Numeric Pain Rating Scale (NPRS)
Purpose
The Numeric Pain Rating Scale (NPRS) measures the subjective intensity of pain.

Description
- The NPRS is an eleven-point scale from 0 to 10.
  - “0” = no pain
  - “10” = the most intense pain imaginable
- Patients verbally select a value that’s most in line with the intensity of pain that they’ve experienced in the last twenty-four hours.
- A written form is also frequently used with the numeric values of 0 to 10, written out.
- The NPRS has good sensitivity while producing data that can be statistically analyzed (Williamson & Hoggar, 2005)

Area of Assessment
Pain

Body Part
Not applicable

Domain
Sensory

Assessment Type
Patient reported outcome

Length of Test
Five minutes or less

Time to Administer
Less than three minutes

Number of Items
One
Equipment Necessary
None necessary

Training Required
None necessary

Type of Training Required
No training

Cost
Free

Actual Cost
None

Age Range
Adult: 18-64 years; Elderly adult: 65+

Administration Mode
Paper/pencil

Diagnosis
Pain

Populations Tested
- Chronic pain
- Acute pain
- Older adults (Geriatric)
- Postsurgical pain (e.g., superficial incisions to complex intra-abdominal and musculoskeletal operations)
- Oncology
- Pain of the neck, back, upper extremity or lower extremity
- Complex regional pain syndrome (CPRS)
- Rheumatoid arthritis
Standard Error of Measurement (SEM)

**Lower Back Pain:** (Childs et al, 2005; \(n = 131\); mean age = 33.9 (11) years; patients receiving physical therapy; 87% with symptoms for under six weeks)

- \(\text{SEM} = 1.02\)

Minimal Detectable Change (MDC)

**Neck/Upper Extremity/Lower Extremity:** (Stratford & Spadoni, 2001; \(n = 124\), subgroups by pain location; neck (\(n = 25\)), back (\(n = 27\)), upper extremity (\(n = 42\)), lower extremity (\(n = 29\)); patients assessed on two occasions within seven days)

- Raw changes of three points or 27% (percent of raw in total = 3 points/11 points) is required for meaningful change

**Lower Back Pain:** (Childs et al, 2005)

- 2 points based on a 95% confidence interval

Minimally Clinically Important Difference (MCID)

**Chronic Musculoskeletal Pain:** (Salaffi et al, 2004; \(n = 825\) patients with chronic musculoskeletal pain)

1 point or 15.0% change

**Lower Back Pain:** (Childs et al., 2005)

- At 1 week of physical therapy treatment = 1.5 points
- At 4 weeks of physical therapy treatment = 2.2 points

**Post-operative Patients:** (Sloman et al, 2006; \(n = 150\); mean age = 47.2 years, 56% post-abdominal surgery, 28.6% post-orthopedic surgery, 15.4% other types of surgery)

- Percent change in NPRS rather than raw scored change may provide more meaningful information regarding a patient’s response to pain treatment. For example, a change from 3/10 to 0/10 pain may be more meaningful than a change from 8/10 to 5/10 pain.
- Therefore, MCIDs were determined in percent change:
  - 35% reduction on the NPRS had a rating of “minimal relief”
67% reduction had a rating of “moderate relief”
70% reductions had a rating of “much relief”
94% reduction had a rating of “complete relief”

**Shoulder Pain:** (Michener et al, 2001; n = 136; surgical and non-surgical conditions; mean age 51.7(16.4) years; 76.5% no surgery, 23.5% status post-surgery; assessment of average NPRS scores for at rest, normal activity, and strenuous activity)
- 2.17 points for surgical and non-surgical subjects after three to four weeks of rehabilitation

**Chronic Pain:** (Farrar et al, 2001; n = 2,724 subjects with varying diagnoses including fibromyalgia, diabetic neuropathy, post-herpetic neuralgia, chronic low back pain and osteoarthritis)
- 1.7 points or a reduction of 27.9% (raw change/baseline x 100)

**Hospital/Emergency Room Population:** (Bijur et al, 2003; n = 108; mean age = 44 years; participants presented with acute pain in the emergency room department)
- 1.3 points

