

Pain Assessment as a Social Transaction Beyond the “Gold Standard”

Martin Schiavenato, PhD, RN* and Kenneth D. Craig, PhD†

Abstract: Pain assessment conventionally has been viewed hierarchically with self-report as its “gold-standard.” Recent attempts to improve pain management have focused on the importance of assessment, for example, the initiative to include pain as the “fifth vital sign.” We question the focus in the conceptualization of pain assessment upon a “vital sign,” not in terms of the importance of assessment, but in terms of the application of self-report as a mechanistic index akin to a biologic measure such as heart rate and blood pressure. We synthesize current inclusive models of pain and pain assessment and propose a more comprehensive conceptualization of pain assessment as a transaction based on an organismic interplay between the patient and clinician.

Key Words: pain assessment, pain assessment as a transaction, communication of pain, self-report, pain expression, fifth vital sign

(*Clin J Pain* 2010;26:667–676)

Forty years ago, McCaffery¹ introduced the now conventional maxim that “Pain is what the person says it is and exists whenever he or she says it does.” This conceptualization of pain brought the individual to the forefront and made patients the experts in their pain experience. This approach to pain assessment seems just and aligned with the principles of patient advocacy and ethical clinical treatment.² Moreover, this emphasis on personal experience helped to lay the foundation for what was argued to be the “gold-standard” for pain assessment: self-report. More recently, the popularization of pain as the “fifth vital sign”³ has made self-report assessment ubiquitous in practice.

The noble intentions of this advocacy are recognized as important. However, a preponderance of evidence now shows a major disconnection between what is advocated and what clinicians actually do. Clinical assessment in practice is not based solely, or even primarily, on the subjective report of patients. Rather than taking a statement at face value, pain is most likely to be inferred on the basis of a broader array of information acquired during the complex transaction between the patient and clinician, with this often poorly reflecting the patient’s self-report. This article examines the discrepancies between

current practices in the application of self-report, including its use as the fifth vital sign, and the complexities underlying pain assessment in general. A more comprehensive model for pain assessment is proposed.

THE PROBLEM WITH SELF-REPORT

The subjective experience of pain has long been recognized as multidimensional,^{4,5} comprising complex thoughts and feelings as well as sensory features. In adults, self-report of pain intensity is most frequently assessed using unidimensional scales, expressed either numerically (eg, ranging from 0 or “no pain,” to 10 or “the worst pain” or through the use of a visual analog scale, a 10 cm line anchored at extremes of no pain and “pain as bad as it could be”) or by using a descriptive, categorical scale (eg, adjectives of no pain, to “extremely intense pain”).⁶ With children, the self-report scales commonly use graphic facial displays of pain showing different degrees of pain expression.^{7–9} Together, these and other attempts to quantify pain through self-report are often referred to as the gold standard for pain assessment. They focus upon the subjective experience of the person, reflect the primacy of the patient, and are at the frontline of clinical practice. When properly used, they can provide valid and reliable information. However, for a gold standard, self-report is fraught with limitations.

Pain assessment scales do not do justice to patient experience. It is recognized that the richness and complexity of the pain experience is oversimplified by the demands for a unidimensional rating of pain intensity.^{10,11} For example, in the course of development, children must acquire both the cognitive maturation and linguistic skills necessary to publicly articulate at least some features of the experience.¹² Although methodologically convenient, self-report requires the patient to integrate qualities of experience in unknown ways, leaving important distinctions, such as differences between sensory-discriminative qualities and intensities and affective discomfort, confounded.¹³ The report provided represents an integration of subjective experience at that moment along with the perception as to how one should behave at that moment in time.

A further glaring problem with self-report is that it excludes a large number of patients because of the cognitive and communicative burden it exacts.¹⁴ Self-report requires the linguistic and social skills necessary to provide a coherent expression of pain; therefore, the strategy is problematic with some of our most vulnerable populations, the cognitively impaired,¹⁵ the critically ill,¹⁶ infants, and young children.¹⁷ The International Association for the Study of Pain has acted to direct the attention of those engaged in pain assessment to the necessity of attending to nonverbal cues for pain in people with communication limitations.¹⁸

Received for publication February 16, 2010; revised April 30, 2010; accepted May 4, 2010.

From the *University of Rochester, School of Nursing & Department of Biomedical Engineering, Rochester, NY; and †Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada.

We have no funding sources or conflict of interests to report.

Reprints: Martin Schiavenato, PhD, RN, University of Rochester, School of Nursing & Department of Biomedical Engineering, Box SON, 601 Elmwood Avenue, Rochester, NY 14642 (e-mail: martin_schiavenato@urmc.rochester.edu).

Copyright © 2010 by Lippincott Williams & Wilkins

Even then, for people who are communicatively and cognitively intact and competent, those for whom the self-report strategy was designed, self-report still leaves a large potential for bias and error. An inherent assumption in pain assessment is that the patient wants to minimize their pain and that the clinician wants to treat it or alleviate it. After all, pain is the cardinal reason healthcare is sought and caring the clinician's *raison d'être*. We call this the "assumption of mutuality (AoM)," and if this is the case, then 2 propositions must be satisfied. First, the patient must be speaking the truth (the self-report is a valid index of their subjective experience), and second, the clinician must be attentive and competent. That is, for "whatever the patient says" to truly reflect his or her pain, one must assume a capacity and willingness to engage in candid disclosure on the part of the patient and unquestioning receptive belief on the part of the clinician. Unfortunately, this is far from reality. Patients are often reluctant to self-report pain, and typically assume that clinicians will know they are in pain; yet, clinicians assume that patients will self-report pain as necessary despite this reluctance.¹⁹ Various patient and clinician factors conspire to sabotage the clarity of this process. Patients act according to their perceived best interests in particular settings and times, consciously or unwittingly, and the clinicians' judgments similarly reflect personal biases, sensitivities, and competencies.

Communication Problems: The Patient

It is now clear that the assumption that the patient invariably is "speaking the truth" in the self-report is not warranted. Self-report typically works as an adequate, legitimate, and methodologically convenient basis for the delivery of patient care. Nevertheless, the reality of working with patients is more complicated, and although self-report is methodologically convenient, it may not be cost efficient. It would be better if the complexities of patient behavior were recognized in the assessment, as extraneous personal and social-context factors can influence conscious deliberations or operate outside consciousness as in the case of self-deception. The inclusion of placebo controls in randomized trials highlights the potential for biases. Placebos control not only for expectancy effects, but also for the potential for suppression, exaggeration, or other distortion of self-report, either as the result of conscious misrepresentation or self-deception. Patients invariably modulate pain displays of any type consistent with whether vigorous or attenuated display is perceived to be in their best interest. We discuss these polar extremes in the following paragraphs, but recognize the potential for more subtle influences deserving of study. For example, a patient sensitive to the subtleties of impression management may over-report pain intensity, but under-report emotional distress to reduce the likelihood that their complaints will be discounted.

