

Influence of interpretation of pain scores on patients' perception of pain: A prospective study

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ABSTRACT

Background and Aims: Assessment of pain using pain scales is essential. In the Numeric Rating Scale (NRS), patients are asked to score their pain intensity on a scale from 0 to 10 (10- worst pain). This requires some abstract thinking by the patient, also the pain scores (PS) may not essentially communicate the patients' need for more analgesia. We planned a study to evaluate the change in patients' self-assessed PS after understanding clinical interpretation of the NRS. **Methods:** This prospective study was registered after approval from our hospital ethics board. Sample size estimated for the trial was 360 patients. All postoperative patients were recruited after informed consent. Patients having prolonged stay in Intensive Care Unit (more than 48 h), or those who underwent emergency surgeries were excluded. During Acute Pain Service (APS) rounds, patients were asked to rate their PS on the NRS. This was followed by a briefing about the clinical interpretation of the scale, and the patients were asked to re score their pain using the same scale. The change in pain severity was compared using Chi-square test. **Results:** Following explanation, a change in severity was seen for PS at rest [X^2 (9, N- 360) = 441, $P < 0.001$] and at movement [X^2 (9, N- 360) = 508, $P < 0.001$]. Overall, a change in PS severity was seen in 162 patients (45%). A decrease and an increase in the severity of pain was seen in 119 and 41 patients respectively. **Conclusion:** Explaining the clinical interpretation of PS on a NRS does lead to a change in patients' self-assessed PS.

Key words: Acute pain, pain scale, pain services, pain severity, pain scores, postoperative pain

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INTRODUCTION

Acute postoperative pain management is a dynamic process and requires assessment and reassessment.^[1] Incorporation of pain as the “fifth vital sign” requires adaptation and acceptance of user-friendly scales.^[2] The Numeric Rating Scale (NRS, 0-10) is a widely used instrument for pain screening because of its ease of administration. NRS is simple, easy and can be used even in the absence of any physical scale.^[3] In NRS, patients are asked to score their pain on a scale from 0 to 10, 0 representing “no pain” and 10 being “the worst pain possible.”^[3] Only whole numbers are to be used to represent pain in this scale.

NRS reflects the change in the severity of pain based on the increase or decrease in scores.^[4] The clinical importance of changes from the baseline may be

difficult to interpret. While using the NRS, the patient could possibly be worried about the score correctly communicating the need for analgesia.^[5] In addition, the NRS scores are not interchangeable, and similar scores in different patients and in the same patient at different time points could mean different degrees of pain.^[4] Communication at times may not be complete, even in adults when it comes to quantifying and concluding about the need for analgesia.^[4]

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Appropriate communication is essential between the patient and treating physician to ensure that the right amount of analgesics is provided.^[6] If analgesics are prescribed solely based on the NRS response, there remains a potential risk of over-treatment or under-treatment.^[7] Hence, additional dialogues and observations are necessary to allow patients to express their pain in detail and to ensure optimum pain relief.^[1] It becomes essential for the health care providers to explain the pain scale in a way that the patient understands, and guides in effectively changing the postoperative pain management. This study was planned to evaluate the change in patients' self-assessed pain scores (PS) after understanding the clinical interpretation of the pain scale.

The primary objective of this study was to evaluate the change in patients' self-rated PS after a brief explanation of the clinical interpretation of PS by caregivers. The secondary objectives were to find out if the caregivers found this communication beneficial and in addition, to understand its impact on pain treatment.

METHODS

After approval by the hospital ethics board, this prospective intermittent time series study was registered with the Clinical Trial Registry of India (CTRI/2017/08/009305). The study was conducted between August 2017 and January 2018. All postoperative adult patients on their first/second postoperative day in the surgical wards and under the care of the Acute Pain Service (APS) team of our hospital were included in this study after taking informed consent. Those patients who had a prolonged stay in the post-anaesthesia care unit (more than 48 h), and those who underwent emergency surgeries were excluded.

During the pain rounds, as a part of our routine practice, the patients were asked to rate their PS on the NRS, which is a 11-point pain scale, for measuring pain severity (0 = no pain and 10 = worst possible pain), at rest and at movement. After recording the patients' response, a member of the APS team explained the clinician's perspective of patients' PS.^[4,6]

The explanation mainly included the following- PS- from 1 to 3, implying mild pain, suggesting that the ongoing pain medications are effective and no further increase in pain medication is necessary. PS

from 4 to 6, implying moderate pain suggesting that an increase or change in pain medications is needed. PS from 7 to 10, implying severe pain which indicates a need for immediate medication/intervention.^[4,6] The explanation was given orally, in the language best understood by the patient and/or their relative. Following the explanation, patients were then asked to rate their PS using NRS for pain at rest and at movement. An independent observer recorded the PS pre-explanation and post-explanation. Any change in severity of PS after explanation was noted. The APS team was entitled to make necessary changes in pain management after complete evaluation and at their clinical discretion.

