Review Article

Challenges in pain assessment: Pain intensity scales

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ABSTRACT

Pain assessment remains a challenge to medical professionals and received much attention over the past decade. Effective management of pain remains an important indicator of the quality of care provided to patients. Pain scales are useful for clinically assessing how intensely patients are feeling pain and for monitoring the effectiveness of treatments at different points in time. A number of questionnaires have been developed to assess chronic pain. They are mainly used as research tools to assess the effect of a treatment in a clinical trial but may be used in specialist pain clinics. This review comprises the basic information of pain intensity scales and questionnaires. Various pain assessment tools are summarized. Pain assessment and management protocols are also highlighted.

Key words: Pain assessment, pain intensity scales, pain assessment tools, pain assessment and management protocols, questionnaires

Introduction

French philosopher Simone Weil noted that "Pain is the root of knowledge." In 1982, singer John Mellencamp proudly sang that it "Hurts so good." Everywhere, professional and weekend warriors grunt the words, "No pain, no gain," as they squeeze out one more push-up. In reality, however, there is nothing smart, good, or macho about pain especially chronic pain, from which an estimated 50 million Americans suffer every day. A recent report by market research firm Decision Resources, "Novel Approaches to Pain" indicates that the overall drug market for pain will reach more than $47 billion in 2023 in the US, France, Germany, Italy, Spain, the UK, and Japan. By that same year, novel drug classes will claim more than one-fifth of total market share.[1]

A pain scale measures a patient's pain intensity or other features. Pain scales are based on self-report, observational (behavioral), or physiological data [Table 1]. Self-report is considered primary and should be obtained if possible. Pain scales are available for neonates, infants, children, adolescents, adults, seniors, and persons whose communication is impaired. Pain scores are sometimes regarded as "the Fifth Vital Sign."[2]

Pain measurement scales

- Wong — Baker Faces Pain Rating Scale.[3]
- Visual analog scale (VAS).[4]
- McGill Pain Questionnaire (MPQ).[5]
- Descriptor differential scale (DDS).[6]
- Faces Pain Scale-Revised (FPS-R).[7]
- Numerical 11-point box scale (BS-11).[8]
- Numeric Rating Scale (NRS-11).[9]
- Dolorimeter Pain Index (DPI).[10]
- Brief Pain Inventory (BPI).[11]
- Walid — Robinson Pain Index (WRI) — computed as intensity on admission (0-10) × length (in months).[12]

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Specialized Tests

- Pediatric Pain Questionnaire (PPQ)[13] for measuring pain in children.
- Premature Infant Pain Profile (PIPP)[14] for measuring pain in premature infants.
- Schmidt Sting Pain Index[15] and Starr sting pain scale[16] both for insect stings.
- Colorado Behavioral Numerical Pain Scale (for sedated patients).[17]
- Pain Impact Questionnaire (PIQ-6).[18]

Wong — Baker Faces Pain Rating Scale

Wong — Baker Faces Pain Rating Scale is shown in Figure 1.

Indications

Adults and children (>3-years old) in all patient care settings.

Instructions

1. Explain to the patient that each face is for a person who feels happy because he has no pain (hurt or, whatever word the patient uses) or feels sad because he has some or a lot of pain.
2. Point to the appropriate face and state, "This face is..."
   0-1: "very happy because he doesn't hurt at all."
   2-3: "hurts just a little bit."
   4-5: "hurts a little more."
   6-7: "hurts even more."
   8-9: "hurts a whole lot."
   10: "hurts as much as you can imagine, although you don't have to be crying to feel this bad."
3. Ask the patient to choose the face that best describes how he feels. Be specific about the pain location and at what time pain occurred (now or earlier during a procedure?).
4. The interdisciplinary team in collaboration with the patient/family (if appropriate) can determine appropriate interventions in response to Faces Pain Ratings.

