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Can Multidimensional Pain Assessment Tools Help Improve Pain Outcomes in the Perianesthesia Setting?

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DELIVERING EFFECTIVE PAIN CARE remains a serious challenge for nurses in the perianesthesia setting. Up to 80% of postoperative patients experience pain, with a significant majority of affected patients reporting moderate-to-severe levels of pain.¹ Fewer than half report adequate pain relief.² The scope of the problem is significant in the United States given that approximately 48 million surgical and nonsurgical procedures are performed each year in both inpatient and ambulatory care settings.³ Inadequate pain treatment is associated with numerous complications in the perianesthesia setting, including impaired mobility, risk for pulmonary infections, sympathetic activation, and risk for myocardial ischemia, prolonged length of stay, and increased health care costs.^{4–9} One of the most concerning complications is persistent postsurgical pain. Depending on the type of surgery, the incidence of persistent postsurgical pain ranges between 5% and 85%.¹⁰ Poorly managed pain has been a well-documented but unresolved issue in all sectors of the health care system for several decades. This problem has led to a variety of responses, including implementation of the pain as the fifth vital sign (P5VS) initiative.

A Brief History of P5VS

In a 1995 address to the American Pain Society (APS), then President Dr James Campbell appealed for consideration of P5VS.¹¹ In a series of policy initiatives following Dr Campbell's call to action, the Veterans Health Administration implemented mandatory pain screening in all Veterans Affairs health centers, and the Joint Commission introduced pain

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assessment as a requirement in their 2001 pain management standards.^{12,13} In 2002, the Centers for Medicare and Medicaid Services released the Hospital Consumer Assessment of Healthcare Providers and Systems Survey; the survey included pain management questions. Survey results were eventually tied to Medicare reimbursement rates, introducing a direct financial incentive for health systems to focus on patients' pain control. These initiatives promoted the use of the numeric rating scale (NRS), a unidimensional screening method in which patients rate their pain intensity on an 11-item scale ranging from 0 (no pain) to 10 (worst possible pain).¹⁴

Despite widespread adoption of P5VS, a growing body of literature suggests that this policy initiative has not improved the quality of pain care delivered in the United States. In 2006, Mularski et al¹⁵ investigated the impact of P5VS at a Veterans Affairs medical center by analyzing pre- and postimplementation pain levels documented in patients' medical records. The results demonstrated no improvement in pain care after implementation of the new assessment procedure. In a related study, investigators examined the impact of P5VS on pain treatment and found that providers frequently failed to conduct further evaluation of patients' pain in the subgroup that endorsed NRS scores in the moderate-to-severe range, suggesting that ascertaining and documenting NRS scores does not invariably improve pain outcomes.^{16,17} Adding to recent efforts to evaluate the quality of pain control, European Commission-funded researchers developed an international acute pain registry entitled PAIN OUT.¹⁸ The researchers analyzed the pain registry data and found that, despite clinician adherence to the recommended guidelines, most patients did not achieve acceptable pain outcomes. These findings are consistent with several other US-based studies.^{1,16,17} One such study compared pain outcomes pre- and postimplementation of mandatory NRS pain screening and continuing education activities that included a focus on pain assessment and dosage. Despite using this two-pronged approach, investigators did not find any improvements in pain outcomes after the intervention.¹⁷ Finally, a US-based survey study designed to allow comparison with previously collected survey data was similarly discouraging in that only minor improvements were documented in postsurgical pain outcomes during the past 20 years.¹⁹

