Scandinavian Journal of Pain 11 (2016) 150–152

Contents lists available at ScienceDirect

Scandinavian Journal of Pain

journal homepage: www.ScandinavianJournalPain.com

Editorial comment

# Fifty years on the Visual Analogue Scale (VAS) for pain-intensity is still good for acute pain. But multidimensional assessment is needed for chronic pain

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In this issue of the *Scandinavian Journal of Pain* David Dorfman and his co-authors focus on limitations of changes in pain-intensity as outcome measure of management of patients with *chronic* pain [1].

## 1. Multidimensionality of chronic pain makes pain intensity inadequate as sole outcome metric of chronic pain management

The Dorfman et al. paper is one of several recent publications questioning the usefulness of pain-intensity as an *only* measurement in chronic pain. Thus, Jane Ballantyne and Mark Sullivan late last year (2015) in the *New England Journal of Medicine* asked whether intensity of chronic pain is the wrong metric [2] and again this year (2016) in *PAIN* they state that it is not necessary to reduce pain-intensity in order to treat chronic pain well [3]. Fayers et al. [4] on behalf of the European Palliative Care Research Collaboration focus on the differences in reports of pain intensity and pain interference among chronic pain patients and palliative care patients in pain. In 2015 in the journal *Quality of Life Research* Cook et al. [5] call for establishing a common metric for self-reported pain by linking scales for pain interference with SF-36 bodily pain subscale.

## 2. VAS – the Visual Analogue Scale: after 50 years there is no better way to measure subjective experience of the intensity of pain [6]

The neurosurgeon and psychiatrist Michael Bond and Issy Pilowsky had knowledge of the method used in the science of psychology for visualizing and measuring subjective psychophysical phenomena, and they were the first to apply a *Visual Analogue Scale* for creating a mental picture of and measure the subjective experience of pain-intensity [6]. Unfortunately, when VAS was next used in a publication on pain a few years later, the original, first ever, publication on VAS for pain-intensity by Bond and Pilowsky was not cited. Not until very recently has the Bond and Pilowsky paper [6] been correctly cited as the origin of pain-VAS [7,8]. Considering how much the pain-intensity-VAS has meant in pain research, for clinical management of pain, and the policy of pain, this is astonishing, indeed.

## 3. Practical performance of pain-intensity measurements: numeric rating scale (NRS), and categorical verbal rating scale (VRS) as alternatives to VAS [9,10]

In the vitally important tissue-injury-alarm system, the intensity of the subjective experience of acute pain is, among other factors, related to the seriousness of the tissue-injury [11].

For a *Visual Analogue Scale (VAS)*-measurement to be possible, the patient must be able to see and handle paper and pencil, marking on a line from 0 = no pain, to 10 cm (or 100 mm) = worst pain imaginable, where on this line the patient's present pain intensity is located.

When the patient cannot handle pen and paper, a verbal *Numeric Rating Scale (NRS)* – is a good alternative: The patient must be able to hear and understand the researcher's or clinician's voice asking where on a scale from 0 (no pain) to 10 (worst pain imaginable) his pain is at the moment of asking [9,10].

These two scales, the VAS and the NRS, are *equally sensitive in detecting changes* in intensities of acute pain [10,12], but the NRS is often easier to use and more practical in a busy clinical praxis.

Categorical *Verbal Rating Scales (VRS)*, with categories of pain-intensity varying from mild, moderate, severe, to very severe (or unbearably severe), such VRS-scales are easy to use, but less sensitive to changes in pain intensities than the VAS and NRS scales are [9,10,12].

## 4. Intensity of pain RIGHT NOW versus making estimates of average pain during a past time period: we cannot remember pain intensity well

As pointed out by Michael Bond and Issy Pilowsky 50 years ago [6] and emphasized by pain-researchers again and again, pain

DOI of refers to article: http://dx.doi.org/10.1016/j.sjpain.2015.12.004.
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http://dx.doi.org/10.1016/j.sjpain.2016.02.004

intensity estimates using VAS or NRS are reliable only for pain intensities experienced and reported **right now, at the present moment,** when he/she is interviewed for a NRS-score or is marking the VAS-line [9,12].