Table 1: Examples of pain scales

	Self-report	Observational	Physiological
Infant	–	PIPP; Neonatal/Infant pain scale	–
Child	FPS-R;[2] Wong – Baker faces pain rating scale; Colored analog scale[3]	FLACC scale; CHEOPS[4]	COMFORT
Adult	NRS-11, NRS-101; VAS; BPI	–	–

PIPP: Premature infant pain profile, FPS-R: Faces pain scale-revised, NRS: Numerical rating scale, VAS: Visual analog scale, BPI: Brief pain inventory, FLACC: Face Legs arms cry consolability, CHEOPS: Children's hospital of eastern ontario pain scale

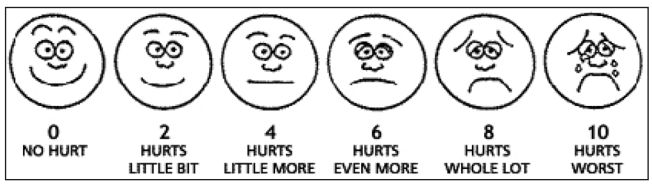

Figure 1: Wong — Baker faces pain rating scale

Visual Analog Scale

The VAS [Figure 2] has been widely used for this purpose in rheumatology and is considered to be a robust, sensitive, and reproducible method of expressing pain severity. In addition, it takes relatively little time to complete and allows cross cultural comparisons due to minimal language translation difficulties. A common assumption made when using the VAS is that it provides a linear measure of pain.

The VAS provides a continuous scale for subjective magnitude estimation and consists of a straight line, the limits of which carry a verbal description of each extreme of the symptom to be evaluated. The line is usually 10-cm long and vertical, though different lengths and orientations have been used and proven satisfactory. Inaccuracies resulting from poor reproduction during mass photocopying have been noted. The VAS is often used to evaluate the analgesic properties of various treatments and accomplishes this by measuring either pain relief or pain severity. The simultaneous measurement of both has been suggested but is rarely observed.

The extreme limits of this "comparative" scale are defined in terms of pain relief, with "complete relief" entered at the lower end and "no relief" at the upper end. Following treatment, patients are required to place a mark on the line between the two extremes indicating their degree of pain relief. Pain relief scores are calculated by taking either the distance between the mark and the upper end of the scale or placing a linear graduated scale, usually divided into 20 equal parts numbered consecutively from 1-20, alongside the visual analog pain relief scale (VAPRS) and recording the pain relief

Figure 2: Visual analog scale

score as the number corresponding to the patients mark. The VAPRS is considered to have two main advantages. First, the magnitude of the response does not depend on the initial pain severity as all patients start from the same baseline, and second, there is no need to assume that the scale is linear. However, the disadvantages of this scale far outweigh its advantages. In measuring pain relief, the scale does not afford patients the opportunity to record an increase in pain, thereby creating a bias in favor of the treatment. The pain relief scale gives the false impression that all patients begin treatment with similar degrees of pain severity and masks real differences between patients. Recording the initial pain severity is important so that comparisons between patients may be made. In addition, the reliability of this scale is low owing to the patients' need to recall their initial pain severity before giving an estimate of their pain relief.

McGill Pain Questionnaire

The MPQ, also known as McGill pain index, can be used to evaluate a person experiencing significant pain. It can be used to monitor the pain over time and to determine the effectiveness of any intervention. It was developed at by Dr. Melzack and Torgerson in 1971 at McGill University in Montreal, Canada.

This questionnaire has the following three sections:

1. What does your pain feel like?
2. How does your pain change with time?
3. How strong is your pain?

The interpretation of questionnaire is as follows:

- Minimum pain score: O (would not be seen in a person with true pain)
- Maximum pain score: 78
- The higher the pain score the greater the pain.

To use the questionnaire, circle the words that describe your pain but do not circle more than one word in a group. Then when you have that done, go back and circle the three words in groups 1-10 that most convey your pain response. Pick the two words in groups 11-15 that do the same thing. Then pick one word in group 16. Finally, pick one word in groups 17-20. At the end, you should have seven words that you can take to your doctor that will help describe both the quality of your pain and the intensity of it.

The MPQ consists primarily of three major classes of word descriptors — sensory, affective, and evaluative — that are used by patients to specify subjective pain experience. It also contains an intensity scale and other items to determine the properties of pain experience. The questionnaire was designed to provide quantitative measures of clinical pain that can be treated statistically. This paper describes the procedures for administration of the questionnaire and the various measures that can be derived from it. The three major measures are as follows:

1. The pain rating index, based on two types of numerical values that can be assigned to each word descriptor,
2. The number of words chosen, and
3. The present pain intensity based on a 1-5 intensity scale.

Correlation coefficients among these measures, based on data obtained with 297 patients suffering several kinds of pain, are presented. In addition, an experimental study that used the questionnaire is analyzed to describe the nature of the information that is obtained. The data, taken together, indicate that the MPQ provides quantitative information that can be treated statistically and is sufficiently sensitive to detect differences among different methods to relieve pain.

