

## Research Article

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## Pain Score Levels Acceptable to Patients and Hospital Staff in Trauma & Orthopaedics in A Large District General Hospital

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### ABSTRACT

Adequate Pain control in trauma and orthopaedic wards is seen as a fundamental equivalence of the quality of medical care worldwide. Despite this, there is no official standard or numerical value of pain that is acceptable for patients. This study examines the level of pain accepted by both inpatients and staff in trauma and orthopaedics in a large district hospital. One hundred three adult inpatients, 46 males and 57 females, were recruited in a prospective blinded cross-sectional study. Pain numerical rating scale (PNRS) and satisfaction questionnaires were recorded in a snapshot visit to the orthopaedic and trauma wards. Patients were asked what exact level of pain would be acceptable for them from zero to 10. Similarly, 51 staff colleagues were asked the same question as to what pain level is thought to be acceptable for them if they were in pain before asking for analgesia. The average acceptable PNRS for patients was 4.7/10 (SD±1.7), whereas the average PNRS which staff deemed acceptable was 4.2/10 (SD±1.3). In the snapshot survey, seventy (68%) of the patients were very satisfied with the pain management as a whole, 30 (29%) satisfied, and 3 (3%) thought that the pain control was poor. The Pain VRS (Verbal Rating Scale) and the pain control satisfaction correlated well. ( $p < 0.0001$ ) In conclusion, the acceptable average pain level was found to be 4.45 out of 10 for patients and staff combined. When compared to doctors; nurses underestimated pain perceived by inpatients by over one point out of three on average in pain verbal rating scale.

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### Introduction

Pain management in hospital wards is often seen as a reflection of the medical care provided, not just for patients and their relatives but for hospital staff and health care providers too [1,2]. Pain control is the cornerstone of the management of the patient as a whole as it is often the primary motive for patients' attendance. For the hospital staff, pain control is not just a moral obligation; but adequate pain management plays a key factor in postoperative recovery for both elective and emergency procedures, facilitates prompt physiotherapy, enables rapid return to work, and decreases workload on families, community healthcare, and others [3-12].

Unrelieved pain in hospitalised patients is a common complaint [13-15]. This is due to numerous factors including underassessment, undermedication, and underreporting, to mention a few. Despite the fact that tolerance to pain reduces with age, most elderly inpatients often deny having symptoms [16-20]. Moreover, pain can induce delirium and confusion in the elderly as was shown by Duggleby et al in 1994 [13].

Pain is a subjective symptom which cannot be directly measured and therefore most researchers agree that the patient's own assessment of the pain is the most accurate measure [21]. "... Pain is whatever the experiencing person says it is and exists

whenever they say it does" [22]. The pain Numerical Rating Scale (PNRS) has revolutionised the way pain is assessed. This tool, which has been validated and used extensively in the literature, has given us a means to objectively assess an otherwise highly subjective symptom [23-26]. Despite various assessment tools, pain scoring systems, multidisciplinary and pain teams as well as education around pain control, there is no well-defined standard or numerical value of an amount of pain that is acceptable for patients and indeed for acceptable for the staff dealing with the pain management of such patients. The aim of this study is to quantify the acceptable level of pain perceived by inpatients and by staff in trauma and orthopaedic wards in a large district general hospital in the United Kingdom.

### Patients and Methods

Patients and hospital staff were separately surveyed in this study in 2021 in our institute of Trauma and Orthopaedic Surgery. In the patients' arm of the study, one hundred three patients were recruited in a prospective blinded study. There were 46 males and 57 females with a male: female ratio of 0.81, and a mean age of 66 years SD±17 (range 21-94). Thirty-six (35%) patients were admitted for non-operative management including conservative management of head injuries, lower back pain and rib fractures; 25 (24.3%) patients with hip fractures, 15 (14.6%) patients following joint arthroplasty, and 11 (10.7%) patients following internal fixation of long bone fracture. Sixteen (15.5%) patients had a variety of procedures including wound washout, limb abscess

incision and drainage, and wrist fracture K-wire stabilisation procedures.