If patients are asked to make an estimate of the *average pain intensity* during the last 12 h, the last 24 h, the last few days, or the last two weeks, variability in responses increases, making the VAS/NRS-numbers less valid, even meaningless.

How can you make a mental average of intensities that vary from low during long and varying periods with high pain intensities during varying length periods? Dorfman et al. made this observation as well [1]: Patients cannot remember accurately what the varying pain intensity was and have great difficulties making an average number for pain intensity during a past period.

## 5. Intensity of acute pain during movements is a highly sensitive outcome measure of management of pain after surgery or trauma

Increased focus during the last 3 decades on monitoring and treating pain intensity during movement, dynamic pain, have improved management of acute pain after surgery and trauma [13]. When intensity of dynamic pain after thoracotomy or major abdominal surgery is reduced by epidural analgesia so that patients are able to breath freely and move around easily, this not only reduces risk of postoperative morbidity, but even 30 days mortality after such surgery is reduced significantly [14].

## 6. For patients with chronic pain condition with varying pain intensity: patient's global impression of change – PGIC – is a more appropriate outcome measure than the pain intensity alone

The following is an illustrative example of how changes in pain intensity can be misleading, while the patient's impression of change indicates a definite benefit of a treatment of osteoarthritis. Osteoarthritis (OA) of hip and knee joints causes a chronic pain condition that interferes with movements and activities of daily living.

The WOMAC questionnaire is often used to evaluate outcome of treatment of OA. There are three sub-scales in the WOMAC score-sheet: One for pain, one for stiffness, and one for disabilities caused by the OA-condition.

In the WOMAC-Pain scale the patient is asked to make estimates of pain intensity during the last 24 h. A treatment that reduces pain intensity allows the patient to move around more, the interference of daily activities will be less as the pain decreases. However, more movement with an OA-extremity will provoke more pain. Therefore, the patient will mark his pain average intensity during the last 24 h as unchanged, but his global impression of change is positive because he/she will have been able to move around more, to be more active. Therefore she/he will have a better global impression of her condition.

This is exactly what happened in a 6 months long double blind comparison of a low dose (median 10 microgram/h) buprenorphine patch compared with a placebo-patch: Pain intensity changed equally in the two groups, but the patients' global impression of change was significantly more positive in the active group [15].

## 7. Why pain-intensity measure alone is NOT appropriate outcome measure for treatment of chronic pain, when for acute pain this is a sensitive outcome measure?

Chronic pain, pain that is there week after week, month after month, pain that interferes with activities of daily living, pain that reduces ability to have a work to go to, regular income disappears, patients have catastrophizing thoughts about never getting back to normal life, they plunge into mental fatigue, depression and suicidal ideas appear. In such circumstances, the intensity of pain is only one part of the total burden of suffering.

The IMMPACT project has focused on this problem: We need to assess several outcome-measures when studying how to help chronic pain patients better. A group of experienced pain clinicians and pain researchers in 2008 published the paper: "Analyzing multiple endpoints in clinical trials of pain treatments: IMMPACT recommendations. Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials" [16]. Follow-up papers have indicated areas of progress based on this project.

However, Jane Ballantyne and Mark Sullivan are correct in their strong statements in *New England Journal of Medicine* and in *PAIN* that we still have a long way to go before outcome measures of chronic pain management are optimal. Reliance on pain intensity as an outcome measure for trials on chronic pain, is not appropriate: While good for acute pain, pain intensity is unreliable as outcome measure for chronic pain.

## Conflict of interest

None declared.

## References


[1] Dorfman D, George MC, Robinson-Papp J, Rahman T, Tamler R, Simpson DM. Patient reported outcome measures of pain intensity: do they tell us what we need to know? Scand J Pain 2016;11:73–6.

[2] Ballantyne JC, Sullivan MD. Intensity of chronic pain – the wrong metric? N Engl J Med 2015;373:2098–9.

[3] Sullivan MD, Ballantyne JC. Must we reduce pain intensity to treat chronic pain? Pain 2016;157:65–9.