Patients provide many reasons for suppressing or masking their report of pain, including a fear of negative consequences. Patients often fear pain as representing a worsening of their condition, and so are capable of engaging in self-denial. Patients also express concern about inconveniencing clinicians, seeming to be whining or complaining unnecessarily, or have fears of tolerance or addiction to medications; concern with medication side-effects; and a belief that pain cannot be relieved.²⁰⁻²³ Patients may also suppress pain to avoid noxious treatments or ward off having others believe that they are playing the "sick role."²⁴ Spiers²⁵ notes that adult patients

may not be as forthcoming in expressing their pain in the hope that their stoic behavior may help them to "save face" or remain in control in an exposed or perilous situation. Stoicism may also be a consequence of socialization in a specific family or culture,^{26,27} although care must be taken not to stereotype.²⁸ Tendencies to modulate pain expression are acquired early in life, as children report suppressing pain for reasons such as fear of embarrassment in front of their peers or to avoid worrying their parents.²⁹

At the other extreme, patients might exaggerate, purposely or unwittingly, their report of pain. Sometimes vigorous advocacy of one's needs is entirely appropriate; this may be the case when patients confront indifferent or distrustful clinicians, or seek an empathetic response. As Werner and Malterud³⁰ observed "It is hard work behaving as a credible patient." In this attempt at establishing credibility, not everybody has the skills and one is at risk of being labeled "a catastrophizer" or as having "psycho-genic" pain. At other times, reasons for exaggeration may include efforts to obtain opioids, the so-called drug seeking behaviors,³¹ and malingering, avoiding responsibilities, or seeking compensation.^{32,33} In addition, children may falsely report pain in an attempt to seek attention.²⁹

Given this state of affairs (ie, the potential for masking and exaggeration of self-report), it seems naive to assume that clinicians would or could suspend inherent skepticism concerning the credibility of other's behaviors. In reality, most practitioners accept personal, professional, and institutional responsibilities to carefully marshal and allocate resources in the interests of caring for those most in need, and engage in discerning judgment,²⁴ for instance, clinicians who are biased against patients they feel are "drug seeking."³⁴ This uncertainty parallels practitioner recognition that they have a personal capacity to misrepresent states in the interest of maximizing personal outcomes. It has also been proposed that there is an evolved tendency toward seeking confirmatory evidence when making judgments about others.³⁵ We can conclude that this interplay must have an effect in creating or perpetrating a skeptical clinician-patient relationship.

Interestingly, distrust in clinician-patient relationships has been implicated as a source of patient tendencies toward exaggerating or "fitting" clinical symptoms in an attempt to establish credibility with their provider.^{30,36} It has been noted that patients with medically unexplained symptoms are at particular risk of being marginalized from meaningful professional care and treatment.³⁷ The proposition that the pain perceived in another reflects the social transaction between the person in pain and the observer allows for circular feedback arising when patients present with pain, are evaluated by clinicians, receive limited trust, and in consequence amplify their painful expression, both in verbal and nonverbal behavior. Despite its importance and relevance to pain assessment and treatment, this process has not been systematically studied. Thus, in the circular feedback manner, "pain" seems to be transacted; there is recursive, dynamic presentation and evaluation engaging both the patient and clinician, with the interactions defined in terms of mutual trust within the dyad (Fig. 1). Importantly, pain presentation has an effect on clinician judgment. For example, Birdwell and colleagues³⁸ found that given the same clinical scenario, clinicians overwhelmingly ignored an experimentally manipulated "histrionic" or dramatic presentation of chest pain (in this case a brightly dressed actress with exaggerated verbal and

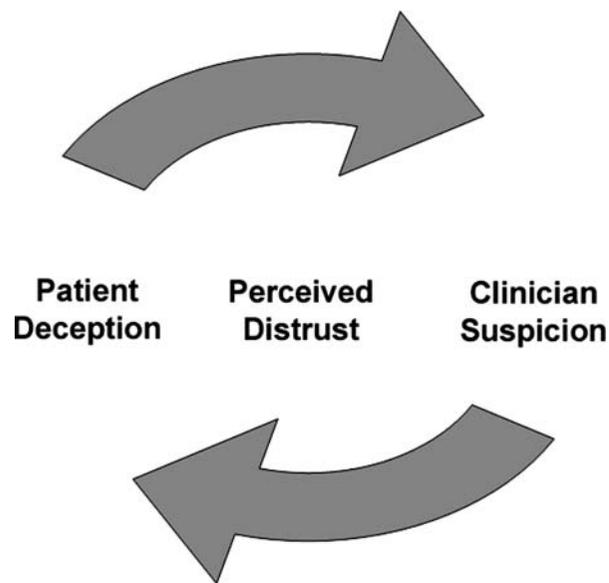


FIGURE 1. Skeptic patient-clinician relationship in pain assessment.

nonverbal behaviors) over a similar presentation of chest pain not characterized as histrionic (the same actress, more subdued and unemotive behaviors).

The incidence of pain deception (suppression, exaggeration, malingering, or other distortion) in practice is hard to ascertain, partly because of methodologic issues and partly because people work hard to avoid the discovery of dishonesty.^{24,33,39} Nevertheless, scrutiny of what is thought to be the “veracity” of the patient self-report seems to not only be warranted but also routinely performed by clinicians, with judgments as to whether the self-report is appropriate similarly describable as a social transaction.

Communication Problems: The Clinician

In reality, self-report is but one strategy used by clinicians to assess pain. Clinicians typically use a broader range of resources in arriving at their judgment, a good practice agreeable with training in clinical examination. Nonverbal expressions and behaviors are of considerable importance. Nonself-report strategies to assess pain include cuing into facial expression (eg, grimacing), behavioral observation (eg, guarding and body movement), and physiologic monitoring (eg, vital signs).^{40,41} Evidence of precipitants of injury and disease, and damage from injury and disease weigh heavily.^{42,43} Kim et al⁴⁴ noted in a post-surgical setting that the leading strategy in assessing pain was not what the patient said (ie, the self-report), but rather how the patient looked (behavioral observation, facial expression, and vital signs). A retrospective study of critical care patients noted that behavioral and physiologic pain indicators were used 97% of the time as compared with 29% for self-report.⁴⁵ Similarly, Katsma and Souza⁴⁶ in the long-term-care setting found that nurses doubted the self-report of patients and were more likely to cue into facial expression. Interestingly, in this study, the more experienced the nurse, the less likely they were to believe the patient’s self-report. McCaffery and Ferrell⁴⁷ documented the lack of trust of nurses in patient’s self-report in a review

of studies spanning 3 decades. It seems that when it comes to pain assessment, clinicians tend not to believe the verbal report of their patients, or at least, they attach greater importance to behavioral displays when in disagreement with self-reports of pain.^{48,49} For example, nurses are most likely to give pain medications to a grimacing patient than to a smiling one.⁵⁰

Thus, in practice, the primacy of self-report is an illusion. The reasons for this are complex. A myriad of personal factors seems to influence or bias the clinician’s response to the self-report. Factors implicated earlier include patient’s demographics, such as age, sex, and ethnicity, as well as other sociocultural factors and nuances such as the patient’s lifestyle, socioeconomic status, litigation status, attractiveness, and friendliness.^{21,47,51–54} Other factors include level of empathy, past exposure to pain, personal beliefs about pain, and professional group membership, such as physician or nurse.^{55–57} Not surprisingly, the clinician’s perception of the patient and the patient’s personality affect the clinician’s feelings and views toward the patient.⁵⁸ There is also evidence that situational or work-contextual factors affect the clinician’s judgment of pain. Manias and colleagues⁵⁹ found that a nurse’s workload affected their pain assessment, with high levels of work activity associated with ignoring patient’s pain cues including their verbal report. Lastly, an underexplored factor may be that the very nature of clinical practice is based on professional evaluation and judgment. Clinical acumen is encouraged by thoughtful processing and analysis. The discrepancy between patients’ self-report and clinicians’ response may partly be the result of clinicians critically seeking and not finding confirmatory evidence. As Tait and others⁶⁰ adduced, this discrepancy itself may have a negative effect in decision making and estimating pain in patients (Table 1). Therefore, pain assessment must be reconceptualized in a manner that accurately encompasses current strategies and the various problems in communication inherent within them.