Reasons Why the P5VS Initiative Has Not Been Successful

Given the broad diffusion of P5VS in practice, many perianesthesia nurses routinely use numerical ratings to ascertain patients' pain levels. Yet, reliance on numerical ratings alone to guide pain treatment has proven problematic. Although numerical ratings are simple, easy to use, and constitute valid and reliable measures, they are limited in representing a patient's overall pain experience.^{20,21} This is because the experience of pain is multidimensional with sensory, affective, cognitive, and functional components. Capturing only one element of the pain experience (ie, severity level) can lead to poor pain outcomes. One qualitative study highlighted the benefits and limitations of using numerical ratings to assess patients' pain. Patients reported that use of numeric pain ratings produced a feeling of security and confidence that patients' providers cared for them as individuals, creating an atmosphere of responsiveness and attention to their care. For nurses, the use of numerical ratings provided a communication tool that facilitated the sharing of pain information with other team members (eg, physicians, physical therapists). Despite these benefits, patients reported

difficulty giving a number that matched their pain level—that a number did not tell the full story of their pain experience. Instead, patients voiced a desire to use adjectives to describe their pain. In addition, patients were uncertain as to how their ratings were used.²¹

These narratives highlight the challenges in the patients' use of a unidimensional pain intensity score and the challenge providers face when interpreting scores.²² It is widely understood that a score of 0 means no pain and is thus a concrete anchor for the low end of the scale. However, the subjective nature of both reporting and interpreting numeric rating scores makes it hard to know how to best respond when pain levels are elevated, for example, when a patient reports a pain score of 7 out of 10, while at the same time reporting that their pain level is acceptable.^{23,24} In addition, there is evidence that nurses sometimes use subjective interpretation and may change patients' scores to record what they believe to be a more accurate and appropriate number.²⁵

Another limitation of using NRS scores alone to guide treatment decisions occurs in care systems that link specific treatments with specific pain scores. In many hospitals, protocols call for administering higher doses of opioids when patients report elevated NRS scores (eg, scores of 7 or greater).^{21,26,27} An example is an order for oxycodone 5 mg orally every 4 hours if needed for NRS 5 to 7 and 10 mg orally for NRS greater than 7 in an effort to facilitate individual initiation and titration of opioid dosing. Linking-prescribed opioids with a given pain intensity score may deter nurses from conducting a thorough pain assessment and evaluation of patients' functional status. Tying a pain intensity score to a specific opioid dose poses the risk for serious opioid-related adverse effects such as advancing sedation and respiratory depression.²⁷ Moreover, linking opioid doses with pain intensity scores places patients at risk for overtreatment of pain.^{28,29} Opioid use has become a national crisis, with prescription opioid overdoses accounting for the highest number of unintentional overdose deaths in the United States.³⁰ Given that many individuals who go on to develop an opioid use disorder are first exposed to opioids as a result of treatment for an acute pain problem, it is especially important to account for factors other than pain intensity to determine appropriate prescription.³¹ Dovetailing with increasing concerns about the negative effects of opioid use, nurses report that at times, they record a lower pain intensity score than the patient indicates to be able to administer a lower—and in the nurse's opinion, safer—dosage.²⁵

Unidimensional pain intensity measures also fail to account for other factors that contribute to the experience of pain. Understanding the impact of these other factors is crucial in formulating appropriate pain care plans. For example, a persistently high pain intensity score could indicate surgical complications, opioid tolerance, or psychological distress.³² Failing to consider the impact of these factors often leads to over- or undertreatment of pain. An interprofessional team approach to implementing multidimensional questionnaires could potentially help to improve pain assessment and management in the perianesthesia setting.³³

The Promise of Multidimensional Pain Assessment Tools

The APS organized an interdisciplinary panel to create new guidelines for the management of postoperative pain.³² The guidelines, approved in 2015, emphasized the importance of

considering more than just the intensity of pain and recommended incorporating elements of the pain experience such as pain's effect on physical function, ascertaining pain-related emotional distress, determining the impact of pain on sleep, and inquiring about past pain treatments and level of opioid tolerance.³² The APS panel further suggested that clinicians conduct a comprehensive evaluation of the patient *before* surgery that includes understanding patients' medical and psychiatric illnesses, documenting previous postoperative treatment regimens and associated responses, and ascertaining whether there is a history of chronic pain and substance abuse. Perianesthesia nurses can use this information to create a pain management plan for the perioperative and recovery period.