Descriptor Differential Scale

The DDS applies psychophysical principles to clinical pain assessment. It contains 12 descriptor items for each pain dimension assessed. For each item, subjects indicate if their pain either is equal in magnitude to that implied by the anchoring descriptor or how much greater or lesser on a 10-point graphic scale. The method permits collection of multiple responses, reducing scaling error, and assessing both pain magnitude and scaling consistency. Ninety-one patients completed the sensory intensity and unpleasantness forms of the DDS at both 1 and 2 h after surgical extraction of a lower third molar. Results show that the DDS satisfies standard psychometric criteria for reliability, objectivity, and item homogeneity. The coefficients found satisfy standard psychometric criteria and improve after elimination of inconsistent profiles.

DDS of pain intensity is a recent methodology designed for assessing pain reports in clinical samples. Experiment 1 evaluated the sensitivity of the measure to small changes in electrocutaneous stimulation relative to a traditional VAS of pain intensity. Additionally, direct psychophysical scaling methods were used to determine ratio-scale values for the DDS sensory items in relation to the electrocutaneous stimuli. This ratio scale was cross-validated by comparison with previously published ratio-scaled data from cross-modality matching pain intensity judgment studies. Experiment 2 evaluated the performance of the measure in both experimental and clinical pain samples, as well as the similarity of item-response patterns in each of these samples. Results indicate that the DDS of pain intensity is sensitive to small changes in electrocutaneous stimulation, has consistent ratio-scale properties across two different psychophysical methods, and demonstrates similar

item-response patterns across divergent experimental and clinical samples. The results support the validity of the sensory DDS as a measure of pain intensity.

Faces Pain Scale — Revised

The FPS-R was adapted from the FPS to make it possible to score on the widely accepted 0-to-10 metric. It shows a close linear relationship with visual analog pain scales across the age range 4 through 16 years. It is easy to administer and requires no equipment except for the photocopied faces. The absence of smiles and tears in this faces scale may be advantageous. The FPS-R is recommended for use with younger children in parallel with numerical self-rating scales (0-to-10) for older children and behavioral observation scales for those unable to provide self-report.

These faces show how much something can hurt. This face [point to left-most face] shows no pain. The faces show more and more pain [point to each from left to right] up to this one [point to right-most face] — it shows very much pain. Point to the face that shows how much you hurt [right now].

Score the chosen face 0, 2, 4, 6, 8, or 10, counting left to right, so '0' = 'no pain' and '10' = 'very much pain' [Figure 3]. Do not use words like 'happy' and 'sad'. This scale is intended to measure how children feel inside, not how their face looks.[20]

Hicks *et al*., carried out three studies to revise the original scale and validate the adapted version. In the first phase, the FPS was revised from its original seven faces to six, while maintaining its desirable psychometric properties, to make it compatible in scoring with other self-rating and observational scales that use a common metric (0-5 or 0-10). Using a computer-animated version of the FPS, psychophysical methods were applied to identify four faces representing equal intervals between the scale values representing least pain and most pain. In the second phase, children used the new six-face FPS-R to rate the intensity of pain from ear piercing. Its validity is supported by a strong positive correlation (r = 0.93, *N* = 76) with a VAS measure in children aged 5-12 years. In the third phase, a clinical sample of pediatric inpatients aged 4-12 years used the FPS-R and a VAS or the colored analog scale (CAS) to rate pain during hospitalization for surgical and nonsurgical painful conditions. The validity of the FPS-R was further supported by strong positive correlations with the VAS (r = 0.92, *N* = 45) and the CAS (r = 0.84, *N* = 45) in this clinical sample. Most children in all age groups including the youngest were able to use the FPS-R in a manner that was consistent with the other measures. There were no significant differences between the means on the FPS-R and either of the analog scales. The FPS-R is shown to be appropriate for use in assessment of the intensity of children's acute pain from age 4 or 5 onward. It has the advantage of being suitable for use with the most widely used metric for scoring (0-10) and conforms closely to a linear interval scale.

