

**Tool:** Checklist of Nonverbal Pain Indicators (CNPI)  
**Tool developer:** Feldt, K.  
**Country of origin:** USA  
**Reviewed:** 04/04  
**Revised:** 06/08

<b>Conceptualization</b> <b>Panel rating: 2</b> <b>Revised: 2</b>	
<b>Purpose</b>	The Checklist of Nonverbal Pain Indicators is an observational assessment tool designed to document pain behaviors in cognitively impaired elders.
<b>Conceptual basis</b>	<p>There is no definition of pain. However, there is discussion on problems of pain and pain measurement in non-verbal elders.</p> <p>The tool measures presence/absence of observable pain behaviors commonly associated with <i>acute/surgical</i> pain in elders with dementia.</p> <p><i>Two subsequent studies tested CNPI in patients with predominantly persistent pain in the longterm care setting (Jones, 2005 &amp; Nygaard, 2006).</i></p>
<b>Item Generation</b>	<p>The tool was based on an extensive literature review and developed by</p> <ul style="list-style-type: none"> <li>• Making modifications to University of Alabama-Behavioral Pain Scale (UAB-BPS): Four inappropriate items were eliminated and one item – restlessness—was redefined).</li> <li>• One item was added based on research findings: vocal complaints.</li> </ul> <p><u>Tool items</u></p> <ul style="list-style-type: none"> <li>• Nonverbal vocalizations</li> <li>• Facial grimacing or wincing</li> <li>• Bracing</li> <li>• Rubbing</li> <li>• Restlessness</li> <li>• Vocal complaints</li> </ul> <p>Each item is further defined by specific behaviors.</p> <p>Each of the 6 items is scored on a dichotomous two point scale (0= not present; 1=present). The points are then added together. Pain is measured at rest and on movement with separate scores for each situation.</p>
<b>Content Validity</b>	<p>The tool developer claims good face validity based on literature review.</p> <p><u>Study 3 (Nygaard, 2006):</u>  <i>Nygaard contributed to face validity by establishing concurrent validity with caregivers' proxy perception of pain intensity as measured on VAS.</i></p>
<b>-Panel Commentary</b>	<p>The tool was developed by making modifications to UAB-PBS, a tool which has not been validated for use with older adults. There is no conceptual blurring between discomfort and pain.</p> <p>Items are scored on a dichotomous present/absent scale and do not attempt to measure pain severity. This is consistent with the limitations of interpretation of pain behaviors in elders with dementia.</p> <p>The tool covers 3 of 6 pain behavior categories in the AGS Persistent Pain Guidelines: Facial expression, Verbalizations/ vocalizations, Body language. More subtle pain behaviors in the AGS Guidelines are not addressed: Changes in activity patterns or routines, Mental status changes, Changes in interpersonal interactions. Thus, the tool includes behaviors most commonly</p>

reported. Moreover, these behaviors may be most salient when evaluating acute pain in elders with dementia. Findings on individual items remained similar whether conducted by research assistants (study 2) or care personnel who were familiar with patients' expressions (study 3).

Although not evaluated in external review by content experts, the CNPI does appear to have face validity for assessment of pain in elders with dementia. *Subsequent studies further support item selection but more specifically attribute restlessness and rubbing to resting pain observations.*

*Study 2 (Jones) points out the finding that only half of patients who were able to report pain actually displayed pain behaviors. It was concluded that observation alone did not disclose pain in these patients. This supports the conceptual limitation that the small number of behaviors observed increases an observational tool's specificity but limits sensitivity in that it may not detect pain in persons presenting atypically.*

**Subjects**  
**Panel rating: 1**  
**Revised: 2**

**Subjects**

Study 1 (Feldt, 2000)  
The tool was tested in a convenience sample of 88 cognitively impaired and cognitively intact subjects undergoing surgery for hip fracture.  
Average age: 83.2 ( $\pm$ 7.7) Range: 65-101.  
Gender: Female: 86%, Male: 14%.  
Cognitive impairment: Average MMSE for total sample =18.1  
Fifty-three patients had MMSE  $\leq$  23. Average MMSE: 12.2 ( $\pm$ 8.0).  
Thirty-five patients had MMSE  $>$  23. Average MMSE: 27.2 ( $\pm$ 1.9).  
*Raters were gerontological nurse practitioners with Master's degrees.*

