed that” (male, age 45).

This basic mistrust, patients said, led them to intentionally report lower NRS scores than they actually perceived.

“Well, there are interpretation differences between people. You’re not allowed to complain. So, you lessen your pain score because you feel that no-one will accept if you say ‘I feel so awful. I’m in so much pain’, then you minimize your pain” (female, age 65).

One patient defined basic mistrust as “mental pain”: “It hurt when someone said to me, ‘Nothing is wrong with you!’” Patients thought that this disbelief was due to a lack of visible tissue damage. Patients felt they were not taken seriously by healthcare professionals when reporting an NRS score. They perceived that the professionals did not consider their pain serious. Patients clearly indicated that they wanted to be taken seriously, even when professionals thought that the reported NRS score was (too) high. Some patients indicated that it was important that the professional just listened to them, without judging.

“Being taken seriously is pleasant for a patient. Knowing that you are being taken seriously, even though from an objective point of view it (the pain score) is not quite the right number on the scale” (female, age 65).

Wish to meet the expectations of professionals: Some patients wanted to meet the expectations of the professional in what pain score fits best on the experienced pain, considering what would be the most socially acceptable pain score. They adjusted their pain score to the estimated level of which they thought the professional will find it logical.

“Then I think I will lower my score, otherwise they (the nurses) will think ‘do you really have so much pain?’ (female, age 63).

“I am just going to give my usual scores and for now, I just not take my neuralgia into account. When my neuralgia gets worse again, then I will give it a score of 20 because adjusting my measure to even worse pain has been proven not efficacious to give a clear explanation of my experienced pain (to the nurses)” (female, age 26).

3.3.2. Analgesic administration

Encounter ambivalence: Many patients were ambivalent towards analgesics. On the one hand, they needed analgesics after surgery to recover, but on the other hand, they actually thought analgesics were not good for them because of toxicity.

“If it really hurts, after surgery for example, then I think it’s necessary. But if it’s not necessary, then preferably

no painkiller, because ultimately it’s junk what you’re putting in your body” (female, age 18).

Some patients accepted analgesics and other patients said that most pain is transient, and therefore, refused analgesics. The different negative terms for analgesics given by patients, like “junk” or “rubbish,” supported this opinion.

“There is so much rubbish in and I think every time ‘O my God, it’s morphine and it’s better if I can do without.’ They (the nurses) have explicitly told me that it’s okay, but it plays on my mind” (female, age 71).

Suffering side effects: Some patients said that they refused opioids because they had previously experienced typical opioid side effects, such as sedation and nausea, even when the nausea had been treated appropriately. Once they are no longer opioid naïve, patients often consciously weigh the desired analgesic effects of opioids against the negative side effects.” One patient expressed this eloquently as follows:

“But as soon as I use too much morphine then I become very nauseous. You are constantly trying to find a balance between bearable pain and bearable nausea, shall we say” (female, age 65).

Variation on timing of opioids: There was significant variation in the pain levels at which patients wanted opioids to be administered. Some patients said they could bear the pain and did not need any analgesics. Other patients wanted light analgesics to be administered at NRS scores of 4–6. However, a large variability was seen when patients needed opioids: Some patients said they needed opioids at NRS scores from 6 onwards, while some only required opioids from NRS 7 or even higher:

“I want painkillers from a four and above and morphine, no, then I would say: eight or above” (male, age 36).

Patients gave different reasons for not wanting opioids (e.g., they had heard terrifying stories about opioids from family and friends, they had previously suffered from the side effects of opioids, they wanted to bear their own pain, they believed that pain was a signal telling the body it needed to rest or that they had to get used to pain).

Nurses have own point of view: Patients said that nurses had their own point of view about the meaning of the numbers from 0 to 10 and do not use the score to communicate about pain with the patient:

“As far as I can remember nobody asked me a question like that if the pain was mild because if it is severe, six or seven, then they (the nurses) say, ‘what can we do about it?’ But when it is three or four then they immediately say, ‘okay’ and write it down. I would prefer if they said, ‘do you want us to do something about it or can you handle it’, instead of saying, ‘so, you’re okay then’” (female, age 26).

Patients said that there was no agreement in terms of the NRS score at which nurses administered analgesics. One patient describes this as follows:

“Well I thought, the pain is easing, so I said five or four, one of those I said and then she (the nurse) said, ‘well then you don’t need any more painkillers.’ And then I said no, then it is a six because it hurt and I needed them. Now I assume with five I won’t get any painkillers so I think ok, with five no painkillers and I want some so I give a six and then I get them” (female, age 32).

In contrast, some patients who rated their pain as NRS 6 or 7 did not want additional analgesic medication, but nurses insisted that they accept additional pain medication according to acute pain treatment guidelines.