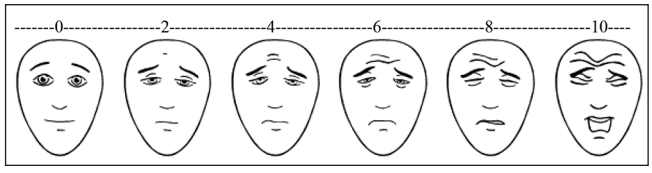

Figure 3: Faces pain scale — revised

Numerical 11 Point Box

If a zero (0) means no pain and ten (10) means pain as bad as it could be, on this scale 0-10, what is your level of pain? Put an X through that number [Figure 4].

Advantages of this scale are easy to remember and can be administered in verbal or written format. The disadvantages require some abstract thinking and only show the changes by increasing or decreasing without telling the extent of the meaningfulness of the score change. It is because there are infinite points between each numeral.

Scientists carried out a study comprising 69 postoperative patients, who indicated the severity of their pain using eight measures designed to assess pain intensity and two designed to measure pain effect. The utility and validity of the 10 measures were evaluated according to two criteria:

a. The magnitude of the relationship between each scale and a linear combination of the pain measures and
b. relative rates of incorrect responding.

The results indicate that each of the measures of pain intensity is adequately valid. In addition, this sample of patients failed to differentiate pain intensity and pain effect using the present measures, suggesting the need for additional research to explore the validity of the effective measures used in the study. The BS-11 of pain intensity demonstrated the strongest relationship to a linear combination of all of the measures used and was responded to correctly by each subject in the sample. All else being equal, these results suggest that the BS-11 scale

0	1	2	3	4	5	6	7	8	9	10

Figure 4: Numerical 11-point box

may be the most useful clinical index of pain intensity among postoperative patients.

Pain intensity is frequently measured on an 11-point pain intensity NRS (PI-NRS), where 0 = no pain and 10 = worst possible pain. However, it is difficult to interpret the clinical importance of changes from baseline on this scale (such as a one- or two-point change). To date, there are no data-driven estimates for clinically important differences in pain intensity scales used for chronic pain studies. We have estimated a clinically important difference on this scale by relating it to global assessments of change in multiple studies of chronic pain. Data on 2724 subjects from 10 recently completed placebo-controlled clinical trials of pregabalin in diabetic neuropathy, postherpetic neuralgia, chronic low back pain, fibromyalgia, and osteoarthritis were used. The studies had similar designs and measurement instruments, including the PI-NRS, collected in a daily diary, and the standard seven-point patient global impression of change (PGIC), collected at the endpoint. The changes in the PI-NRS from baseline to the endpoint were compared with the PGIC for each subject. Categories of "much improved" and "very much improved" were used as determinants of a clinically important difference and the relationship to the PI-NRS was explored using graphs, box plots, and sensitivity/specificity analyses. A consistent relationship between the change in PI-NRS and the PGIC was demonstrated regardless of study, disease type, age, sex, study result, or treatment group. On average, a reduction of approximately two points or a reduction of approximately 30% in the PI-NRS represented a clinically important difference. The relationship between percent change and the PGIC was also consistent regardless of baseline pain, whereas higher baseline scores required larger raw changes to represent a clinically important difference. The application of these results to future studies may provide a standard definition of clinically important improvement in clinical trials of chronic pain therapies. Use of a standard outcome across chronic pain studies would greatly enhance the comparability, validity, and clinical applicability of these studies.

Numeric Rating Scale (NRS-11)

The NRS-11 has been widely used clinically for the assessment of pain [Figure 5]. Its use for clinical research is controversial. Reports differ as to whether or not the NRS-11 should be treated as a ratio pain measurement tool. This study compared the NRS-11 with a ratio measure for pain assessment: the VAS. Simultaneous pain measurements using these two scales were compared in clinical situations commonly encountered in a tertiary community hospital. Whereas linear relationships were noted in laboring patients and in postoperative patients with thoracic or abdominal incisions during cough, no such correlations were noted for the same postoperative patients at rest or for postoperative orthopedic patients. The NRS-11 should not be considered to be interchangeable with the VAS. Its use for clinical research should be limited to situations where it has specifically demonstrated linear properties.

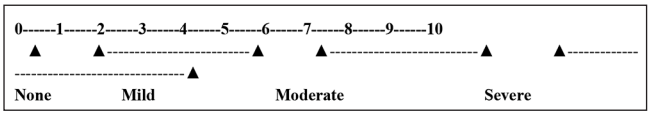

Figure 5: Numeric rating scale

Indications

Adults and children (>9-years old) in all patient care settings who are able to use numbers to rate the intensity of their pain.