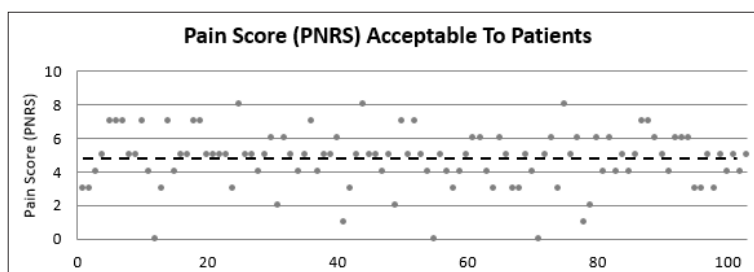
The day of the snapshot assessment visit to the ward was without prior notice to ward staff and patients to eliminate observational bias or overmedication. The inclusion criteria were all trauma and elective orthopaedic inpatient admissions including conservatively managed patients. Patients that lack mental capacity with an abbreviated mental score an of less than 7 out of 10 and paediatric patients were excluded from the study. In addition, patients less than 24 hours post-admission or 24 hours postoperatively were also excluded from the study. This was to allow the peri-operative analgesia including local and regional anaesthesia or nerve blocks to level off, and to give the staff enough time to control the pain perceived by patients. Patients with hospital stay more than 14 days were excluded too as they were convalescent awaiting placement.

The data was collected by a single assessor that included PNRS (Pain Numerical Rating Scale) pain score patients had. Patients were also asked what PNRS pain score was acceptable for them. We also recorded the pain Verbal Rating Scale (VRS) as assessed and recorded by nurses on the electronic record application vitalPac® (System C Healthcare Ltd., Kent, UK). Patients' demographics, reasons for admission, surgical interventions, dates, and analgesic requirements were recorded too. Patients were asked if they were satisfied specifically with the pain management and with the total care given in our institute as a whole.

Records of analgesic administration were obtained from the medical notes and whether this was regular or as and when required. Furthermore, the time elapsed since last analgesics administration was recorded at the time of the snapshot study. The data was tabulated and analysed using Microsoft® Excel® for Mac 2011 version 14, and IBM® SPSS® Statistics V26 software. The statistical correlation between the different groups was assessed using Pearson's correlation test. P values less than 0.05 were considered significant. In the staff survey arm of the study, fifty-one staff members agreed to participate to ascertain what an acceptable level of pain would be to them using PNRS. Eighteen were doctors including senior and junior surgical colleagues; eighteen were nurses; eight were allied health practitioners including plaster technicians, pharmacists, physiotherapists, orthotic therapists, and health care assistants; and seven were administration support staff including receptionists, secretaries, and managers. The average number of years in the role for the surveyed staff was 17.6 years (SD±12.6).

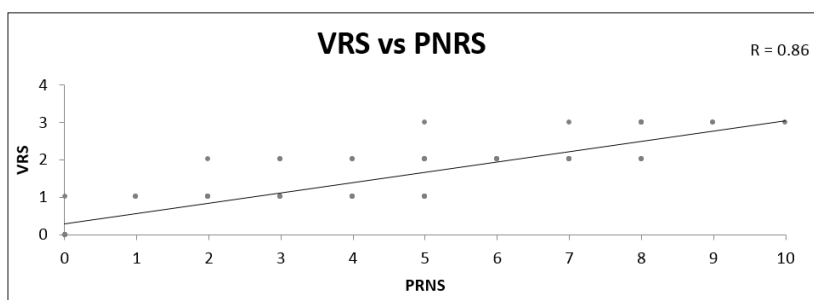
### Results

The average acceptable pain score was 4.7/10 (SD±1.7) according to one hundred three inpatients. (Figure. 1) The average actual PNRS for the inpatients recruited in this study was 4.2 (SD±2.6), with 13 patients (12%) complaining of severe pain (PNRS more than 8 out of 10), 46 (45%) had moderate pain with PNRS of 4-7 out of ten, and 44 patients (43%) had a pain score of 3 or less, and defined as having mild or no pain.