**Chronic SCI:** (Hanley et al, 2006a; n = 82; mean age = 41.44(10.14) years; 54% cervical SCI, 38% thoracic SCI, 7% lumbar/sacral SCI; average pre-treatment pain intensity = 5.27 (1.79) on NPRS)
- 1.80 points or 36%

**Cut-Off Scores**

**Traumatic Spinal Cord Injury (SCI):** (Forchhemier MB et al, 2011; n = 6096; mean age = 32.5 (14) years; mean time since injury = 9.8 (9.3) years; all subjects had SCI and pain; injury level: 24.3% AIS D, 5.8% paraplegia AIS C, 5.0% paraplegia B, 29.8% paraplegia A, 7.0% tetraplegia AIS C, 8.0% tetraplegia AIS B, 20.1% tetraplegia AIS A)
- Pain severity can be categorized into 3 distinct groups as relates to pain interference: 1-3, 4-6, and 7-10
**Chronic SCI:** (Hanley et al, 2006b; for questions about general pain: n = 307, mean age = 43.1 (13.0) years; for questions about worst pain: n = 174, mean age = 41.6 (13.6) years; inclusion criteria of SCI >6 months)

- For rating overall pain: mild = 1-3, moderate = 4-7, severe = 8-10
- For rating worst pain problem: mild = 1-3, moderate = 4-6, severe = 7-10
- For cut-off determination, pain severity on NPRS was compared to pain interference

**Normative Data**

Not established.

**Test-retest Reliability**

**Chronic Pain:** (Jensen & McFarland, 1993; n = 200; mean age = 43.83 (13.2) years; mean time since pain onset = 6.13 (8.24) years)

- Adequate test-retest reliability for a single pair of assessments (one assessment during week 1, one assessment during week 2) (r = 0.63)
- Excellent test-retest reliability for ratings on 2 or more days during week 1 compared to 2 or more days during week 2 (r = 0.79 – 0.92)
- Test-retest reliability increases with increasing numbers of ratings with the highest reliability for 4 ratings/day taken on 7 days (r=0.95)

**Interrater/Intrarater Reliability**

**Healthy Populations:** (Herr et al, 2004; n = 175 total, 86 subjects aged 25-55 years (mean age = 39.1 (8.8) years), 89 subjects aged 65-94 years (mean age = 76.0 (7.4) years))

- **Excellent** interrater reliability with 100% agreement between two raters scoring the 0-10 point NPRS

**Internal Consistency**

**Chronic Pain:** (Jensen & McFarland, 1993)
• Excellent internal consistency for a single pair of ratings (one during week 1 and one during week 2) (Coefficient alpha = 0.84)
• Excellent internal consistency for ratings on 2 or more days during week 1 compared to 2 or more days during week 2 (Coefficient alpha = 0.89 – 0.98)

**Healthy Populations:** (Herr et al, 2004)

• Excellent internal consistency for NPRS in participants aged 65-94 (Cronbach’s alpha = 0.87)
• Excellent internal consistency for NPRS in participants aged 25-55 (Cronbach’s alpha = 0.88)

**Criterion Validity (Predictive/Concurrent)**

**Concurrent Validity:**

**Healthy Populations:** (Herr et al, 2004)

• **Excellent** correlation between NPRS and Visual Analogue Scale (r = 0.86)
• **Excellent** correlation between NPRS and Verbal Descriptor Scale (r = 0.88)
• **Excellent** correlation between NPRS and 21-point Numeric Rating Scale (r = 0.87)
• **Excellent** correlation between NPRS (on 0-20 scale) and Faces Pain Scale (r = 0.80)

**Construct Validity (Convergent/Discriminant)**

**Convergent Validity:**

**Hospital/Emergency Room Population:** (Bijur et al, 2003)

• **Excellent** correlation between NPRS and VAS (r = 0.94, 95% CI = 0.93-0.95)

**Traumatic SCI:** (Dijkers, 2010; n = 168; mean 38(18) years; level of injury: 10% paraplegia incomplete, 26% paraplegia complete, 45% tetraplegia incomplete, 19% tetraplegia complete)