A CALL FOR A CONCEPTUAL SHIFT

The fervor for self-report is such that it is advocated as the single most reliable indicator of the presence and intensity of pain and asserted by the Joint Commission to be “the primary source of information, as it is more accurate than the observation of others” (p. 13).⁶¹ By definition, as the gold standard, self-report supposedly represents the best tool available for the task of pain assessment.⁶² Viewed hierarchically, self-report is recommended to supersede all assessment techniques, even in patients with limited verbal or cognitive skills.⁶³ Such is the inertia behind self-report that pain is now to be assessed, per regulatory and professional organizations, as the fifth vital sign.^{4,64,65} These guidelines, statutory requirements, and proposals are no doubt intended to highlight the importance of pain assessment and the indispensability of routinely assessing pain and providing care. However, to conceptualize pain as “a vital sign” implicitly assumes it is comparable to the other 4 (pulse, temperature, respiration, and blood pressure); they are fairly rapidly assessed, physiologically rooted, potentially objectively assessed (although intercoder reliability should not be taken for granted), and easily obtainable in the clinical environment. Self-report, in the form of the common pain rating (eg, “on a scale of 0 to 10...”) seems to fit the mechanics of these

TABLE 1. Communication Factors Affecting Self-report of Pain

Patients: Why They Are Not Saying It	Clinicians: Why We Are Not Hearing It
<ol style="list-style-type: none"> 1. Inability to communicate 2. Fear of negative medical consequences (addiction, tolerance, unrelieved pain) 3. Fear of indicating a worsening condition 4. Avoidance of noxious treatments or “sick role” 5. Desire to save face/maintain control 6. Fear of embarrassment, avoid worrying parents 7. Playing of a cultural role 8. Perceived disempowerment 9. Clinician skepticism/distrust 10. Deliberate deception (malingering, seeking opioids) 	<ol style="list-style-type: none"> 1. Preference and reliance in other assessment techniques 2. Suspicion and distrust 3. Level of exposure to pain, “institutional insensitivity” 4. Personal beliefs about pain 5. Lack of empathy 6. Increased workload affects cueing into self-report 7. Personal nuances/preferences 8. Biases/stereotypes 9. Incompetence, poor clinical knowledge/skills 10. Critical evaluation/judgment

criteria. However, this terminology and conceptualization of pain assessment is misleading because self-report is not vital and it is not a sign.

Although we are sympathetic to the sense of urgency and the rhetorical impact of the slogan, self-report does not refer to vitality in a physiologic system whose collapse would represent loss of life, as would be the case with the other 4 vital signs. Furthermore, self-report is not a sign, in the sense of an objective index of disease; at best it should be recognized as a symptomatic declaration, requiring interpretation in the context of other information. Compared with the discrete physiologic data provided by vital signs, pain assessment is much more complex, evolving, and subjective. Rather than yielding an absolute measure or index, pain assessment is best described as a dynamic process, a transaction.

However, the idea that “pain is whatever the patient says it is” remains a seductive ideal. Philosophically, this maxim carries a sense of democracy, of fairness about self-expression and it supports the principle of allowing patients to have authority in defining their pain severity. Nevertheless, as von Baeyer⁶⁶ observes, any attempt to reduce pain experience to an intensity score represents an oversimplification capable of neglecting features such as location, sensory qualities, and affective and cognitive features of the experience. Used exclusively, self-report is naive pain assessment and it diminishes a considerably more complex phenomenon. In fact, in the context of the fifth vital sign, self-report may not positively affect or may even jeopardize pain management. Mularski and colleagues⁶⁷ found that routinely measuring pain by the fifth vital sign did not improve quality of pain management in a sample of military veterans. Moreover, Taylor and colleagues⁶⁸ caution the fifth vital sign campaign as potentially leading to oversedation in postoperative patients, whereas Vila and colleagues⁶⁹ found that instituting a “pain as the fifth vital sign” policy at a cancer center was associated with a 2-fold increase in opioid sedation-related adverse drug reactions. Similarly, Lucas and colleagues⁷⁰ reported alarming evidence implicating the practice in injury and death from oversedation.

If pain is a multifaceted experience, with cognitive, emotional, as well as sensory components, and requiring explanation inclusive of both biophysiological and socio-cultural determinants,^{71–73} as biopsychosocial models of pain argue,⁷⁴ then its assessment must span beyond the reductionist view captured by the mantra of pain is whatever the patient says it is and the concept of the fifth vital sign.

PAIN ASSESSMENT AS A SOCIAL TRANSACTION

There is no lack of conceptual models to show the complexities of the phenomenon that is pain. For example, Melzack's⁷⁵ exposition on the neuromatrix model of pain, an expansion of the earlier Gate Control Theory work with Wall in 1965,⁷⁶ relies heavily on a comprehensive biologic model that encompasses even the molecular level, and it includes social, environmental, and behavioral modifiers.^{73,77} Alternatively, the biopsychosocial model of pain⁷⁸ attempts to incorporate social and other parameters in pain, but it is rarely formally described and most often pays short shrift to social dimensions.⁷⁴ The social parameters are of considerable importance as even a brief consideration of ethnicity and culture indicates.^{79,80} Sullivan⁸¹ advanced a biopsychomotor model of pain picking up on the Wall⁸² observation that sensory formulations of pain neglect the action component. One must also recognize transformations in the experience and expression of pain associated with biologic and social development.^{83–86} Frantsve and Kerns⁸⁷ highlight the importance of communication in chronic pain management in the context of shared medical decision making. Shared medical decision making is viewed as a process of collaboration, dynamic in nature, and affected by demographic and situational factors from both the patient and clinician. Specific to pain assessment, Craig and colleagues present a multifactor social-communication model of pain that highlights the importance of both verbal (eg, self-report) and nonverbal (eg, facial expression) communication,^{71,88,89} including extended consideration of the clinician. Table 2 for a summary of key points of these models.

A theme that emerges from these models is the complexity of pain and its assessment. In contrast to the view that pain can be encapsulated singularly in a unidimensional report, Williams and colleagues¹⁰ showed that unidimensional accounts obscure important features. The phenomenon is viewed as composed of diverse components comprising both interpersonal and intrapersonal dimensions that interact and affect each other, and thereby the whole, in an organismic manner. Recent efforts to understand widespread misestimation of pain in clinical and everyday life situations have recognized the importance of psychologic and social factors.^{60,90,91} From this earlier research, we synthesize and present a model that conceptualizes pain assessment as a patient-clinician transaction (Fig. 2).