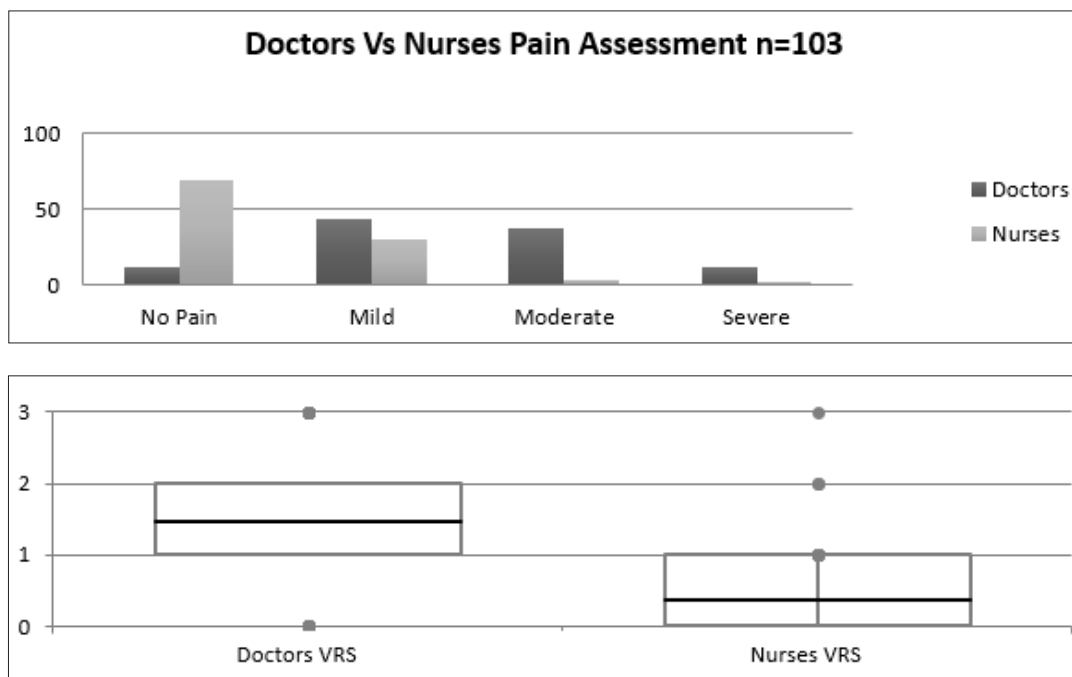


**Figure 1:** A Scatterplot Showing the Acceptable Pain Level (PNRS) For Each of The 103 Inpatients. The Dash Line Represents the Average of 4.7/10.

Further assessment showed that the pain experienced was improving in 67 patients (62%) and worsening in 12 patients (12%). Ninety-four patients (91%) found the pain was tolerable whereas 9 (9%) found it intolerable. The pain scale using the PNRS did not statistically differ from the pain score category using the pain verbal rating scale, 4.2/10 vs 1.45/3 which has been previously demonstrated in the literature [25, 26]. (Pearson's Correlation Coefficient  $R > 0.86$ ) (Figure 2) Furthermore, we compared the correlation of pain assessment between the medical and nursing staff with VRS (0-3 score where zero is no pain, 1 is mild, 2 is moderate, and 3 is severe pain). This demonstrated a mean VRS of 1.45 out of 3 when assessed by doctors whereas the mean VPS was 0.37 when assessed by nurses. This difference was statistically significant using Chi Square test.  $p < 0.0001$  (Figure 3) There was no statistically significant correlation between age or sex, and pain. ( $p > 0.18$ ) Seventy patients (68%) were very satisfied with the pain management as a whole, 30 (29%) were satisfied, and 3 (3%) thought that the pain control was poor. The PNRS and the pain control satisfaction correlated well. (Paired Student T Test  $p < 0.0001$ ).



**Figure 2:** A Scatterplot Depicting Pearson Linear Correlation Graph Demonstrating Good Correlation Between (VRS) Verbal Rating Scale and (PNRS) Pain Numerical Rating Scale with the Coefficient R of 0.86



**Figure 3:** Showing the difference between Doctors and Nurses pain assessment which demonstrates an underestimation of pain by nurses by over one point out of three on average using the 0-3 verbal rating scale (VRS).