Instructions

1. The patient is asked any one of the following questions:
   - What number would you give your pain right now?
   - What number on a 0–10 scale would you give your pain when it is the worst that it gets and when it is the best that it gets?
   - At what number is the pain at an acceptable level for you?
2. When the explanation suggested in #1 above is not sufficient for the patient, it is sometimes helpful to further explain or conceptualize the NRS in the following manner:
   - 0 = No pain
   - 1-3 = Mild pain (nagging, annoying, interfering little with activities of daily learning (ADLs))
   - 4-6 = Moderate pain (interferes significantly with ADLs)
   - 7-10 = Severe pain (disabling; unable to perform ADLs)
3. The interdisciplinary team in collaboration with the patient/family (if appropriate) can determine appropriate interventions in response to Numeric Pain Ratings.

This scale, the NRS, is administered by asking patients to say a number, usually from 0-10, to express the intensity of their pain. Compared with well-known published scales such as the FPS-R, Wong — Baker Faces Pain Rating Scale, Oucher, Colored Analog Scale, and Pieces of Hurt, the NRS has the great advantage of requiring only a verbal interaction between the clinician and child, without the necessity for paper or plastic materials that can

raise concerns about purchase, storage, distribution, and infection control. The NRS is well established with adults. However, few studies before 2009 have reported using the NRS with children and adolescents or have provided data supporting the use of this scale.

The NRS, like all self-report pain scales, has limitations. Scores are subject to many social, cognitive, and contextual influences. In particular, the user should remember that scores are meaningful within patients over time and not necessarily across patients. A child who scores 10/10 may not have more severe pain than a child who scores 6/10 because the two children may understand the scale or its anchors differently. However, a change over time in either child's scores will often be meaningful. Pending further research on instructions, anchors, age range, and screening concludes that the NRS has major practical advantages in terms of not requiring any physical materials and in terms of widespread acceptance in clinical practice.

Dolorimeter Pain Index (DPI)

A dolorimeter is an instrument used to measure pain tolerance. Dolorimetry has been defined as "the measurement of pain sensitivity or pain intensity." There are several kinds of dolorimeter that have been developed. Dolorimeters apply steady pressure, heat, or electrical stimulation to some area or move a joint or other body part and determine what level of heat, pressure, electric current, or amount of movement produces a sensation of pain. Sometimes the pressure is applied using a blunt object, or by locally increasing the air pressure on some area of the body, and sometimes by pressing a sharp instrument against the body.

A dolorimeter known as the Sonic Palpometer was developed at the University of Victoria in British Columbia, Canada. Patents have been applied for it worldwide. The Sonic Palpometer uses ultrasound and computer technology to automate the physician's technique of palpation to determine sensitivity of some part of the patient's body. The related pressure-controlled palpometer (PCP) uses a pressure-sensitive piece of plastic film to determine how much pressure is being applied in palpation. This technique appears to be more reliable than unaided palpation. A laser-based dolorimeter called a Dolorimeter Analgesia meter is marketed by IITC Life Sciences. Another pain measurement device uses heat from a 500-watt lamp that is delivered to a small area of skin. Other dolorimeters include Baseline Algorimeter from the Kom Kare Company, Björnström's algesimeter measures sensitivity of the skin to pain, Boas' algesimeter measures sensitivity over the epigastrium. Other terms for similar instruments include algesiometer, algesichronometer, analgesia meter, algometer, algonometer, prick algesimeter, and pressure algometer.

A simple pressure dolorimeter for the detection and quantification of joint tenderness was developed. The pressure dolorimeter was more sensitive than a modified Ritchie Index in measuring degree of joint tenderness and as sensitive in detecting tender joints. The interobserver error of the pressure dolorimeter was low, and in a drug withdrawal study, the pressure dolorimeter was able to detect change in joint tenderness, whereas the conventional Ritchie Index was not. These results suggest that the pressure dolorimeter is a simple, reliable, and sensitive instrument for measuring joint tenderness in patients with inflammatory joint disease. It is also inexpensive and readily available.

Brief Pain Inventory (BPI)

The BPI was modeled after the MPQ. The BPI is a 17-item patient self-rating scale assessing demographic data, use of medications, and sensory and reactive components of pain. The BPI includes items that will address components of sensory pain including severity, location, chronicity, and degree of relief due to therapy. The BPI also has items that address reactive pain components including depression, suffering, and perceived availability of relief. Respectable reliability has been demonstrated over short intervals using test-retest item correlation; worst pain, r = 0.93; usual pain, r = 0.78; and pain now, r = 0.59.