The model of pain assessment as a transaction is composed of 3 main parts. “Contributing factors” are the

TABLE 2. Global Views of Pain

Source	Theory/Model	Key Points
Melzack ^{73,75} expansion on Gate Control Theory ⁷⁶	The Neuromatrix	Comprehensive genetic and neurohormonal processes in pain. Biopsychologic linked with personal variables such as culture and personality
Bates et al ^{79,80}	Biocultural Model of Pain	Ethnocultural attitudes and emotion influence the perception of pain
Izard et al ^{84–86}	Differential Emotions Theory	Expression of emotions is the result of neural/genetic processes which are modulated developmentally and environmentally (eg, learned)
Craig et al ^{71,88,89}	The Communications Model of Pain	Verbal and nonverbal interaction between patient and clinician modified by the physiologic and social context
Frantsve and Kerns ⁸⁷	Shared Medical Decision Making and Chronic Pain	Pain management as a process of collaboration between clinician and patient; bidirectional and dynamic

foundation to the transaction; they form the personal and societal context and encompass both the patient and clinician. The “assessment process” is a feedback loop composed of 5 stages that starts with the pain stimulus, and travels from the patient (the personal experience of pain) to the clinician, whose judgment and intervention (or lack thereof) directly affects the patient experience. The “intervening steps” show possible products, along a gradient or continuum of variable levels of activity between the 5 stages of the assessment process (it is represented in the model with a triangle).

We start with the assumption that pain assessment is a process, an ongoing and dynamic exchange within the patient-clinician dyad but subject to external influences. We assume that this relationship is purposeful and goal oriented in nature. That is, as mentioned earlier, in the AoM, patients want relief from pain and clinicians want to provide care. Thus, as shown in Figure 1, a level of trust predicates this assumption. The exchange of meaning (ie, pain) from the patient to clinician (and back) is the essence of the transaction.

Contributing Factors

The aforementioned conceptual model attempts to be more inclusive of factors contributing to pain assessment. Specifically, biologic, developmental/psychologic, and socio-cultural factors are, in varying degrees, recurring themes. A common thread, and an emphasis in the model presented here is the fluid nature of the pain phenomenon encompassing internal features (eg, neurophysiologic and psychologic) and external or environmental determinants (eg, culture, ethnicity, and interpersonal communication). The boundaries between these 2 spheres are characteristically permeable.

Numerous contributing factors mediate the pain assessment process for both the patient and clinician. Together, these factors represent the history and current state of the 2 players in the transaction. Table 3 lists examples of contributing factors. Interestingly, although powerful sociocultural factors have been implicated at length in pain from a patient perspective (eg, patient ethnicity, access to care,⁹² and patient sex⁹³), there is a void in the literature when it comes to the clinician's own attributes such as sex and ethnicity, and their effect on pain assessment. If sociocultural forces have an impact on the

patient, it would be a safe assumption that they too are at work on the clinician. Nevertheless, there is evidence to support that a patient's sociocultural attributes affect the clinician's attitudes. Ferguson and Candib's⁹⁴ review found that patient ethnicity and language influence quality of care; minorities, especially those not proficient in English, are less likely to engender empathic attitudes from clinicians. Evidence for other clinician social biases and preferences has already been mentioned above.

Additional factors include experience/empathy and contextual/situational. By experience, we mean factors such as individual knowledge and individual exposure to pain. From the clinician's perspective, knowledge refers to skills, special training, and general familiarity with relevant pain assessment matters such as recognition of signs and symptoms, treatment options and interventions, documentation and communication abilities, and the kind of clinician personal competence often implicated in good or poor pain management.^{95–98} Exclusive use of self-reported pain, which probably is a rarity, would contribute to poor management. By exposure to pain, we mean repetitive experiences with pain leading to “institutional insensitivity,” or a habituation and lack of sensitivity to pain on the part of the clinician.^{57,99,100} Dialectically related to this is the concept of empathy that implies greater sensitivity to another's pain based on one's own experience.^{56,101} Goubert and colleagues⁵⁶ provide a model of pain empathy arguing that empathy is an integrated product of both the bottom-up sources of information (ie, patient behavior) and top-down influences (ie, clinician attitudes, values, training, biases, etc). Recent research in the field points to empathy as potentially being both learnt (eg, from direct personal experience) and being an automatic reflexive response.^{102–105} This nicely shows the entanglement of intrapersonal and interpersonal contributing factors.

From a patient perspective, past experience or exposure to pain also affects the phenomenon. For instance, in the premature infant, pain exposure may change neurodevelopment and alter subsequent pain perception.¹⁰⁶ Similarly, at the other end of the age spectrum, cumulative and vast life experiences in the elderly may affect their perception of and response to treatment of pain.¹⁴

Contextual and situational factors from a clinician perspective may include variables such as staffing, workload