Later, the APS team was asked if the PS post-explanation was "beneficial" or not. For this study, "beneficial" information was defined as information which helped in deciding/re-enforcing (when in doubt) the changes that were needed in the pain management plan.

Previous studies have shown an overtreatment in around 30% of patients, because of disparity in interpretation of pain scales between patient and caregiver.^[8] A sample size of 341 was required as per Clopper-Pearson method to test the primary objective of the trial which was to study the change in patients' pain severity (mild/moderate/severe) after the explanation. The sample size was calculated using a precision width of 0.1 and a two-sided 95% confidence interval. Allowing a 5% chance of data loss in view of the patient not communicating/comprehending the NRS pain scales, a total sample size of 360 patients was planned.

For analysis, PS was entered as categories: mild (1-3), moderate (4-6), severe (7-10).^[9,10] Change in severity of PS after explanation was taken as an event and expressed as percentage. Pre and post-explanation pain severity was compared using Chi-square test, expressed as X^2 (degree of freedom- *df*, sample size-N) = Chi-square value, *P* value. The number of patients in whom the PS after explanation were found to be beneficial to the caregivers was expressed as a percentage. All data was analysed using International Business Machine Statistical Package for the Social Sciences (IBM® SPSS) version 21. For all data, *P* value <0.05 was considered as statistically significant.

As there could be potential bias in the results during consenting for participation in the trial, the consenting process was done in two steps as per the direction of our institutional review board. The informed consent

for participation in the trial was taken a day prior to surgery from the patients posted for major and supra-major surgeries and in whom APS follow-up was expected as per the existing protocols. The initial consenting process included an overall view of the study explaining mainly post-operative pain and PS. Finer details like the actual clinical interpretation of PS were not revealed at this stage. Following recruitment and recording of PS, a debriefing consent was re- obtained and patient data was used. Feedback was taken only once from each adult patient.

RESULTS

468 patients were screened and expressed their willingness to participate in the trial. 360 were included after exclusion [Figure 1]. A near-equal gender distribution was seen in the study participants [Table 1].

Pain was analysed at rest and at movement. There was a significant change in severity of pain at rest post-explanation, $X^2 (9, N=360) = 441, P < 0.001$ [Table 2]. Similarly, for severity of pain during movement, the change was statistically significant, $X^2 (9, N=360) = 508, P < 0.001$. Overall, a change in severity of PS was seen in 162 patients (45%). In 42 patients, there was a change in pain severity with pain at rest; in 75 patients the change was seen in PS

during movement, while in the remaining 45 patients, the severity of pain during rest and movement changed post-explanation. A decrease and an increase in severity of pain was found in 119 and 41 patients, respectively. The rest scores reduced in two patients, but the severity of pain at movement increased after explanation.

We looked at factors which influenced the change in severity of PS post-explanation. There was no association between change in PS post-explanation and gender ($P = 0.48$), the time of interview ($P = 0.058$) or pain management modality ($P = 0.21$). When asked if the information was useful, the APS team found the information post-explanation to be beneficial in 71% of cases.

DISCUSSION

Explaining the clinical interpretation of PS did lead to a change in severity of pain in nearly half of the study population (45%). In 119 patients, a decrease in pain severity was seen and hence these patients were at risk for over-treatment. In 41 patients, an increase in severity of pain was found, and this group was at risk of under-treatment of pain using the traditional NRS system for pain assessment.

NRS is one of the most widely used scales. Evidence supports the reliability of NRS in adults and in patients

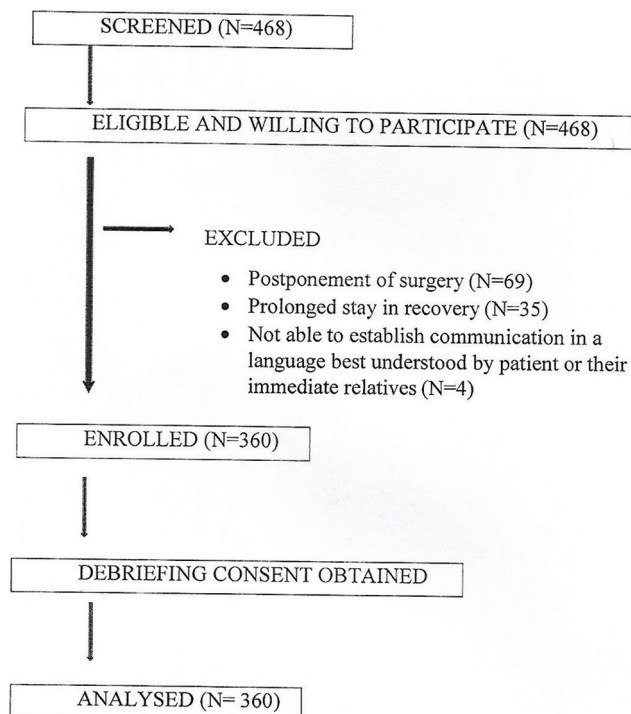


Figure 1: CONSORT diagram for recruitment of patients in the trial

Table 1: Demographic and surgical details of participants

Variable	Number of patients (n)	
	n	%
Age	Mean (±SD)	47 (±15)
	Range	18-82
Gender	Male	186 52
	Female	174 48
Patients assessed on Postoperative day	Day 1	207 58
	Day 2	153 42
Pain management	Epidural Analgesia	169 47
	PCA	31 9
	Epidural analgesia+PCA	07 2
	Regional Analgesia	22 6
	Others (Round the clock analgesic)	131 36
Surgical Unit	Gastrointestinal	134 37
	Gynaecology	75 21
	Bone and soft tissue	57 16
	Thoracic	48 13
	Urology	42 12
	Others	4 1