Evidence of validity of the BPI comes from several sources. The relationship between use of pain medications and overall pain ratings was examined. The percentage of patients taking pain medications increased with high pain ratings. Significance was demonstrated between increased medication use and high pain ratings for both narcotic ($x = 28.17$, df = 3, $P < 0.002$) and nonnarcotic ($x = 23.75$, df = 3, $P < 0.002$) pain relievers. Validity of the BPI was also supported by the moderate correlation between worst pain intensity ratings and ratings of interference with six areas of activity and mood (r = 0.245-0.478; $P < 0.02$ for all, but social relationships had $P < 0.05$). Finally, there is a logical pattern in the differences in intercorrelations among various pain and activity interference measures for different diseases.

The BPI has demonstrated respectable test-retest item correlations (reliability), at least over short intervals. Evidence for the validity of the BPI comes from several studies using the instrument with cancer patients and patients with other diseases who had pain. Expected differences in

pain severity were found between groups of patients with pain who differed in the presence or absence of metastases. Ratings of pain interference with various activities increased as ratings of pain severity were higher. The proportion of patients receiving opioid analgesics increased with increased severity rating. Finally, the correlations among the items differed in a logical way from one disease to another, suggesting that the BPI is sensitive to differences in pain characteristics associated with different diseases.

The BPI uses 0-10 NRSs for item rating because of its simplicity and lack of ambiguity, and seemed the best to be used for crosslinguistic pain measurement. Because pain can be variable over a day, the BPI asks patients to rate their pain at the time of responding to the questionnaire (pain now), and also at its worst, least, and average over the previous week. The ratings can also be made for the last 24 h. The design of the study will dictate the most appropriate period to rate. The pain worst rating can be chosen to be the primary response variable, with the other items serving as a check on variability, or, alternatively, these ratings can be combined to give a composite index of pain severity. Although it is necessary to limit the dimensions of assessment, it is critical to estimate the degree to which pain limits patient function. Interference of function can be thought of as a reactive dimension. An effective intervention for pain control should demonstrate its effectiveness on more than a reduction in pain intensity alone. Again, using numeric 0-10 scales, with 0 being "no interference" and 10 being "interferes completely," the BPI asks for ratings of the degree to which pain interferes with mood, walking, and other physical activity, work, social activity, relations with others, and sleep. The mean of these scores can be used as a pain interference score.

Walid-Robinson Pain Index (WRI)

The prevalence of opioid dependence (OD) in spine surgery patients and its correlation with length of stay (LOS) was shown as the most important determinant of hospital cost. The study took place at Georgia Neurosurgical Institute and the Medical Center of Central Georgia between March 2006 and January 2007. A prospective convenience sample of 150 spine surgery patients (48 lumbar diskectomy, 60 cervical decompression and fusion, and 42 lumbar decompression and fusion [LDF]) was assembled. Patients were interviewed before surgery using a questionnaire designed in accordance with the World Health Organization and DSM-IV-TR criteria for the diagnosis of OD. The prevalence of OD was calculated based on questionnaire results. Pain intensity was quantified during admission using a 0-to-10 pain scale. They used pain intensity multiplied by duration of pain in months (WR index) as a new parameter. Lengths of stay were collected following patients' discharge from hospital. Pearson correlation and regression analysis were performed using Statistical Package for the Social Sciences (SPSS) software. The results showed that 30 (20.00%) patients were opioid dependent. The prevalence was highest among LDF patients (23.81%), females (22.78%), and, to a lesser degree, Caucasians (20.87%). There was no correlation between OD and age ($r = 0.08$, $P > 0.1$) or between OD and LOS ($r = 0.09$, $P > 0.1$). This study proved a significant positive correlation between OD and pain intensity ($r = 0.24$, $P < 0.01$) and between OD and the WR index ($r = 0.30$, $P < 0.01$). On the other hand, there was a significant positive correlation between LOS and age ($r = 0.42$, $P < 0.01$), between LOS and the number of previous spine surgeries ($r = 0.28$, $P < 0.01$), and between LOS and duration of pain ($r = 0.18$, $P < 0.05$). Regression analysis showed that age, ethnicity, and type of surgery were the main determinants of LOS. They concluded that chronic pain and prolonged use of opioids raise the prevalence of OD in spine surgery patients to 20%. The lack of effect of OD on LOS after surgical intervention means that efforts to decrease LOS by trying to satisfy patients' craving for opioids will not be fruitful. Older African — American LDF patients with a lengthy history of pain and multiple spine surgeries in the past are the most likely to stay longer in hospital.