4. Discussion

The qualitative approach in this study identifies several elements underlying the process of a patient translating his/her currently experienced postoperative pain into a reported rating on the NRS. A model of this decision-making process is proposed made of the interrelationship between the factors that influence this rating process. The model may help healthcare professionals to better understand this process and the factors that possibly influence the NRS score that is actually reported to them. When assigning an NRS score to their pain, patients process the first two themes in stages: They first weigh score-related factors and intrapersonal factors. Some patients go through a last stage before telling the professional: weighing the anticipated consequences of reporting a particular NRS score against their actual desire for more or less analgesics. Patients can be aware of these factors, but most often, the entire process appears to be implicit and subconscious.

Quantifying pain through the self-reported NRS score from 0 to 10 is often referred to as the gold standard for pain assessment (Schiavenato and Craig, 2010). However, for a gold standard, self-report is fraught with limitations. Nowadays, pain professionals develop guidelines for pain treatment including the manner for instructing and informing patients how they should interpret NRS scores from 0 to 10. Our data suggest that this single number does not tell the whole story. Instead, healthcare professionals should listen to the patient’s story about the experienced pain rather than simply administering analgesics as soon as a single pain score exceeds a numeric threshold. Without a pain assessment beyond the NRS by healthcare professionals, postoperative patients may be at risk of both undertreatment and overtreatment of their pain. The scores on the NRS are only important to detect change in postoperative pain treatment. Knowledge of the factors in this study that influence a patient’s pain scoring can help professionals use simple questions to explore patients’ unique pain experiences and consequently titrate analgesic treatment in dialogue with the patient, improving the quality and safety of care.

The current study also confirmed that patients find it especially difficult to rate their unique pain experience on the NRS when their score is in the middle of the sequence (i.e., 4 to 6) (Eriksson et al., 2014; Williams et al., 2000). Therefore, many patients considered an NRS score of 7 as the limit of pain acceptance, and at 7 or above, opioids

were desired. This is clearly a much higher pain threshold than currently taught to professionals based on guidelines for acute pain management. There is no agreement on the optimal NRS cut-off score in guidelines for pain treatment and there is no agreement on how to identify an optimal NRS cut-off score for pain treatment (Gerbershagen et al., 2011). Rigid cut-off scores in guidelines for pain treatment should not be used with individual patients to prevent a risk of over- or undertreatment. Therefore, patients should be asked what their individual cut-off score is when they require a particular intervention.

Many factors are known to affect the experience of pain, including gender, age, culture, previous experiences, types of surgery, the meaning the pain has to the individual experiencing it, and psychological factors (e.g., coping skills) (Gerbershagen et al., 2013; Mackintosh, 2007). Patients often arrived at a new NRS score by comparing their worst previous pain experience with the current pain sensation (Dionne et al., 2005; Manias et al., 2004). In the current study, we found that the NRS scores from 0 to 10 can conceal real differences in pain intensity across patients, because previous pain experiences differ between patients. In line with this finding, a previous study concluded that it is impossible to compare pain scores between patients, because we cannot share pain experiences (Bartoshuk et al., 2003).

Subjective norms influence the social pressure on the individual to exhibit (or not exhibit) a particular behaviour (Rhodes and Courneya, 2003). Our findings confirmed the idea that patients do not want to deviate from perceived social norms and be known as an individual who complains a lot (Eriksson et al., 2014; Hansson et al., 2011). Patients are afraid of being judged by healthcare professionals when the NRS score they report is perceived as “too high.” This exact situation, called basic mistrust, is described in a phenomenological study in which nurses did not believe the patients (Söderhamn and Idvall, 2003). Only when there is confirmation by the professional does the patient feel empowered to assign a high NRS score.

Patients also envision what their reported pain scores will mean regarding the subsequent administration of analgesics, especially opioids. There appears to be a wide variation in how patients interpret NRS scores in relation to if, when, and how much analgesia needs to be given. The NRS cut-off points used in guidelines for acute pain are often lower than those of patients; patients tend to use the midpoint of the scale as the NRS cut-off value for additional analgesia. Therefore, most patients with NRS scores of 4, 5, and even 6 consider their pain “bearable” and do not want opioid analgesics. It seems that many professionals have learned this from patients and do not administer analgesics when patients’ NRS pain scores are in the middle of the scale. In turn, patients have learned from previous reactions of professionals at what NRS score they will be administered a certain analgesic. A study of chronic pain patients also showed that patients have to give an NRS score higher than 5 in order to receive more analgesics from the nurse (Hansson et al., 2011).