%- number of patients expressed as percentage. SD - Standard deviation . PCA - Patient controlled analgesia

Table 2: Impact of clinical interpretation of pain scores on patients' perception of pain

		Pain scores			
		At rest		At movement	
		Pre- explanation	Post- explanation	Pre- explanation	Post- explanation
Severity of pain (%of patients)	None	11	11	3	3
	Mild	55	66	35	44
	Moderate	30	20	48	46
	Severe	4	3	14	7
<i>P</i> (Chi- square test)		χ^2 (9, <i>n</i> =360) = 441, <i>P</i> <0.001		χ^2 (9, <i>n</i> =360) = 508, <i>P</i> <0.001	

with low health literacy.^[11] It is also an appropriate tool for assessment in older patients.^[12] In a previous study, it was seen that with the assumption of moderate pain for scores more than 3, 30% of the patients who considered their pain to be bearable, would wrongly be classified as having unbearable pain, leading to over-treatment. Similarly, 3% of patients would be assumed to have bearable pain though they were having unbearable pain, thus leading to under-treatment of pain.^[8] A similar result was seen by the same group of investigators in the geriatric population.^[7] There is a potential risk of inappropriate treatment, if the pain is assessed wholly by the number provided by the patient.^[13] It is essential that the caregivers should communicate in detail and assess the patients' entire pain experience rather than prescribing analgesics based on a single numeric response.^[12,14,15] Frequent and thorough assessment of patients' pain would ensure optimal pain management.^[16,17] The communication between patient and health care professionals is aided by the use of pain scales.^[14,15,18] However, there can be a discordance in the interpretation of pain assessment between the patient and the caregiver.^[14,19] The caregivers must realise that patients can have their own interpretation of the pain scale and their own perception with respect to the NRS score while correlating with the need for additional analgesics.^[10,13,14,16]

The potential risk of under-treatment is a possibility with some patients who hesitate to choose a high score fearing disbelief by the physicians.^[12] Explaining both ends of the spectrum despite low pain scores does reassure the patient that high pain scores are not unexpected. This could be the reason why, in a few patients, we had increase in severity in pain scores after explanation.

In this study, we have explored the effect of clinical interpretation of PS on patients' self-rated pain perception. The feedback from the APS team was positive with the team members reporting the communication as beneficial in 71% of the cases. This

suggests that the additional communication did help the APS team members in decision-making and/or reinforcing their treatment plan.

Numerous types of pain scales are available for clinical use.^[20-22] One can argue that the inadequacy of interpretation of PS is restricted to the NRS and that other scales^[23,24] like the objective pain score^[4] could be more suitable tools to be adapted. However, even with the use of more objective scores, there still lies a gap between the caregivers' interpretation of need of rescue analgesic and severity of pain at rest or deep coughing.^[7,13] Though the effect of communication has been studied with respect to the NRS in our study, it may also prove to be beneficial with the use of other scales as it tries to bridge the gap and helps in understanding the severity of pain and need for additional analgesics. Hence, we strongly feel that communication could be used as a second step to enhance the process of pain assessment following the use of any suitable pain assessment tool. Based on our clinical experience, we believe that the difference in interpretation of PS between patient and caregiver and subsequently better communication lead to a change in PS post-explanation. To elaborate, in patients in whom the severity of PS does not match with the clinicians' expectation of mobilisation, a briefing about interpretation of PS can help in understanding the patients' need for additional analgesia; for example, the patient may have pain during coughing but it may not be severe enough to need a rescue analgesic.^[7]

Following explanation, we found an increase in reporting of mild pain, with patients realising that high scores could lead to overtreatment with analgesics. However, the possibility that the patients reported low scores because they actually thought that analgesics could cause harm and side effects cannot be ruled out.^[7,12] The fact that, we had few patients going up on the PS reinforces that fear of analgesic in our patient population did not play a major role. However, this was not prospectively asked for and remains a limitation of our study. Another limitation includes the failure to

record the actual change in the amount of analgesics administered pre and post-explanation. As per the study design, the APS team decided on changes after complete evaluation and hence the actual change could not be assessed. The study design adapted was essential and is inevitable in a pragmatic trial.

CONCLUSION

Explaining the clinical interpretation of pain scores for the numeric pain scale does lead to a change in patients' self-assessed pain scores.

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Conflicts of interest

There are no conflicts of interest.

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