Time from admission or operative procedure varied from 1 to 15 days as outlined in the inclusion criteria. The relationship between this and the VRS score of each individual was statistically insignificant. (Pearson coefficient  $R < -0.06$ ) Ninety-eight (95%) of the patients had 'as required' analgesia prescribed according to a trust-wide pain management protocol. Sixty-nine (67%) of patients had their 'as required' analgesia administered to them while 29 (28%) did not require it. One Hundred (97.1%) of patients had regular analgesia prescribed on their medication card out of which seven (7%) refused regular analgesics. One hundred (97.1%) of patients were either satisfied or very satisfied with the overall provided care in our institute. Three patients (2.9%) thought it was poor.

In the second arm of the study, 51 staff stated that an average of 4.2 (SD±1.3) out of 10 would be an acceptable level of pain for them if they were patients. There was no correlation between acceptable PNRs recorded for staff and the number of years in role with  $p > 0.9$  using Pearson's test. The moving average of acceptable PNRs tended to increase with moving roles from doctors to nurses to allied practitioners and finally to administrative colleagues, but this difference among roles was statistically insignificant using one way Anova test,  $p > 0.14$ .

### Discussion

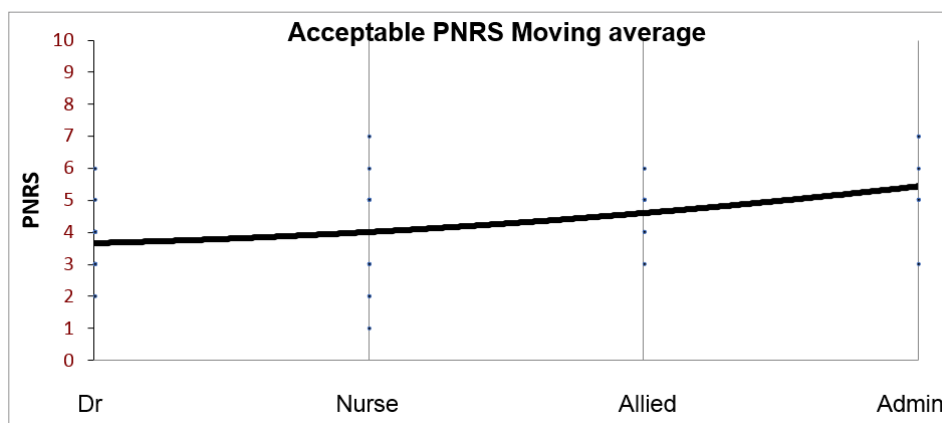
In 1958, Hannah Arendt the German philosopher defined pain as being "... borderline experience between life and death" [3]. In 1965 Melzack and Wall published their work describing the gate theory of pain modulation, since then there have been tremendous advances in our understanding of the neurophysiology and psychology of pain [4]. Pain is now described not only as a complex subjective response to tissue insult, but it is an unpleasant multidimensional sensory, emotional cognitive and cultural

experience associated with actual or potential tissue damage [5].

Many authors agree that nurses are responsible for pain relief administration to patients. Sofaer et al stated that pain relief was at the core of nursing practice, and McCaffrey and Beebe that pain control is the cornerstone of being a nurse [27, 28]. Unfortunately, many nurses may have a poor understanding of pain control [29-34]. This has been attributed to many factors including fear of opioid addiction; negative attitude towards patient complaints; undermedication due to lack of communication, inadequate assessment, and poor records [35-44].

The statistical insignificance and the poor correlation between pain and the number of days since admissions or days postoperatively shows that pain is not directly related to the time following injury or following surgery as we first thought (Pearson correlation  $R < -0.06$ ). Patients may still experience pain many days afterwards. This might relate to the fact that nursing staff assume that the patient is not in pain, and at times the patients themselves would not declare their suffering, fearing prejudice and alienation [45-59].