PAIN ASSESSMENT AS A TRANSACTION

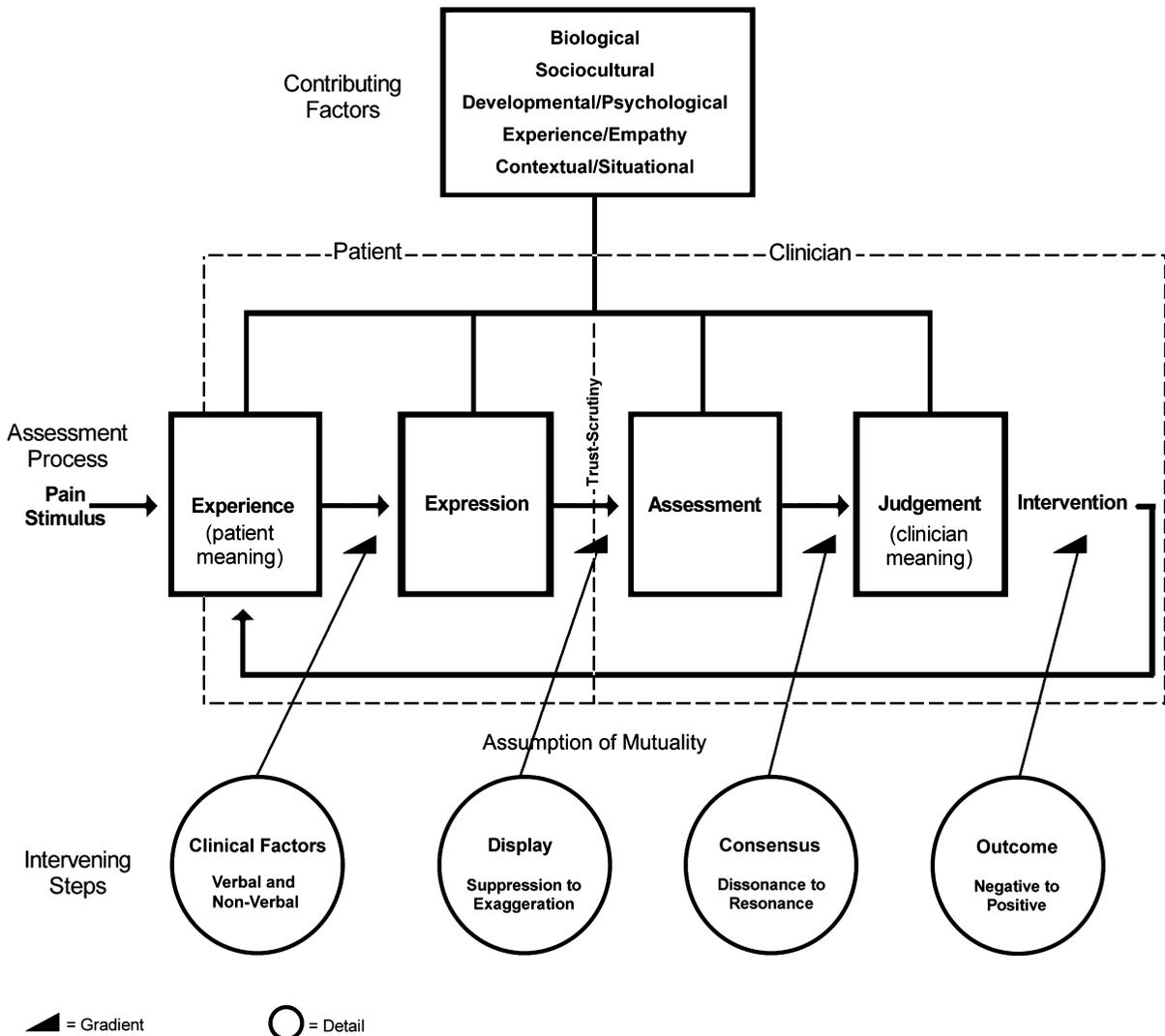


FIGURE 2. Pain assessment as a transaction.

issues, and interdisciplinary communication.^{59,87} From a patient perspective, contextual and situational factors may include communication barriers such as speaking a foreign language, or factors affecting economic/financial status (eg, ability to follow-up care, access to therapy/treatment).

Assessment Process and Intervening Steps

The assessment process begins with an event signaling the possibility of pain perception by either some communication of distress on the part of the patient, the clinician perceiving the possibility of pain, or the clinician fulfilling some mandate to engage in assessment. When pain is reported, there may be an identifiable “Pain Stimulus,” but frequently no adequate pathophysiologic event can account for highly distressing pain.⁷² It often is the absence of a match between some pain stimulus and the intensity of pain experienced that drives the consideration of psychologic,

social, and environmental contributors to the seriousness of pain experience and pain-related disability.¹⁰⁷

Pain experienced (“Experience”) is intimately subjective, personal, and corresponds to the totality of sensory, emotional, and cognitive neural correlates of the phenomenon.¹⁰⁸ This integrated meaning of pain for the patient is the focus in pain assessment, but it is not available to the clinician unless there are public manifestations. Note that “Expression” after Experience implies that the pain is real to the patient regardless of their ability to express it. That is, the pain experience precedes and may exist independent of the ability to display or communicate it. Thus, the product of Experience lies along a continuum or gradient of verbal and nonverbal output, including biopsychologic output, mediated by the various clinical factors.

The product of Expression is its display, which ranges from suppressed to exaggerated and would include “appropriate” as a middle term. It is important to highlight

TABLE 3. Examples of Contributing Factors in Pain Assessment

	Biologic	Sociocultural	Developmental/ Psychologic	Experience/ Empathy	Contextual/ Situational
Patient	Disease processes, pathophysiology, clinical condition Drug influences (eg, anesthetics, analgesics, addiction) Disabilities (eg, amputation, facial paralysis)	Ethnicity, cultural origin Sex Access to healthcare Healthcare disparities	Age Stress Wanting to regain control or credibility Drug addiction Interpersonal/communication skills Fear	Previous exposure and experiences with pain	Language Socioeconomic status Fear/stress Similarity to clinician
Clinician	Biologic dispositions Stress reactivity	Patient preferences or biases (eg, socioeconomic status, physical appearance) Clinician demographics (eg, age, sex, education) Clinician ethnic background	Critical evaluation of pain report/assessment Personal views on pain Trust/suspicion Interpersonal/communication skills	Knowledge, clinical competence Sensitivity to other's pain/empathy "Institutional insensitivity"	Workload, rushed clinical encounters, stress Interdisciplinary communication, follow-up Facility resources (eg, staffing, proper documentation)

that appropriate expression is defined by the sociocultural context; as such, it varies with the context and it is not an absolute or fixed expression. In contrast to the product of Experience above, "Display" marks the interface, the boundary between the patient and clinician, and includes pain signs and behaviors accessible to the clinician and normally associated with clinical pain assessment, including self-report. In the model, trust and scrutiny delineate this boundary.

"Assessment" implies all the clinical skills and tools used in evaluating pain. This includes behavioral observation, evaluation of physiologic signs, and symptoms, and self-report, if obtainable. Through critical analysis, the clinician begins to build the clinical picture, and translates and interprets the severity and quality of the patient's pain and its implications for quality of life and disability. Interpretation of this meaning leads to varying degrees of agreement or "consensus" between the patient and clinician; this may vary anywhere from agreement with the patient's meaning (resonant) to disagreement with the patient's meaning (dissonant).

The product of deciding on the nature of the patient's pain is punctuated with a clinical judgment ("Judgment"). The term "social judgment" was used earlier in a similar context by Tait.¹⁰⁹ Craig et al⁷¹ have used the term "attribution" to make it clear that the clinician is assigning or attributing pain to the patient. We use "clinical judgment" here, to recognize the broad range of contributing factors and to acknowledge that the judgment implies

some imposition of values with health repercussions for the patient. The judgment represents some final evaluation and understanding of the patient's meaning of pain. The process of pain assessment invariably is dynamic and recursive, but the judgments are very important as they represent the culmination of the complex process.

This is followed by "Intervention" that implies treatment or the absence thereof, and may cover the extensive range of therapeutic options in pain. The effectiveness of the intervention or "outcome" will in turn have a range of negative-to-positive consequences for the patient's experience, wherein the cycle once again continues (Table 4 for examples of possible Assessment Process issues or products).

Notwithstanding an excellent pain assessment and the human empathic response evoked in the clinician (eg,^{42,56,101}), the meaning of pain is inherently different for the clinician and patient.⁹⁰ By "meaning," we refer not to the intact transmission of the experience from the patient to the clinician, but rather the relaying of the global message pain within the boundaries and demands of the therapeutic relationship. The essence of the transaction is the transference of this message and the success of the transaction depends on whether consensus is achieved.