Study 2 (Jones, 2005)  
*The CNPI was used in a multipart, multifaceted pain management intervention study in 12 Colorado nursing homes with n=917 randomly selected patients.*  
*Mean age: 81 (+/- 12.9 years)*  
*Gender: 70% female*  
*Diversity: 85% white, 13% Hispanic*  
*Cognitive impairment: Physician diagnosis of dementia 89%.*  
*52% were cognitively able to self-report using a pain intensity rating scale. 7% were determined to be in pain but unable to communicate this.*  
*Raters were investigator-trained research assistants who followed a rigorous assessment protocol*

Study 3 (Nygaard, 2006)  
*Convenience sample n=46 from 7 different nursing homes in Norway.*  
*Mean age: 84.7 years old (SD +/-7.8 years)*  
*Gender: 73% female.*  
*Cognitive impairment: All scored <8 on the Short Portable Mental Questionnaire. Roughly 25% were unable to answer "Have you any pain today?" coherently and were considered non-communicative.*  
*Raters held various degrees of training (nurses, auxiliary nurses and nurses' assistants) and were familiar with the patients.*

**-Panel Commentary**

Acute care hospital setting is clearly identified as setting for the initial tool. *Studies 2&3 evaluated CNPI with longterm care samples.*  
Cognitively impaired patients were identified as having a wider range of dementia using the MMSE, SPQ or physician diagnosis. However, acute

	<p>confusion was not measured and is also often present in hospitalized elders with hip fracture. Age and gender distribution across studies reflects the homogeneity found in most practice settings. <i>Jones introduced some diversity by oversampling Hispanic and male participants.</i></p> <p>Using 5 subjects per tool item as a minimum requirement for this review, a minimum sample size of 30 subjects (6 items x 5 subjects) would be needed. Thus, all studies have adequate sample size for tool evaluation.</p>
<p><b>Administration, Scoring, Feasibility</b>  <b>Panel rating: 2</b>  <b>Revised: 2</b></p>	
<p><b>Administration, Scoring, Feasibility</b></p>	<p>There are 6 items, each of which is further defined by specific behaviors. Each item is scored on a dichotomous two point scale (0= not present; 1=present). The points are then added together.</p> <p>Pain is measured at rest and on movement with separate scores for each situation.</p> <p>Skill level needed to use the tool reliably was not addressed in the original study where two gerontological nurse practitioners did assessments.</p> <p><i>Study 3 (Nygaard) showed reliable use of the tool in longterm care staff with mixed skill levels (see data for test-retest and interrater reliability).</i></p>
<p><b>-Panel Commentary</b></p>	<p>The method of administration and scoring is clearly described and simple to follow. Neither a cut-off point nor interpretations of the tool score are provided.</p> <p>The time needed to administer the tool has not been formally evaluated. However, the tool is short and appears easy to use.</p>

<p><b>Reliability</b>  <b>Panel rating: 2</b>  <b>Revised: 2</b></p>	
<p><b>Internal consistency</b></p>	<p><u>Study 1 (Feldt, 2000)</u>  Observations of the subjects were conducted at approximately the third postoperative day. Observations were made of subjects at rest and with movement (sample specifications are provided above).</p> <p>Results:  KR-20 (=alpha for dichotomous variables).  At rest: .54 (95% CI=.38 -.68)  With movement: .54 (95% CI=.49-.75)</p> <p><u>Study 2 (Jones, 2005)</u>  <i>No internal consistency was reported</i></p> <p><u>Study 3 (Nygaard, 2006)</u>  <i>Low internal consistency was reported without an actual Cronbach alpha.</i></p>
<p><b>Interrater reliability</b></p>	<p><u>Study 1 (Feldt, 2000)</u>  Interrater reliability was established in a subgroup of 12 patients from the study sample.</p> <p>Results:  93% agreement on dichotomous checklist items  Kappa=0.63-0.82 for behaviors observed.</p> <p><u>Study 2 (Jones, 2005)</u>  <i>No interrater reliability between trained research assistants reported.</i></p>