[4] Fayers PM, Hjermstad MJ, Klepstad P, Loge JH, Caraceni A, Hanks GW, Borchgrevink P, Kaasa S. European Palliative Care Research Collaborative (EPCRC). The dimensionality of pain: palliative care and chronic pain patients differ in their reports of pain intensity and pain interference. Pain 2011;152:1608–20, http://dx.doi.org/10.1016/j.pain.2011.02.052.

[5] Cook KF, Schalet BD, Kallen MA, Rutsohn JP, Cella D. Establishing a common metric for self-reported pain: linking BPI Pain Interference and SF-36 Bodily Pain Subscale scores to the PROMIS Pain Interference metric. Qual Life Res 2015;24:2305–18, http://dx.doi.org/10.1007/s11136-015-0987-6.

[6] Bond MR, Pilowsky I. Subjective assessment of pain and its relationship to the administration of analgesics in patients with advanced cancer. J Psychosom Res 1966;10:203–8.

[7] Lu YM, Wu YY, Hsieh CL, Lin CL, Hwang SL, Cheng KI, Lue YJ. Measurement precision of the disability for back pain scale-by applying Rasch analysis. Health Qual Life Outcomes 2013;11:119, http://dx.doi.org/10.1186/1477-7525-11-119.

[8] Wang Y, Liu R, Zhang Z, Xue Q, Yan J, Yu J, Liu H, Zhao L, Mou T, Deng H, Li G. A safety study of transumbilical single incision versus conventional laparoscopic surgery for colorectal cancer: study protocol for a randomized controlled trial. Trials 2015;16:539, http://dx.doi.org/10.1186/s13063.

[9] Breivik H, Borchgrevink PC, Allen SM, Rosseland LA, Romundstad L, Hals EK, Kvarstein G, Stubhaug A. Assessment of pain. Br J Anaesth 2008;101:17–24.

[10] Breivik EK, Bjornsson GA, Skovlund E. A comparison of pain rating scales by sampling from clinical trial data. Clin J Pain 2000;16:22–8.

[11] Breivik EK, Bjornsson GA. Variation in surgical trauma and baseline pain intensity: effects on assay sensitivity of an analgesic trial. Eur J Oral Sci 1998;106:844–52.

[12] Hjermstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, Loge JH, Fainsinger R, Aass N, Kaasa S, European Palliative Care Research Collaborative (EPCRC). Studies comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for assessment of pain intensity in adults: a systematic literature review. J Pain Symptom Manag 2011;41:1073–93, http://dx.doi.org/10.1016/j.jpainsymman.2010.08.016.

[13] Breivik H, Curatolo M, Niemi G, Haugtomt H, Kvarstein G, Romundstad L, Stubhaug A. How to implement an acute postoperative pain service: an update. In: Breivik H, Shipley M, editors. Pain – best practice and research compendium. Oxford: Elsevier; 2007. p. 255–70.

[14] Pöpping DM, Elia N, Van Aken HK, Marret E, Schug SA, Kranke P, Wenk M, Tramèr MR. Impact of epidural analgesia on mortality and morbidity after surgery: systematic review and meta-analysis of randomized controlled trials. Ann Surg 2014;259:1056–67.

[15] Breivik H, Ljosaa TM, Stengaard-Pedersen K, Persson J, Aro H, Villumsen J, Tvinnemose D. A 6-months, randomised, placebo-controlled evaluation of

efficacy and tolerability of a low-dose 7-day buprenorphine transdermal patch in osteoarthritis patients naïve to potent opioids. Scand J Pain 2010;1:122–41.
[16] Turk DC, Dworkin RH, McDermott MP, Bellamy N, Burke LB, Chandler JM, Cleeland CS, Cowan P, Dimitrova R, Farrar JT, Hertz S, Heyse JF, Iyengar S, Jadad AR, Jay GW, Jermano JA, Katz NP, Manning DC, Martin S, Max MB, McGrath P, McQuay HJ, Quessy S, Rappaport BA, Revicki DA, Rothman M, Stauffer JW, Svensson O, White RE, Witter J. Analyzing multiple endpoints in clinical trials of pain treatments: IMMPACT recommendations. Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials. Pain 2008;139:485–93, http://dx.doi.org/10.1016/j.pain.2008.06.025.