• **Adequate** correlation between NPRS and Verbal Rating Scale (Spearman’s r = 0.38)
**Content Validity**

**SCI:** (Bryce et al, 2007; n = 50 health care providers attending the 2006 combined American Spinal Injury Association (ASIA)/International Spinal Cord Society (ISCoS) scientific meeting)

- In a vote on the validity and usefulness of the NPRS in people with pain related to a SCI, attendees voted as follows:
  - 64% NPRS is a valid measure and should be part of a minimum dataset for clinical trials
  - 14% NPRS is a valid measure but should be part of an expanded dataset only
  - 20% NPRS needs further study to establish reliability and validity before being recommended
  - 2% NPRS is not valid or relevant for use
  - 79% NPRS as first choice for a minimum data set over a VRS (16%) and VAS (5%) (n= 57)

**Face Validity**

**Healthy Population:** (Herr et al, 2004)

- Subjects were shown 5 scales rating pain intensity and asked which scale best described the severity of pain experienced during the study.
  - 35.3% preferred the 21-point Numeric Rating Scale (written format)
  - 25.3% preferred the Verbal Descriptor Scale
  - 15.9% preferred the NPRS (11-point verbal scale)
  - 12.9% preferred the Faces Pain Scale
  - 10.6% preferred the Visual Analogue Scale

**Floor/Ceiling Effects**

Not established

**Responsiveness**

**Lower Back Pain:** (Childs et al, 2005)

- Large effect size at 1 week and 4 weeks (ES = 0.95-1.2) in patients receiving physical therapy for low back pain
Healthy Population: (Herr et al, 2004)

- NPRS detected significant differences across temperatures of thermal stimuli tested (F6,1037 = 67.09, p<0.0001) indicating sensitivity to changes in pain stimulus

Shoulder Pain: (Michener et al., 2011)

- Large effect size for surgical (ES = 1.51) and non-surgical subjects (ES = 1.94)

Professional Association Recommendations

Recommendations for use of the instrument from the Neurology Section of the American Physical Therapy Association’s Multiple Sclerosis Taskforce (MSEDE), Parkinson’s Taskforce (PD EDGE), Spinal Cord Injury Taskforce (PD EDGE), Stroke Taskforce (StrokEDGE), Traumatic Brain Injury Taskforce (TBI EDGE), and Vestibular Taskforce (VEDGE) are listed below. These recommendations were developed by a panel of research and clinical experts using a modified Delphi process.

For detailed information about how recommendations were made, please visit: http://www.neuropt.org/go/healthcare-professionals/neurology-section-outcome-measures-recommendations

Abbreviations

- HR: Highly Recommend
- R: Recommend
- LS / UR: Reasonable to use, but limited study in target group / Unable to Recommend
- NR: Not Recommended

Recommendations for use based on acuity level of the patient

Acute (CVA < 2 months post) (SCI < 1 month post) (Vestibular < 6 weeks post)

- SCI EDGE: R

Subacute (CVA 2 to 6 months) (SCI 3 to 6 months)
• SCI EDGE: R

Chronic (> 6 months)

• SCI EDGE: HR

Recommendations based on SCI AIS Classification

AIS A/B

• SCI EDGE: R

AIS C/D

• SCI EDGE: R

Recommendations for entry-level physical therapy education and use in research:

Students should learn to administer this tool? (Yes/No)

• SCI EDGE: Yes

Students should be exposed to tool? (Yes/No)

• SCI EDGE: Yes

Appropriate for use in intervention research studies? (Yes/No)

• SCI EDGE: Yes

Is additional research warranted for this tool (Yes/No)

• SCI EDGE: Not reported

Considerations

Older Adults: (Herr et al, 2004)

Herr et al recommend use of a Verbal Descriptor Scale over the NPRS based on evidence related to failures, internal consistency reliability, construct validity, scale sensitivity, and patient preference. Do you see an error or have a suggestion for this instrument summary? Please e-mail us!

Bibliography


Year Published

1995

Instrument in PDF Format

Yes

Approval Status

Approved