Understanding the process by which patients make decisions is important to understand the decisions they make. In previous studies several factors are described that

influence patients' decision-making process, e.g., past experiences, cognitive biases, age, and belief in personal relevance (Dietrich, 2010; Juliusson et al., 2005; Sagi and Frieland, 2007). Once the decision is made, levels of regret or satisfaction will impact future decisions (Juliusson et al., 2005; Sagi and Frieland, 2007). In the current study, patients anticipate on the consequences on reporting a particular pain score whether professionals will administer analgesics or not depending on their past experiences in pain treatment. Additionally, patients anticipate on the judgement by healthcare professionals; some patients hesitated to report a high NRS score, thinking that healthcare professionals would not believe that they were really in so much pain (Idvall et al., 2008).

When the NRS score is used, a shared understanding of patients and professionals is crucial to the adequate treatment of pain. However, this seems difficult to realize, because the interpretation of pain scores differs between individuals. Everyone has its own standards and values that are impossible to change in favour of looking the same way to the pain scores from 0 to 10. Culture influences how each person experiences and responds to pain. Some cultures value stoicism and tend to avoid saying that there is pain and other cultural groups tend to be more expressive about pain (Narayan, 2010). Patients' diverse cultural patterns are not right or wrong, just different. The purpose is to achieve individualized pain assessment and pain treatment. Professionals evaluate patients' pain and make judgements that are required for prescribing pain treatment. Therefore, healthcare professionals must learn to think about analgesic administration in a more "patient-oriented" way: a patient has to be seen as a whole person in his/her social context, and his/her feelings, wishes, expectations, norms, and experiences have to be taken into account (Ouwens et al., 2012). Patients want to participate in the treatment of their pain and tell the healthcare professionals if and when they need analgesics because patients know what pain they have (Idvall et al., 2008; McTier et al., 2014; Joelsson et al., 2010).

Many patients could tolerate short bouts of severe pain during movement as well and did not desire additional opioids. For some patients, the pain can be so severe as to preclude adequate coughing. In these cases, it is important that patients accept additional analgesia to prevent pneumonia. In a previous study, we educated patients about the principles in postoperative pain management (Van Dijk et al., 2015). Patients' knowledge and beliefs changed, moreover, their behaviour did not change. Postoperative patients still gave high pain scores and considered this as bearable and did not want (extra) analgesics. Changing patients' habits is very difficult, as patients in the current qualitative study say that they want to hold their own standards and remain having their own point of view about pain management.

Although our study was restricted to only one university hospital, the richness of the data makes us confident that our analysis has captured the most typical aspects of patients' underlying processes for rating their pain on the NRS. Moreover, the current study is strengthened by the number of interviews and the fact that the new insights that emerged during data collection were

incorporated into the interview topic list. In this qualitative study, only Dutch patients were interviewed, and the results are, therefore, not immediately generalizable to other countries and cultures. While we believe that many of the themes that we elicited (e.g., fear of being judged) will also emerge when repeated in other countries in the Western world, ideally a cross-cultural international study should be conducted to expand on the themes and to validate or extend our conceptual model of how patients arrive at their reported NRS scores. Such a study would possibly give interesting and important insights into cross-cultural differences in the pain experience and responses to pharmacologic and non-pharmacologic pain treatments offered.

5. Conclusions

In postoperative pain management, NRS cut-off scores are widely used as a basis for administering or withholding opioid analgesics. Patients however, have a different view on these NRS cut-off scores; many patients consider NRS scores 4, 5 and 6 as bearable and do not need analgesics. Therefore, it is necessary to communicate with patients beyond the NRS score. The current qualitative study identified several elements of the underlying process (e.g., previous pain experiences, being tough on oneself, basic mistrust by healthcare professionals, and variation on timing of opioids) by which patients translate acute postoperative pain into a rating on the NRS. The factors in the model are subsumed under three main themes: score-related factors, intrapersonal factors, and the anticipated consequences of reporting a particular NRS score. Knowing these factors could help healthcare professionals to better understand the complex process by which patients assign pain scores and the factors that influence the scores that are ultimately reported to them. This could serve as basis for a dialogue aimed at clarifying the patient's current needs and result in more patient-centred, shared decision making regarding (opioid) analgesic administration improving the quality and safety of care.

6. Relevance to clinical practice

Pain assessment is the foundation of pain management when a patient is experiencing postoperative pain. Frequent and thorough assessment of patients' pain provides information to achieve optimal pain relief. We recommend assessing patients' pain on the NRS. Asking patients to score their pain on the NRS ensures that all professionals assess pain in the same way and with adequate treatment of postoperative pain, subsequent NRS scores are expected to be lower. Nevertheless, the NRS score is not an absolute number. Once the patient has reported an NRS score, the professional is not finished. Rather, the professional should communicate with the patient to understand the meaning of this particular score without being judgemental. Healthcare professionals should understand that patients can have their own interpretation of the pain scale and might have different ideas regarding the particular NRS score that signifies the need for additional analgesics. Rigid cut-off scores in

guidelines for postoperative pain treatment should not be used with individual patients; patients should be asked what their individual cut-off score is when requiring a particular intervention.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ijnurstu.2015.08.007>.

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