COMFORT Scale

COMFORT Scale is described in Table 2.

Indications

Infants, children, and adults in a critical care or operative setting who are unable to use the NRS or the Wong–Baker Faces Pain Rating Scale.

Instructions

1. Each of the nine categories is scored from 1-5, which results in a total score between 9 and 45.
   - Alertness
   - Calmness
   - Respiratory distress
   - Crying
   - Physical movement
   - Muscle tone
   - Facial tension
   - Blood pressure baseline
   - Heart rate baseline
2. The interdisciplinary team in collaboration with the patient/family (if appropriate) can determine appropriate interventions in response to COMFORT Scale scores.

Table 2: COMFORT scale

	Date/Time
Alertness	1-Deeply asleep
	2-Lightly asleep
	3-Drowsy
	4-Fully awake and alert
	5-Hyperalert
Calmness	1-Calm
	2-Slightly anxious
	3-Anxious
	4-Very anxious
	5-Panicky
Respiratory distress	1-No coughing and no spontaneous respiration
	2-Spontaneous respiration with little or no response to ventilation
	3-Occasional cough or resistance to ventilation
	4-Actively breathes against ventilator or coughs regularly
	5-Fights ventilator; Coughing, or choking
Crying	1-Quiet breathing, no crying
	2-Sobbing or gasping
	3-Moaning
	4-Crying
	5-Screaming
Physical movement	1-No movement
	2-Occasional, slight movement
	3-Frequent, slight movements
	4-Vigorous movement
	5-Vigorous movements including torso and head
Muscle tone	1-Muscles totally relaxed, no muscle tone
	2-Reduced muscle tone
	3-Normal muscle tone
	4-Increased muscle tone and flexion of fingers and toes
	5-Extreme muscle rigidity and flexion of fingers and toes
Facial tension	1-Facial muscles totally relaxed
	2-Facial muscle tone normal, no facial muscle tension evident
	3-Tension evident in some facial muscles
	4-Tension evident throughout facial muscles
	5-Facial muscles contorted and grimacing
Blood pressure (Map) Baseline	1-Blood pressure below baseline observation)
	2-Blood pressure consistently at baseline
	3-Infrequent elevations of 15% or more above baseline (1-3 during 2 min
	4-Frequent elevations of 15% or more above baseline (>3 during 2 min observation)
	5-Sustained elevations of 15% or more
Heart rate Baseline	1-Heart rate below baseline
	2-Heart rate consistently at baseline
	3-Infrequent elevations of 15% or more above baseline (1-3 during 2 min observation)
	4-Frequent elevations of 15% or more above baseline (>3 during 2 min observation)
	5-Sustained elevations of 15% or more
	Total score

Checklist of Nonverbal Indicators (CNVI)

CNVI is discussed in Table 3.

Indications

Behavioral health adults who are unable to validate the presence of or quantify the severity of pain using either the NRS or the Wong–Baker Faces Pain Rating Scale.

Instructions

1. Write a 0 if the behavior was not observed
2. Write a 1 if the behavior was observed even briefly during activity or rest
3. Results in a total score between 0 and 5.
4. The interdisciplinary team in collaboration with the patient (if appropriate) can determine appropriate interventions in response to CNVI scores.[19]

CRIES Pain Scale

CRIES Pain Scale is described in Table 4.[20]

Use baseline preoperative parameters from a non-stressed period. Multiply baseline HR by 0.2, then add to baseline HR to determine the HR that is 20% over baseline. Do the same for BP and use the mean BP.