The acceptable level of pain of 4.7 out of 10 for patients was noted to be similar to that recorded for the non-medical staff (the allied practitioners and the administrative group), compared to doctors and nurses. This might be explained by the fact that both groups were laymen and reflected the views of inpatients most accurately. [Figure 4] The results show that non-medical staff accepted more pain on average than that accepted by doctors and nurses. This might be attributed to the fact that doctors and nurses, especially in trauma surgery, might have different ceilings to how severe pain can be when dealing with a plethora of accidents and mangled extremity injury presentations that laymen will rarely encounter.



**Figure 4:** Acceptable PNRS according to role of different healthcare professionals). See text.

Out of the thirteen patients who reported severe pain, three had worsening pain, two patients had improving pain and eight had pain that was static. There was a single patient who reported severe (10 out of 10) pain who had sustained multiple rib fractures. The pain eventually improved following diligent assessment and prompt involvement of the pain team followed by a regional block and PCA (patient-controlled analgesia) by the anesthetic team. The patient was discharged home pain-free on the sixth post injury day. Having a mean pain VRS of 1.45 out of three when assessed by doctors and 0.37 when assessed by nurses showed that nurses underestimated patients' pain by almost one full grade below that of a doctor's assessment. [Figure 3] The cause of this significant difference is unclear, but we believe that the cause might be related to the fact that, unlike doctors, nurses are placed with patients in the wards all the time which could cause a level of desensitisation and apathy towards multiple repetitive and frequent patients' requests that often lead to further assessment, investigation, paperwork, and ultimately an obligation to medicate. Patients that register no pain, or mild pain would undoubtedly remove the burden to medicate from the already overworked nursing colleagues. Although pain is the most common presentation and patient complaint, there has yet to be a set standard or guideline on the amount of pain a patient should be in. Further research may be required to be able to create and formulate a recognised standard for pain.

### Conclusions

The average acceptable pain score by patients and staff in our study was 4.7 and 4.2 out of 10 respectively using the pain numerical rating scale (PNRS). The overall combined average acceptable pain score was 4.45 out of 10 (SD±1.5). When compared to doctors; nurses underestimated pain perceived by inpatients by over one point out of three on average in pain verbal rating scale.

### References

- Jamison RN, Ross MJ, Hoopman P, Griffin F, Levy J, et al. (1997) Assessment of postoperative pain management: patient satisfaction and perceived helpfulness. *Clin J Pain* 13: 229-236.
- Gaston-Johansson F, Colburn K, Walrath J, Johansson C, Johansson F, et al. (1998) Factors influencing patient satisfaction with pain management. *Smärta* 1: 12-18.
- Arendt H (1958) *The human condition*. Garden City, NY: Doubleday Anchor Books 51.
- Melzack R Wall (1965) Pain mechanisms: A new theory. *Science* 150: 971-979.
- International Association for the study of pain (IASP) Subcommittee on Taxonomy. (1979) Pain terms: a list with definitions and notes on usage. *Pain* 6: 249-52.
- McMenemin I (1999) Management of pain after day surgery. *J one day surg* 3: 10-11.
- Kehlet H (1997) Multimodal approach to control postoperative pathophysiology and rehabilitation. *Br J Anaesth* 78: 606-617.
- Breivik H (1998) Postoperative pain management: why is it difficult to show that it improves outcome? *Eur J Anaesthesiol* 15: 748-751.
- Bridger P, Rees M (1995) Day surgery. What a difference a day makes. *Health Serv J* 105: 22-23.
- Fletcher J, Dawes M, McWilliam J, Millar J, Griffiths S (1996) Day surgery and community health services work load: a descriptive study. *Br J Gen Pract* 46: 681-682.
- Kong KH, Kevorkian CG, Rossi CD (1997) Demand on primary health care after day surgery. *Ann R Coll Surg Engl* 79: 291-295.
- Lewis C, Bryson J (1998) Does day case surgery generate extra workload for primary and community health service staff? *Ann R Coll Surg Engl* 80: 200-202.
- Duggleby W, Lander J (1994) Cognitive status and postoperative pain: older adults. *J Pain Symptom Manage* 9: 19-27.
- Miaskowski C, Nichols R, Brody R, Synold T (1994) Assessment of patient satisfaction utilizing the American Pain Society's Quality Assurance Standards on acute and cancer-related pain. *J Pain Symptom Manage* 9: 5-11.
- Paice J, Mahon SM, Faut-Callahan M (1995) Pain control in hospitalized postsurgical patients. *Medsurg Nurs* 4: 367-372.
- Zalon ML (1993) Nurses' assessment of postoperative patients' pain. *Pain* 54: 329-34.
- Cohen FL (1980) Postsurgical pain relief: patients' status and nurses' medication choices. *Pain* 9: 265-274.
- Woodrow KM, Friedman GD, Siegelau AB, Collen MF (1972) Pain tolerance: differences according to age, sex and race. *Psychosom Med* 34: 548-556.
- Donovan M, Dillon P, McGuire L (1987) Incidence and characteristics of pain in a sample of medical-surgical inpatients. *Pain* 30: 69-78.
- Carr EC (1990) Postoperative pain: patients' expectations and experiences. *J Adv Nurs* 15: 89-100.
- Katz J, Melzack R (1989) Measurement of pain. *Surg Clin North Am* 79: 231-252.
- McCaffery M (1989) *Pain: clinical Manual for nursing practice*, 2nd ed. Mosby, St Louis 7.
- Price DD, Bush FM, Long S, Harkins SW (1994) A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. *Pain* 56: 217-226.