To elaborate, given the AoM (that the patient wants relief from pain and the clinician wants to provide care), more positive outcomes will come when patient/clinician meaning is most similar; that is, when consensus is high. The opposite is true; the more dissimilar the meaning from

TABLE 4. Examples of Assessment Process Issues or Products in Intervening Steps

Clinical Factors	Display	Consensus	Outcome
From verbal to nonverbal Level of consciousness Intubation Age Cognitive ability	From suppression to exaggeration "Saving face" Histrionic Vital signs, physiologic data	From dissonance to resonance Varying degrees of patient-clinician concordance	From negative to positive Pain persistence Pain relief Overmedication

the clinician to patient, the lesser the consensus, and more negative the outcome. In contrast, if the AoM is violated, skepticism and distrust (Fig. 1) will conspire to thwart the assessment process. In reference to the AoM, there are important caveats to mention. We can assume, for example, that a toddler with a broken bone will not readily welcome clinician intervention, or share the goal of “pain relief” achieved in the form of a needle and syringe. Similarly, providing for a cognitively impaired patient or someone suffering from psychosis, may violate the AoM. In healthcare, these situations are not unique to pain management and typically already have an established course of action. A proxy is frequently used to ascertain the needs and rights of the individual. In our model, this means that for pediatric and other special cases, the AoM may be established by a parent or other legal guardian. A more nebulous situation may arise when a cognitively and seemingly psychologically intact adult advocates against their relief from pain. Reasons for this vary, but let us consider as an example an individual who finds religious virtuosity in pain and suffering (for a compelling treatise on the subject Ref. 110). Such an individual may welcome pain, even to their detriment, as defined by others. On the basis of our model, in this case, we may anticipate distrust, dissonance, and a negative outcome. However, even with this potential gloomy result, the model informs us of a root cause (ie, AoM violation) and heralds possible problems while signaling for preemptive actions and potential resolutions. That is, given the dynamic and recursive nature of the pain assessment process, a complex and sensitive scenario such as this is given a broad context in which to negotiate and pursue clinical solutions true to the spirit of transaction.

CONCLUSIONS

Characterizing “pain assessment as a transaction” is an attempt to conceptualize the complex processes underlying the social exchanges patients have with clinicians. The prevailing very direct and simple argument that pain is what the patient says it is is applauded in principle because it acknowledges patient subjectivity and validates the nature of their experience. However, this approach ignores many facets of the complex patient/clinician dyadic relationship, and in consequence is only half-true. Similarly, pain as the fifth vital sign is of importance rhetorically, as it highlights the significance (vitalness) of pain assessment. However, its current mechanistic execution is problematic. Pain as a transaction introduces the clinician as an important part of the process, and focuses on the inevitable social features of the assessment process that implicate interpersonal demands on both the clinician and patient. Pain assessment is not merely the subjective statement of the patient, no more than it is the sole objective decision of the clinician. Rather, pain assessment is the intersubjective exchange of meaning between the patient and clinician. It is a process, which is ongoing and is dependent on both the internal and external factors inherent to both the parties and their environment.

The model proposed here is meant to show the complexity and expose the limitations inherent in a mechanistic conceptualization of pain assessment implicit in the various slogans and demands to see pain as a “vital sign.” The reconceptualization of pain assessment using a broader organismic view is proposed in the interest of

improved assessment techniques that are sensitive to the nuances and multifaceted nature of pain. Incorporation of this model into a workable heuristic awaits and ultimately its utility must be evaluated within the challenging demands of the clinical arena.

ACKNOWLEDGMENTS

The authors thank Dr Carl von Baeyer, PhD, University of Saskatchewan for his comments and suggestions in the development of this manuscript, as well as anonymous reviewers for their invaluable guidance and observations to the earlier versions of this study.

REFERENCES

1. McCaffery M. *Nursing Practice Theories Related to Cognition, Bodily Pain and Main Environment Interactions*. Los Angeles: University of Los Angeles; 1968:95.
2. Ferrell B. Ethical perspectives on pain and suffering. *Pain Manag Nurs*. 2005;6:83–90.
3. American Pain Society. *Principles of Analgesic Use in the Treatment of Acute Pain and Cancer Pain*. Glenview, IL: American Pain Society; 1999.
4. Melzack R, Torgerson WS. On the language of pain. *Anesthesiology*. 1971;34:50–59.
5. Clark WC, Yang JC, Tsui S, et al. Unidimensional pain rating scales: a multidimensional affect and pain survey (MAPS) analysis of what they really measure. *Pain*. 2002;98:241–247.
6. Jensen MP, Karoly P. Self-report scales and procedures for assessing pain in adults. In: Turk D, Melzack R, eds. *Handbook of Pain Assessment*. New York: The Guilford Press; 2001:15–34.
7. Chambers CT, Hardial J, Craig KD, et al. Faces scales for the measurement of postoperative pain intensity in children following minor surgery. *Clin J Pain*. 2005;21:277–285.
8. McGrath P, Gillespie J. Pain assessment in children and adolescents. In: Turk D, Melzack R, eds. *Handbook of Pain Assessment*. New York: The Guilford Press; 2001:97–118.
9. Stinson J, Kavanagh T, Yamada J, et al. Systematic review of the psychometric properties, interpretability and feasibility of self-report pain intensity measures for use in clinical trials in children and adolescents. *Pain*. 2006;125:143–157.
10. Williams ACdC, Davies HTO, Chadury Y. Simple pain rating scales hide complex idiosyncratic meanings. *Pain*. 2000;85:457–463.
11. Knotkova H, Crawford Clark W, Mokrejs P, et al. What do ratings on unidimensional pain and emotion scales really mean? A Multidimensional Affect and Pain Survey (MAPS) analysis of cancer patient responses. *J Pain Symptom Manage*. 2004;28:19–27.
12. Stanford EA, Chambers CT, Craig KD. A normative analysis of the development of pain-related vocabulary in children. *Pain*. 2005;114:278–284.
13. Goodenough B, Thomas W, Champion GD, et al. Unraveling age effects and sex differences in needle pain: ratings of sensory intensity and unpleasantness of venipuncture pain by children and their parents. *Pain*. 1999;80:179–190.
14. Hadjistavropoulos T, Herr K, Turk DC, et al. An interdisciplinary expert consensus statement on assessment of pain in older persons. *Clin J Pain*. 2007;23:S1–S43.
15. Abbey J, Piller N, Bellis AD, et al. The Abbey pain scale: a 1-minute numerical indicator for people with end-stage dementia. *Int J Palliat Nurs*. 2004;10:6–13.
16. Shannon K, Bucknall T. Pain assessment in critical care: what have we learnt from research. *Intensive Crit Care Nurs*. 2003;19:154–162.
17. Walker SM, Howard RF. Neonatal pain. *Pain Rev*. 2002;9:69–79.
18. Charlton EJ. *Core Curriculum for Professional Education in Pain*. Seattle: IASP Press; 2005:47–54.