	<p><u>Study 3 (Nygaard, 2006)</u> Interrater reliability was moderate to good for all 6 behaviors (<math>k = .45-.69</math>), strongest for rubbing and vocalizations.</p>												
<b>Test-retest reliability</b>	<p>Test-retest reliability was not available for study 1 (Feldt, 2000) which is appropriate in assessment of acute pain; it was not reported in study 2 (Jones, 2005).</p> <p><u>Study 3 (Nygaard, 2006)</u> There was moderate to good (<math>k=0.43-0.66</math>) intra-rater reliability for all six items except rubbing (<math>k=0.23</math>). Nurses (<math>k= 0.20-0.63</math>) had lower test-retest reliability than auxiliary nurses (<math>k= 0.46-0.63</math>).</p>												
<b>-Panel commentary</b>	<p>In study 1, internal consistency was established between qualified raters. Correlation coefficients were low, which may relate to the few items in the tool, however further evaluation is recommended. Follow-up studies added no new evidence.</p> <p>Interrater reliability was established using % agreement and kappa statistic, appropriate for the data. Results are moderate to good (study 1&amp;3). However, not all behaviors on the tool were observed in either study.</p> <p>Test-retest reliability is not an appropriate parameter to examine when assessing acute pain due to its changing nature. However, test-retest reliability should be established when used with persistent pain states. Study 3 (Nygaard, 2006) found moderate to good test-retest reliability in assessment of persistent pain when caretakers were familiar with the patient.</p>												
<p><b>Validity: Criterion or construct</b> <b>Panel rating: 1</b> <b>Revised: 2</b></p>													
<b>Construct validity/ Criterion related validity</b>	<p><u>Study 1 (Feldt, 2000)</u> <u>Concurrent criterion related validity</u> CNPI scores compared with VDS scores (VDS scores transcribed into numbers 0=no pain, 1=slight pain, 6=pain as bad as it could be.) 64 patients had CNPI and VDS scores.</p> <table border="0"> <thead> <tr> <th></th> <th style="text-align: center;"><u>At rest</u></th> <th style="text-align: center;"><u>With movement</u></th> </tr> </thead> <tbody> <tr> <td>Pain in total population</td> <td style="text-align: center;"><math>r_s=.37, p=.001^*</math></td> <td style="text-align: center;"><math>r_s =.43, p&lt;.0001^*</math></td> </tr> <tr> <td>Intact (n=32)</td> <td style="text-align: center;"><math>r_s =.50, p=.003^*</math></td> <td style="text-align: center;"><math>r_s =.39, p=.032^*</math></td> </tr> <tr> <td>Impaired (n=32)</td> <td style="text-align: center;"><math>r_s =.30, p=.076</math></td> <td style="text-align: center;"><math>r_s =.46, p=.009^*</math></td> </tr> </tbody> </table> <p>Pain at rest correlated weakly within the impaired group. According to the tool developer the tool is only valid for assessment of pain with movement.</p> <p><u>Study 2 (Jones, 2005)</u> No concurrent validity statistics of CNPI with NRS, FPS and VDS were reported. The number of pain behaviors increased with higher ratings of pain intensity in those patients who were able to use pain rating scales. The CNPI had poorer sensitivity (45% of patients who said they had pain did not show any CNPI behaviors) than specificity (85% of those who denied pain also did not have any pain behaviors).</p> <p><u>Study 3 (Nygaard, 2006)</u> This study meant to establish concurrent validity between CNPI and the VAS used by carers after observation of pain behaviors. Concurrent validity with proxy-VAS was high. In same-carer observations: <math>r = 0.88</math> and <math>r = 0.82</math> For blinded third observer: <math>r = 0.69</math>.</p> <p><u>Construct validity</u></p>		<u>At rest</u>	<u>With movement</u>	Pain in total population	$r_s=.37, p=.001^*$	$r_s =.43, p<.0001^*$	Intact (n=32)	$r_s =.50, p=.003^*$	$r_s =.39, p=.032^*$	Impaired (n=32)	$r_s =.30, p=.076$	$r_s =.46, p=.009^*$
	<u>At rest</u>	<u>With movement</u>											
Pain in total population	$r_s=.37, p=.001^*$	$r_s =.43, p<.0001^*$											
Intact (n=32)	$r_s =.50, p=.003^*$	$r_s =.39, p=.032^*$											
Impaired (n=32)	$r_s =.30, p=.076$	$r_s =.46, p=.009^*$											