The APS panel strongly recommended using validated pain assessment tools to monitor patients' pain and track progress in postoperative pain levels. Because further research is needed to examine the effects of different validated tools on postoperative pain outcomes, the panel did not recommend using any specific tools. Clinicians are therefore encouraged to select a validated tool that is most appropriate for a particular setting and patient and one that takes into account the patient's education level, cognitive ability, language proficiencies, and any cultural differences that may be present. Clearly, tools that are brief (eg, limited number of items) and easily understood by patients are the ones most likely to be adopted. Many multidimensional tools assess for impact of pain on function (eg, ability to transfer and ambulate) and sleep, which can lead to more tailored pain care plans in the perianesthesia setting. In addition, many of the tools ask about perception of pain relief, which can also help to guide the amount and type of analgesia to administer.

In recognition of the need to meet patients' needs while using safe opioid prescriptive practices, the Joint Commission recently revised their pain assessment and management standards.³⁴ The new standards (released in January 2018) require accredited hospitals to establish policies and procedures for comprehensive pain assessment that include ascertaining the effect of pain on patients' function and patient engagement in decisions about their pain management.³⁵ These revised standards have implications for perianesthesia nursing, given that this group of providers will be on the frontlines of implementing the new standards. Importantly, these comprehensive multidimensional pain assessments have the potential to provide additional information that can enhance perianesthesia nurses' decisions regarding the type and dose of analgesic medications to administer, thereby optimizing patients' pain care.

Specific Examples of Multidimensional Tools

During the first 72 hours after surgery, it is common for patients to experience lower cognitive ability and function because of the effects of anesthesia and postoperative pain.³⁶ Depending on patient capacity and phase of recovery, nurses should use pain assessment tools that are appropriate for patients with decreased cognitive capacity. One relevant source of information on multidimensional pain assessment tools for use in adults with limited ability to communicate is [GeriatricPain.Org](https://geriatricpain.org/pain-assessment) (<https://geriatricpain.org/pain-assessment>). This Web site, developed by nursing experts throughout the United States, provides evidence-based pain assessment tools for nurses in diverse practice settings.³⁷ Although intended for older adults with cognitive impairment, these validated tools may be useful to assess pain in

postsurgical patients who are sedated and have limited cognitive function as a consequence of surgery.^{38,39}

After the beginning phases of recovery have transpired and patients regain cognitive function, nurses should consider using multidimensional tools in the care process (Table 1). One example of a multidimensional pain assessment tool is the Clinically Aligned Pain Assessment Tool (CAPA). CAPA prompts clinicians to have a structured conversation with patients about their pain. In one large medical center, CAPA has replaced the NRS as a means of measuring patients' pain.⁴⁰ There are no scripted questions, the tool encourages providers to begin an open-ended discussion with patients to determine how pain is changing over time, whether pain is controlled, the degree of overall comfort a patient experiences at a given point in time, and what impact pain is having (if any) on their physical function and sleep. Although the medical center's transition to CAPA required a culture change from the unidimensional NRS to a multifaceted discussion-based tool, the results have been promising.⁴⁰ After administration of the CAPA, patients reported higher satisfaction with the quality of pain care received, and they felt that nurses cared more about their pain. In addition, nurses suggested that CAPA did not take much more time to administer than the NRS. Nurses also commented that CAPA allowed them to make more informed clinical decisions and to create better pain management plans.