19. Watt-Watson J, Stevens B, Garfinkel P, et al. Relationship between nurses' pain knowledge and pain management outcomes for their postoperative cardiac patients. *J Adv Nurs*. 2001;36:535–545.
20. Ameringer S, Serlin RC, Hughes SH, et al. Concerns about pain management among adolescents with cancer: developing the adolescent barriers questionnaire. *J Pediatr Oncol Nurs*. 2006;23:220–232.
21. Calvillo E, Flakerud J. Evaluation of the pain response by Mexican American and Anglo American women and their nurses. *J Adv Nurs*. 1993;18:451–459.
22. Cleeland C, Gonin R, Hatfield A, et al. Pain and its treatment in outpatients with metastatic cancer. *N Engl J Med*. 1994;330:592–596.
23. Ersek M, Kraybill BM, Pen AD. Factors hindering patients' use of medications for cancer pain. *Cancer Pract*. 1999;7:226–232.
24. Craig KD. Credibility assessment. In: Schmidt RF, Willis WD, eds. *Encyclopedia of Pain*. Berlin: Springer; 2007:491–493.
25. Spiers J. Expressing and responding to pain and stoicism in home-care nurse-patient interactions. *Scand J Caring Sci*. 2006;20:293–301.
26. Finnström B, Söderhamn O. Conceptions of pain among Somali women. *J Adv Nurs*. 2006;54:418–425.
27. McCarthy P, Chammas G, Wilimas J, et al. Managing children's cancer pain in Morocco. *J Nurs Scholarsh*. 2004;36:11–15.
28. Abbotts J, Williams R, Ford G, et al. Morbidity and Irish Catholic descent in Britain: relating health disadvantage to behaviour. *Ethn Health*. 1999;4:221–230.
29. Larochette A, Chambers CT, Craig KD. Genuine, suppressed and faked facial expressions of pain in children. *Pain*. 2006;126:64–71.
30. Werner A, Malterud K. It is hard work behaving as a credible patient: encounters between women with chronic pain and their doctors. *Soc Sci Med*. 2003;57:1409–1419.
31. Vukmir RB. Drug seeking behavior. *Am J Drug Alcohol Abuse*. 2004;30:551–575.
32. Mendelson G, Mendelson D. Malingering pain in the medicolegal context. *Clin J Pain*. 2004;20:423–432.
33. Mittenberg W, Patton C, Canyock EM, et al. Base rates of malingering and symptom exaggeration. *J Clin Exp Neuropsychol*. 2002;24:1094–1102.
34. McCaffery M, Grimm MA, Pasero C, et al. On the meaning of "drug seeking." *Pain Manag Nurs*. 2005;6:122–136.
35. Cosmides L, Tooby J. Cognitive adaptations for social exchange. In: Barkow J, Cosmides L, Tooby J, eds. *The Adapted Mind*. New York: Oxford University Press; 1992:163–228.
36. Werner A, Isaksen LW, Malterud K. "I am not the kind of woman who complains of everything": illness stories on self and shame in women with chronic pain. *Soc Sci Med*. 2004;59:1035–1045.
37. Cowley AW, Cowley T, Norton NJ, et al. Foreword. In: Mayer EA, Bushnell MC, eds. *Functional Pain Syndromes: Presentation and Pathophysiology*. Seattle WA: IASP Press; 2009:xiii.
38. Birdwell BG, Herbers JE, Kroenke K. Evaluating chest pain. The patient's presentation style alters the physician's diagnostic approach. *Arch Intern Med*. 1993;153:1991–1995.
39. Craig KD, Hill ML, McMurtry B. Detecting deception and malingering. In: Block AR, Kramer ER, Fernandez E, eds. *Handbook of Chronic Pain Syndromes: Biopsychosocial Perspectives*. Mahwah NJ: Lawrence Erlbaum Associates; 1999:41–58.
40. Donovan J. Learning disability nurses' experiences of being with clients who may be in pain. *J Adv Nurs*. 2002;38:458–466.
41. Odhner M, Wegman D, Freeland N, et al. Assessing pain control in nonverbal critically ill adults. *Dimens Crit Care Nurs*. 2003;22:260–267.
42. Jackson PL, Meltzoff AN, Decety J. How do we perceive the pain of others? A window into the neural processes involved in empathy. *Neuroimage*. 2005;24:771–779.
43. Marquié L, Raufaste E, Lauque D, et al. Pain rating by patients and physicians: evidence of systematic pain miscalibration. *Pain*. 2003;102:289–296.
44. Kim HS, Schwartz-Barcott D, Tracy SM, et al. Strategies of pain assessment used by nurses on surgical units. *Pain Manag Nurs*. 2005;6:3–9.
45. Gelinas C, Fortier M, Viens C, et al. Pain assessment and management in critically ill intubated patients: a retrospective study. *Am J Crit Care*. 2004;13:126–135.
46. Katsma DL, Souza CH. Elderly pain assessment and pain management knowledge of long-term care nurses. *Pain Manag Nurs*. 2000;1:88–95.
47. McCaffery M, Ferrell BR. Nurses' knowledge of pain assessment and management: how much progress have we made? *J Pain Symptom Manage*. 1997;14:175–188.
48. Craig KD, Prkachin KM. Nonverbal measures of pain. In: Melzack R, ed. *Pain Measurement and Assessment*. New York: Raven Press; 1983:173–179.
49. Puntillo K, Neighbor M, Chan GK, et al. The influence of chief complaint on opioid use in the emergency department. *J Opioid Manag*. 2006;2:228–235.
50. McCaffery M, Ferrell BR, Pasero C. Nurses' personal opinions about patients' pain and their effect on recorded assessments and titration of opioid doses. *Pain Manag Nurs*. 2000;1:79–87.
51. Chibnall JT, Tait RC. Disparities in occupational low back injuries: predicting pain-related disability from satisfaction with case management in African Americans and Caucasians. *Pain Med*. 2005;6:39–48.
52. Hadjistavropoulos HD, Ross MA, Von Baeyer CL. Are physicians' ratings of pain affected by patients' physical attractiveness? *Soc Sci Med*. 1990;31:69–72.
53. Tait RC, Chibnall JT. Physician judgments of chronic pain patients. *Soc Sci Med*. 1997;45:1199–1205.
54. Tait RC, Chibnall JT, Andresen EM, et al. Disability determination: validity with occupational low back pain. *J Pain*. 2006;7:951–957.
55. Dalton JA, Carlson J, Mann JD, et al. An examination of nursing attitudes and pain management practices. *Cancer Pract*. 1998;6:115–124.
56. Goubert L, Craig KD, Vervoort T, et al. Facing others in pain: the effects of empathy. *Pain*. 2005;118:285–288.
57. Pillai-Riddell R, Craig KD. Judgments of infant pain: the impact of caregiver identity and infant age. *J Pediatr Psychol*. 2007;32:501–511.
58. Holmqvist R. Staff feelings and patient diagnosis. *Can J Psychiatry*. 2000;45:349–356.
59. Manias E, Bucknall T, Botti M. Nurses' strategies for managing pain in the postoperative setting. *Pain Manag Nurs*. 2005;6:18–29.
60. Tait RC, Chibnall JT, Kalaoukalani D. Provider judgments of patients in pain: seeking symptom certainty. *Pain Med*. 2009;10:11–34.
61. Joint Commission. *Pain Assessment and Management: an Organizational Approach*. Oakbrook Terrace, IL: Joint Commission on Accreditation of Healthcare Organizations; 2000:13.
62. Claassen J. The gold standard: not a golden standard. *BMJ*. 2005;330:1121.
63. Herr K, Coyne PJ, Key T, et al. Pain assessment in the nonverbal patient: position statement with clinical practice recommendations. *Pain Manag Nurs*. 2006;7:44–52.
64. Washington, DC. Department of Veterans Affairs. VHA Directive 2003–21: Pain Management.
65. Frasco PE, Sprung J, Trentman TL. The impact of the joint commission for accreditation of healthcare organizations pain initiative on perioperative opiate consumption and recovery room length of stay. *Anesth Analg*. 2005;100:162–168.