24. Ekblom A, Hansson P (1988) Pain intensity measurements in patients with acute pain receiving afferent stimulation. *J Neurol Neurosurg Psychiatry* 51: 481-486.
25. Seymour RA (1982) The use of pain scales in assessing the efficacy of analgesics in post-operative dental pain. *Eur J Clin Pharmacol* 23: 441-444.
26. Ohnhaus EE, Adler R (1975) Methodological problems in the measurement of pain: a comparison between the verbal rating scale and the visual analogue scale. *Pain* 1: 379-384.
27. Sofaer B (1983) Pain relief--the core of nursing practice. *Nurs Times* 79: 38-42.
28. McCaffrey M, Beebe A (1994) PAIN. *Clinical Manual for Nursing Practice*. UK ed. Times mirror International publishers limited, London.
29. Cohen FL (1980) Postsurgical pain relief: patients' status and nurses' medication choices. *Pain* 9: 265-274.
30. Watt-Watson JH (1987) Nurses' knowledge of pain issues: a survey. *J Pain Symptom Manage* 2: 207-211.
31. Watt-Watson J, Stevens B, Garfinkel P, Streiner D, Gallop R (2001) Relationship between nurses' pain knowledge and pain management outcomes for their postoperative cardiac patients. *J Adv Nurs* 36: 535-545.
32. Mackintosh C (1994) Do nurses provide adequate postoperative pain relief? *Br J Nurs* 3: 342-347.
33. Collins SL, Moore RA, McQuay HJ (1997) The visual analogue pain intensity scale: what is moderate pain in millimetres? *Pain* 72: 95-97.
34. Lee NC, Wasson DR, Anderson MA, Stone S, Gittings JA (1998) A survey of patient education postdischarge. *J Nurs Care Qual* 13: 63-70.
35. de Rond M, de Wit R, van Dam F, van Campen B, den Hartog Y, et al. (1999) Daily pain assessment: value for nurses and patients. *J Adv Nurs* 29: 436-444.
36. Seers K (1998) Perioperative pain management: a gate control perspective. *Br J Theatre Nurs* 7: 18-24.
37. Nash R, Yates P, Edwards H, Fentiman B, Dewar A, et al. (1999) Pain and the administration of analgesia: what nurses say. *J Clin Nurs* 8: 180-189.
38. Graffam S (1979) Nurse response to patients in pain: an analysis and an imperative for action. *Nurs Leadersh* 2: 23-25.
39. Saxey S (1986) The nurse's response to postoperative pain. *Nursing (Lond)* 3: 377-381.
40. Brunier G, Carson MG, Harrison DE (1995) What do nurses know and believe about patients with pain? Results of a hospital survey. *J Pain Symptom Manage* 10: 436-445.
41. Sjostrom B, Haljamae H, Dahlgren LO, Lindstrom B (1997) Assessment of postoperative pain: impact of clinical experience and professional role. *Acta Anaesthesiol Scand* 41: 339-344.
42. Klopfenstein CE, Herrmann FR, Mamie C, Van Gessel E, Forster A (2000) Pain intensity and pain relief after surgery. A comparison between patients' reported assessments and nurses' and physicians' observations. *Acta Anaesthesiol Scand* 44: 58-62.
43. Briggs M, Dean KL (1998) A qualitative analysis of the nursing documentation of post-operative pain management. *J Clin Nurs* 7: 155-163.