Another example of a multidimensional tool is the Brief Pain Inventory (BPI).⁴² The BPI inquires about the level of pain intensity a patient is experiencing as well as its impact on mood, sleep, general activity, relationships with others, and enjoyment of life (Table 1). The modified BPI⁴³ contains three items that measure severity of pain and five items that measure pain interference.³⁶ The modified BPI has been validated in the postoperative setting and can effectively assess patients' level of pain severity and pain-related interference in postsurgical patients.³⁶

The revised APS Outcome Questionnaire is another multidimensional measure that seeks to ascertain the quality of pain care patients receive in the hospital setting (Table 1).⁴¹ The tool assesses pain severity, pain's impact on activities, sleep, and emotions, and inquires about any pain medication-related side effects.⁴⁴ The authors encourage providers to share the results of the tool with patients and families as a way of bringing them into the pain management decision-making process. Such an approach has substantial potential to improve communication between nurses and patients and lead to positive outcomes.^{45,46}

Conclusions

The P5VS initiative was important in that it emphasized the need to address the significant problem of undertreated pain, but it has not solved the problem. Assessing pain intensity as a single indicator of pain is insufficient and can potentially lead to harmful outcomes. Indeed, the new Joint Commission standards require accredited hospitals to establish policies and procedures for comprehensive pain assessment. Because nurses are on the front lines of delivering pain care, attention should be placed on their perspectives regarding the most effective ways to assess perioperative pain²⁵ and the future research that documents outcomes associated with the use of multidimensional tools in diverse practice settings. We

are optimistic that thoughtful implementation of multidimensional pain assessment tools that can be feasibly administered will ultimately help to improve pain care outcomes in the perianesthesia setting.

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References

1. Apfelbaum JL, Chen C, Mehta SS, Gan TJ. Postoperative pain experience: Results from a national survey suggest postoperative pain continues to be undermanaged. *Anesth Analg*. 2003;97:534–540. table of contents. [PubMed: 12873949]
2. Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*, 2nd ed Washington, DC: National Academies Press (US); 2011.
3. Hall MJ, Schwartzman A, Zhang J, Liu X. Ambulatory surgery data from hospitals and ambulatory surgery centers: United States, 2010. *Natl Health Stat Rep* 2017;1–15.
4. Rana MV, Desai R, Tran L, Davis D. Perioperative pain control in the ambulatory setting. *Curr Pain Headache Rep*. 2016; 20:18. [PubMed: 26879876]
5. Morrison RS, Magaziner J, Gilbert M, et al. Relationship between pain and opioid analgesics on the development of delirium following hip fracture. *J Gerontol A Biol Sci Med Sci*. 2003;58:76–81. [PubMed: 12560416]
6. Argoff CE. Recent management advances in acute postoperative pain. *Pain Pract*. 2014;14:477–487. [PubMed: 23945010]
7. Dihle A, Helseth S, Kongsgaard UE, Paul SM, Miaskowski C. Using the American Pain Society's patient outcome questionnaire to evaluate the quality of postoperative pain management in a sample of Norwegian patients. *J Pain*. 2006;7:272–280. [PubMed: 16618471]
8. Karani R, Meier DE. Systemic pharmacologic postoperative pain management in the geriatric orthopaedic patient. *Clin Orthop Relat Res*. 2004;425:26–34.
9. Reich DL, Porter C, Levin MA, et al. Data-driven interdisciplinary interventions to improve inpatient pain management. *Am J Med Qual*. 2013;28:187–195. [PubMed: 22942123]
10. Macrae WA. Chronic post-surgical pain: 10 years on. *Br J Anaesth*. 2008;101:77–86. [PubMed: 18434337]
11. American Pain Society. *Principles of Analgesic Use in the Treatment of Acute Pain and Cancer Pain*. Glenview, IL: American Pain Society; 1999.
12. Department of Veterans Affairs. Pain management: VHA Directive 2009–053. <https://www.va.gov/painmanagement/docs/vha09paindirective.pdf>. Published October 28, 2009 Accessed August 12, 2018.
13. Baker DW. History of the Joint Commission's pain standards: Lessons for today's prescription opioid epidemic. *JAMA*. 2017;317:1117–1118. [PubMed: 28241189]
14. Levy N, Sturgess J, Mills P. "Pain as the fifth vital sign" and dependence on the "numerical pain scale" is being abandoned in the US: Why? *Br J Anaesth*. 2018;120:435–438. [PubMed: 29452798]
15. Mularski RA, White-Chu F, Overbay D, Miller L, Asch SM, Ganzini L. Measuring pain as the 5th vital sign does not improve quality of pain management. *J Gen Intern Med*. 2006;21: 607–612. [PubMed: 16808744]
16. Zubkoff L, Lorenz KA, Lanto AB, et al. Does screening for pain correspond to high quality care for veterans? *J Gen Intern Med*. 2010;25:900–905. [PubMed: 20229139]
17. Narasimhaswamy S, VEDI C, Xavier Y, Tseng CH, Shine D. Effect of implementing pain management standards. *J Gen Intern Med*. 2006;21:689–693. [PubMed: 16808767]