66. Von Baeyer CL. Children's self-reports of pain intensity: scale selection, limitations and interpretation. *Pain Res Manag.* 2006;11:157.
67. Mularski RA, White-Chu F, Overbay D, et al. Measuring pain as the 5th vital sign does not improve quality of pain management. *J Gen Intern Med.* 2006;21:607-612.
68. Taylor S, Voytovich AE, Kozol RA. Has the pendulum swung too far in postoperative pain control? *Am J Surg.* 2003;186:472-475.
69. Vila H Jr, Smith RA, Augustyniak MJ, et al. The efficacy and safety of pain management before and after implementation of hospital-wide pain management standards: is patient safety compromised by treatment based solely on numerical pain ratings? *Anesth Analg.* 2005;101:474-480.
70. Lucas CE, Vlahos AL, Ledgerwood AM, et al. The negative impact of pain as the fifth vital sign. *J Am Coll Surg.* 2007;205:101-107.
71. Craig KD, Korol CT, Pillai RR. Challenges of judging pain in vulnerable infants. *Clin Perinatol.* 2002;29:445-457.
72. International Association for the Study of Pain. Descriptions of chronic pain syndromes and definitions of pain terms. In: Merskey H, Bogduk N, eds. *Classification of Chronic Pain.* Seattle, WA: IASP Press; 1994:210.
73. Melzack R. From the gate to the neuromatrix. *Pain.* 1999;(Suppl 6):S121-S126.
74. Gatchel RJ, Peng YB, Peters ML, et al. The biopsychosocial approach to chronic pain: scientific advances and future directions. *Psychol Bull.* 2007;133:581-624.
75. Melzack R. Phantom limbs, the self and the brain (The D.O. Hebb Memorial Lecture). *Can Psychol.* 1989;30:1-14.
76. Melzack R, Wall PD. Pain mechanisms: a new theory. *Science.* 1965;150:971-979.
77. Melzack R, Katz J. Pain: Psychological Perspectives. In: Hadjistavropoulos T, Craig KD, eds. *The Gate of Control Theory: Reaching for the Brain.* Mahwah, NJ: Lawrence Erlbaum Associates; 2004:13-34.
78. Asmundson GJG, Wright KD. Biopsychosocial approaches to pain. In: Hadjistavropoulos T, Craig KD, eds. *Pain: Psychological Perspectives.* Mahwah, NJ: Lawrence Erlbaum Associates; 2004:35-57.
79. Bates MS. Ethnicity and pain: a biocultural model. *Soc Sci Med.* 1987;24:47-50.
80. Bates MS, Edwards WT, Anderson KO. Ethnocultural influences on variation in chronic pain perception. *Pain.* 1993; 52:101-112.
81. Sullivan MJL. Toward a Biopsychomotor conceptualization of pain: implications for research and intervention. *Clin J Pain.* 2008;24:281-290.
82. Wall PD. *Pain: the Science of Suffering.* London: Weidenfeld and Nicolson; 1999.
83. Craig KD, Korol CT. Developmental issues in understanding, assessing and managing pediatric pain. In: Walco G, Goldschneider K, eds. *Pediatric Pain Management in Primary Care.* Totowa, NJ: The Humana Press Inc; 2008:9-20.
84. Izard CE. *Human emotions.* New York: Plenum; 1977:67-96.
85. Izard CE, Abe JA. Developmental changes in facial expressions of emotions in the strange situation during the second year of life. *Emotion.* 2004;4:251-265.
86. Izard CE, Fantauzzo CA, Castle JM, et al. The ontogeny and significance of infants' facial expressions in the first 9 months of life. *Dev Psychol.* 1995;31:997-1013.
87. Frantsve LM, Kerns RD. Patient-provider interactions in the management of chronic pain: current findings within the context of shared medical decision making. *Pain Med.* 2007;8:25-35.
88. Hadjistavropoulos T, Craig KD. A theoretical framework for understanding self-report and observational measures of pain: a communications model. *Behav Res Ther.* 2002;40: 551-570.
89. Prkachin KM, Craig KD. Expressing pain: the communication and interpretation of facial pain signals. *J Nonverbal Behav.* 1995;19:191-205.
90. Kappesser J, Williams AC. Pain estimation: asking the right questions. *Pain.* 2010;148:184-187.
91. Prkachin KM, Solomon PE, Ross J. Underestimation of pain by health-care providers: towards a model of the process of inferring pain in others. *Can J Nurs Res.* 2007;39:88-106.
92. Nguyen M, Ugarte C, Fuller I, et al. Access to care for chronic pain: racial and ethnic differences. *J Pain.* 2005;6: 301-314.
93. Vallerand AH, Polomano RC. The relationship of gender to pain. *Pain Manag Nurs.* 2000;1(suppl 1):8-15.
94. Ferguson WJ, Candib LM. Culture, language, and the doctor-patient relationship. *Fam Med.* 2002;34:353-361.
95. Eder S, Sloan E, Todd K. Documentation of ED patient pain by nurses and physicians. *Am J Emerg Med.* 2003;21: 253-257.
96. Johnston CC, Bournaki MC, Gagnon AJ, et al. Self-reported pain intensity and associated distress in children aged 4-18 years on admission, discharge, and one-week follow up to emergency department. *Pediatr Emerg Care.* 2005;21:342-346.
97. Rupp T, Delaney K. Inadequate analgesia in emergency medicine. *Ann Emerg Med.* 2004;43:494-503.
98. Twycross A. Educating nurses about pain management: the way forward. *J Clin Nurs.* 2002;11:705-714.
99. Von Baeyer CL, Johnson ME, McMillan MJ. Consequences of nonverbal expression of pain: patient distress and observer concern. *Soc Sci Med.* 1984;19:1319-1324.
100. Xavier Balda R, Guinsburg R, de Almeida MF, et al. The recognition of facial expression of pain in full-term newborns by parents and health professionals. *Arch Pediatr Adolesc Med.* 2000;154:1009-1016.
101. Danziger N, Prkachin KM, Willer JC. Is pain the price of empathy? The perception of others' pain in patients with congenital insensitivity to pain. *Brain.* 2006;129: 2494-2507.
102. Campbell-Yeo M, Latimer M, Johnston C. The empathetic response in nurses who treat pain: concept analysis. *J Adv Nurs.* 2008;61:711-719.
103. Simon D, Craig KD, Miltner WHR, et al. Brain responses to dynamic facial expressions of pain. *Pain.* 2006;126: 309-318.
104. Valeriani M, Betti V, Le Pera D, et al. Seeing the pain of others while being in pain: a laser-evoked potentials study. *Neuroimage.* 2008;40:1419-1428.
105. Craig KD, Versloot J, Goubert L, et al. Perceiving pain in others: automatic and controlled mechanisms. *J Pain.* 2010; 11:101-108.
106. Grunau RE, Holsti L, Peters JW. Long-term consequences of pain in human neonates. *Semin Fetal Neonatal Med.* 2006;11: 268-275.
107. Mader T, Blank F, Smithline H, et al. How reliable are pain scores? A pilot study of 20 healthy volunteers. *J Emerg Nurs.* 2003;29:322-325.
108. Apkarian AV, Bushnell MC, Treede R, et al. Human brain mechanisms of pain perception and regulation in health and disease. *Eur J Pain.* 2005;9:463-484.
109. Tait RC. The social context of pain management. *Pain Med.* 2007;8:1-2.
110. Glucklich A. *Sacred Pain: Hurting the Body for the Sake of the Soul.* New York: Oxford University Press; 2001.