44. Coyne ML, Smith JF, Stein D, Hieser MJ, Hoover L (1998) Describing pain management documentation. *Medsurg Nurs* 7: 45-51.
45. Idvall E, Ehrenberg A (2002) Nursing documentation of postoperative pain management. *J Clin Nurs* 11: 734-742.
46. Jacques E. 10 Common Types of Pain Scales. Accessed at: <https://www.verywellhealth.com/pain-scales-assessment-tools-4020329>. (Accessed September 2020)
47. Karcioglu O, Topacoglu H, Dikme O, Dikme O (2018) A systematic review of the pain scales in adults: which to use?. *The American journal of emergency medicine* 36: 707-714.
48. Hjermstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, et al. (2011) 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. *Journal of pain and symptom management* 41: 1073-1093.
49. Lee JJ, Lee MK, Kim JE, Kim HZ, Park SH, et al. (2015) Pain relief scale is more highly correlated with numerical rating scale than with visual analogue scale in chronic pain patients. *Pain Physician* 18: E195-200.
50. Schwenkglens M, Gerbershagen HJ, Taylor RS, Pogatzki-Zahn E, Komann M, et al. (2014) Correlates of satisfaction with pain treatment in the acute postoperative period: results from the international PAIN OUT registry. *PAIN®* 155: 1401-1411.
51. Phillips S, Gift M, Gelot S, Duong M, Tapp H (2013) Assessing the relationship between the level of pain control and patient satisfaction. *Journal of pain research* 6: 683.
52. Pellino TA, Ward SE (1998) Perceived control mediates the relationship between pain severity and patient satisfaction. *Journal of pain and symptom management* 15: 110-116.
53. Cline ME, Herman J, Shaw ER, Morton RD (1992) Standardization of the visual analogue scale. *Nursing research* 41: 378-380.
54. Langley GB, Sheppard H (1985) The visual analogue scale: its use in pain measurement. *Rheumatology international* 5: 145-148.
55. Downie WW, Leatham PA, Rhind VM, Wright V, Branco JA, et al. (1978) Studies with pain rating scales. *Annals of the rheumatic diseases* 37: 378-81.
56. Ferreira-Valente MA, Pais-Ribeiro JL, Jensen MP (2011) Validity of four pain intensity rating scales. *Pain®* 152: 2399-2404.
57. Williamson A, Hoggart B (2005) Pain: a review of three commonly used pain rating scales. *Journal of clinical nursing* 14: 798-804.
58. Hawker GA, Mian S, Kendzerska T, French M (2011) Measures of adult pain: Visual analog scale for pain (vas pain), numeric rating scale for pain (nrs pain), mcgill pain questionnaire (mpq), short-form mcgill pain questionnaire (sf-mpq), chronic pain grade scale (cpgs), short form-36 bodily pain scale (sf-36 bps), and measure of intermittent and constant osteoarthritis pain (icoap). *Arthritis care & research* 63: S240-252.
59. Ridderikhof ML, Lodder DV, Van Dieren S, Lirk P, Goddijn H, et al. (2019) The relationship between patient factors and the refusal of analgesics in adult Emergency Department patients with extremity injuries, a case-control study. *Scand J Pain* 20: 87-94.

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