18. Zaslansky R, Rothaug J, Chapman CR, et al. PAIN OUT: The making of an international acute pain registry. *Eur J Pain*. 2015;19:490–502. [PubMed: 25132607]
19. Gan TJ, Habib AS, Miller TE, White W, Apfelbaum JL. Incidence, patient satisfaction, and perceptions of post-surgical pain: Results from a US national survey. *Curr Med Res Opin*. 2014;30:149–160. [PubMed: 24237004]
20. Dworkin RH, Turk DC, Farrar JT, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain*. 2005;113:9–19. [PubMed: 15621359]
21. Eriksson K, Wikström L, Årestedt K, Fridlund B, Broström A. Numeric rating scale: Patients' perceptions of its use in postoperative pain assessments. *Appl Nurs Res*. 2014; 27:41–46. [PubMed: 24332467]
22. Castarlenas E, Jensen MP, von Baeyer CL, Miró J. Psycho-metric properties of the Numerical Rating Scale to assess self-reported pain intensity in children and adolescents: A systematic review. *Clin J Pain*. 2017;33:376–383. [PubMed: 27518484]
23. van Boekel RLM, Vissers KCP, van der Sande R, Bronkhorst E, Lerou JGC, Steegers MAH. Moving beyond pain scores: Multidimensional pain assessment is essential for adequate pain management after surgery. *PLoS One*. 2017;12: e0177345. [PubMed: 28489926]
24. Maroney CL, Litke A, Fischberg D, Moore C, Morrison RS. Acceptability of severe pain among hospitalized adults. *J Palliat Med*. 2004;7:443–450. [PubMed: 15265354]
25. von Baeyer CL, Pasero C. What nurses' work-arounds tell us about pain assessment. *Int J Nurs Stud*. 2017;67:A1–A2. [PubMed: 27743597]
26. Tighe P, Buckenmaier CC, Boezaart AP, et al. Acute pain medicine in the United States: A status report. *Pain Med*. 2015;16:1806–1826. [PubMed: 26535424]
27. Pasero C, Quinlan-Colwell A, Rae D, Broglio K, Drew D. American Society for Pain Management Nursing position statement: Prescribing and administering opioid doses based solely on pain intensity. *Pain Manag Nurs*. 2016;17:170–180. [PubMed: 27108082]
28. Drew DJ, Gordon DB, Morgan B, Manworren RCB. "As-needed" range orders for opioid analgesics in the management of pain: A consensus statement of the American Society for Pain Management Nursing and the American Pain Society. *Pain Manag Nurs*. 2018;19:207–210. [PubMed: 29801596]
29. Pasero C One size does not fit all: Opioid dose range orders. *J Perianesth Nurs*. 2014;29:246–252. [PubMed: 24856343]
30. Centers for Disease Control and Prevention. CDC grand rounds: Prescription drug overdoses—A U.S. epidemic. *MMWR Morb Mortal Wkly Rep*. 2012;61:10–13. [PubMed: 22237030]
31. Brands B, Blake J, Sproule B, Gourlay D, Busto U. Prescription opioid abuse in patients presenting for methadone maintenance treatment. *Drug Alcohol Depend*. 2004;73: 199–207. [PubMed: 14725960]
32. Chou R, Gordon DB, de Leon-Casasola OA, et al. Management of postoperative pain: A clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *J Pain*. 2016;17: 131–157. [PubMed: 26827847]
33. Scher C, Meador L, Van Cleave JH, Reid MC. Moving beyond pain as the fifth vital sign and patient satisfaction scores to improve pain care in the 21st century. *Pain Manag Nurs*. 2018;19:125–129. [PubMed: 29249620]
34. The Joint Commission. Pain assessment and management standards for hospitals. R3 report—Requirement, rationale, reference. 2017 Available at: https://www.jointcommission.org/assets/1/18/R3_Report_Issue_11_Pain_Assessment_8_25_17_FINAL.pdf. Accessed August 12, 2018.
35. The Joint Commission. Pain management. 2018 Available at: https://www.jointcommission.org/topics/pain_management.aspx. Accessed August 12, 2018.
36. Mendoza TR, Chen C, Brugger A, et al. The utility and validity of the modified brief pain inventory in a multiple-dose postoperative analgesic trial. *Clin J Pain*. 2004;20:357–362. [PubMed: 15322443]
37. [GeriatricPain.org](https://geriatricpain.org/pain-assessment). Available at: <https://geriatricpain.org/pain-assessment> Published 2018 Accessed August 12, 2018.