Indications

For neonates (0-6 months)

Instructions

Each of the five categories is scored from 0-2, which results in a total score between 0 and 10. The interdisciplinary team in collaboration with the patient/family (if appropriate)

Table 3: Checklist of nonverbal indicators

Nonverbal indicators	With movement	At rest
Vocal complaints–nonverbal expression of pain demonstrated by moans, groans, grunts, cries, gasps, and sighs		
Facial grimaces and winces–furrowed brow, narrowed eyes, tightened lips, dropped jaw, clenched teeth, and distorted expression		
Bracing–clutching or holding onto siderails, bed, tray table, or affected area during movement		
Restlessness–constant or intermittent shifting of position, rocking, intermittent or constant hand motions, and inability to keep still		
Rubbing–massaging affected area		
Vocal complaints–verbal expression of pain using words, e.g. “ouch” or “that hurts,” cursing during movement, or exclamations of protest, e.g. “stop” or “that’s enough”		
Total score		

can determine appropriate interventions in response to CRIES Scale scores.

Face Legs Arms Cry Consolability (FLACC) Scale

FLACC Scale is discussed in Table 5.

Indications

Infants and children (2 months to 7 years) unable to validate the presence of or quantify the severity of pain.

Instructions

1. Each of the five categories is scored from 0-2, which results in a total score between 0 and 10.
- (F) Faces
- (L) Legs
- Activity
- Cry
- Consolability

2. The interdisciplinary team in collaboration with the patient/family (if appropriate) can determine appropriate interventions in response to FLACC Scale scores.[21]

Other Pain Intensity Scales for Measurements of Pain

- 10 and 21 point scales
- Verbal Rating Scale (VRS)
- Simple Descriptive Pain Scale (SDS)
- Eland Scale
- Modified Eland Scale
- Mankowski Pain Scale (SKIP)
- Cube Test
- Disease-Specific Pain Scale (DSPI)

Conclusion

As pain is a subjective experience, its objective measurement is difficult. It is, however, essential to determine pain intensity, quality, and duration to determine the most effective analgesic drug and appropriate dose to control it and/or to evaluate the relative effectiveness of different analgesic therapies. As pain is a subjective experience, the patient's self-assessment provides the most valid measure.

An exact and reliable measurement of pain would enable drug efficacy and patient progress to be accurately assessed. Pain assessment today is lacking in sophistication and accuracy. The challenge is that pain is subjective. What one patient might categorize as severe pain might not be severe to another patient. "Pain is not something that is easily diagnosable or documented by magnetic resonance imaging (MRI) scans or imaging studies. We have to look at pain in a more subjective way and trace each patient longitudinally along the course of various treatments." In the past several years, there has been growing recognition on the part of healthcare providers, government regulators, and the public

Table 4: CRIES pain scale

Date/time
Crying—characteristic cry of pain is high pitched
0 - No cry or cry that is not high pitched
1 - Cry high pitched, but baby is easily consolable
2 - Cry high pitched, but baby is inconsolable
Requires O_2 for SaO_2 <95%—babies experiencing pain manifest with decreased oxygenation. Consider other causes of hypoxemia, e.g. oversedation, atelectasis, and pneumothorax
0 - No oxygen required
1 - <30% oxygen required
2 - >30% oxygen required
Increased vital signs (BP and HR)—take BP last, as this may awaken child making other assessments difficult
0 - Both HR and BP unchanged or less than baseline
1 - HR or BP increased but increase in <20% of baseline
2 - HR or BP is increased >20% over baseline
Expression—the facial expression most often associated with pain is a grimace. A grimace may be characterized by brow lowering, eyes squeezed shut, deepening nasolabial furrow, or open lips and mouth
0 - No grimace present
1 - Grimace alone is present
2 - Grimace and non-cry vocalization grunt is present
Sleepless—scored based on the infant's state during the hour preceding this recorded score
0 - Child has been continuously asleep
1 - Child has awakened at frequent intervals
2 - Child has been awake constantly
Total score

Table 5: Face legs arms cry consolability scale

Date/time
Face
0 - No particular expression or smile
1 - Occasional grimace or frown, withdrawn, disinterested
2 - Frequent to constant quivering chin, clenched jaw
Legs
0 - Normal position or relaxed
1 - Uneasy, restless, tense
2 - Kicking, or legs drawn up
Activity
0 - Lying quietly, normal position, moves easily
1 - Squirming, shifting back and forth, tense
2 - Arched, rigid, or jerking
Cry
0 - No cry (awake or asleep)
1 - Moans or whimpers, occasional complaint
2 - Crying steadily, screams or sobs, frequent complaints
Consolability
0 - Content, relaxed
1 - Reassured by occasional touching, hugging, or being talked to, distractible
2 - Difficult to console or comfort
Total score

that the undertreatment of pain is a major societal problem. Pain of all types is undertreated in our society."

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