38. Gélinas C, Fillion L, Puntillo KA, Viens C, Fortier M. Validation of the critical-care pain observation tool in adult patients. *Am J Crit Care*. 2006;15:420–427. [PubMed: 16823021]
39. Gélinas C, Johnston C. Pain assessment in the critically ill ventilated adult: Validation of the Critical-Care Pain Observation Tool and physiologic indicators. *Clin J Pain*. 2007;23:497–505. [PubMed: 17575489]
40. Topham D, Drew D. Quality improvement project: Replacing the Numeric Rating Scale with a Clinically Aligned Pain Assessment (CAPA) Tool. *Pain Manag Nurs*. 2017;18: 363–371. [PubMed: 28843633]
41. Gordon DB, Polomano RC, Pellino TA, et al. Revised American Pain Society Patient Outcome Questionnaire (APSQOQ-R) for quality improvement of pain management in hospitalized adults: Preliminary psychometric evaluation. *J Pain*. 2010;11:1172–1186. [PubMed: 20400379]
42. Tan G, Jensen MP, Thornby JI, Shanti BF. Validation of the Brief Pain Inventory for chronic nonmalignant pain. *J Pain*. 2004;5:133–137. [PubMed: 15042521]
43. Ward SE, Gordon D. Application of the American Pain Society quality assurance standards. *Pain*. 1994;56:299–306. [PubMed: 8022623]
44. Zoëga S, Sveinsdottir H, Sigurdsson GH, Aspelund T, Ward SE, Gunnarsdottir S. Quality pain management in the hospital setting from the patient's perspective. *Pain Pract*. 2015; 15:236–246. [PubMed: 24433333]
45. Gordon DB, Pellino TA, Miaskowski C, et al. A 10-year review of quality improvement monitoring in pain management: Recommendations for standardized outcome measures. *Pain Manag Nurs*. 2002;3:116–130. [PubMed: 12454804]
46. Mechanic D Improving the quality of health care in the United States of America: The need for a multi-level approach. *J Health Serv Res Policy*. 2002;7:35–39.

Table 1.

Selected Multidimensional Tools That May Improve Pain Outcomes For Consideration in the Perianesthesia Setting

Tool	Number of Items	Domains
CAPA ⁴⁰	Not applicable	• Intensity • Sleep • Functioning • Comfort • Change in pain • Pain control
Modified BPI ³⁶	8	• Intensity • Sleep • Walking ability • Mood • Relations with others • Ability to concentrate
APS-POQ-R ⁴¹	12	• Intensity • Sleep • Ability to function • Mood • Medication side effects • Pain relief • Pain management decision making

CAPA, Clinically Aligned Pain Assessment Tool; BPI, Brief Pain Inventory; APS-POQ-R, American Pain Society Patient Outcome Questionnaire, revised.