	The data demonstrate construct validity of the CNPI for acute pain because higher scores were attained during periods of movement eliciting discomfort than during periods of rest. Study 2 added to these findings by demonstrating that higher ratings of pain corresponded with more pain behaviors.
<b>-Panel commentary</b>	<p>Although validity data are in the expected direction, testing with a more cognitively impaired sample is needed to assess tool sensitivity to detect pain. <i>In all studies done so far, resting scores for pain are too low to interpret. Poor sensitivity of the tool found in study 2 (Jones, 2005) supports Feldt's suggestion that the CNPI observes acute pain behaviors and may not be strong in detecting persistent pain.</i></p> <p>Use of any pain intensity scale with cognitively impaired individuals as a gold standard may be problematic and contribute to lower correlations. <i>There was better correlation with the VAS among proxy ratings which may be included as part of the overall pain assessment in cognitively impaired older patients (Nygaard, 2006). However, the meaningfulness of concurrent validity between an informant rating and an observer tool (CNPI and proxy-VAS) is limited when both tools are administered by the same person. Jones (2005) categorized responses into 4 categories of pain intensity (none, mild, moderate and severe) similar to the MDS, but found that ratings varied according to the intensity scale used. At this point there is no evidence that any number or nature of pain behaviors from the CNPI might correspond with these four levels of pain intensity.</i></p>
<b>Summary of panel evaluation of pain assessment tool</b>	
<p>The CNPI is a brief, clinically useful approach to assessing pain in elders with cognitive impairment. Items included in the scale are conceptually sound. Preliminary tool testing provides initial support for use of the tool at least with elders in acute care setting. <i>Nygaard (2006) successfully used the CNPI with a brief introduction to nursing staff in the nursing home setting. There was acceptable interrater and test-retest reliability. Most common pain behaviors observed were vocalizations, grimacing and verbal complaints, whereas rubbing yielded no reliable observations. In a study of mostly communicative NH residents to explore preference for a pain intensity rating tool, Jones (2005) found relatively poor sensitivity of the CNPI. Cutoff scores to direct interventions have not been determined. Jones (2005) confirmed increase of pain behaviors with activity except for restlessness and rubbing, and an increasing number of behaviors in the presence of higher pain intensity scores.</i></p> <p>The CNPI needs further evaluation to determine its usefulness with nonverbal <i>elders with persistent rest pain. Follow-up studies only weakly support use of the CNPI for assessment of persistent pain. More testing of the tool in the acute pain population is recommended as well.</i> Addition of items that consider more subtle behaviors or changes in behaviors or interaction would improve comprehensiveness and ability to detect pain in those with less obvious behavioral manifestations or non-verbal depressed patients. Continued tool testing with males and minority samples is needed. <i>The Nygaard study was able to demonstrate ease of use of the CNPI for a group of caregivers with different educational levels in Norwegian nursing homes but further investigation for reliable administration in US care settings is recommended.</i></p>	

### Sources of evidence

Feldt, K. S. (1996). Treatment of pain in cognitively impaired versus cognitively intact post hip fractured elders. (Doctoral dissertation, University of Minnesota, 1996). Dissertation Abstracts International, 57-09B, 5574.

Feldt, K. S. (2000). The Checklist of Nonverbal Pain Indicators (CNPI). *Pain Management Nursing*, 1(1), 13-21.

Feldt, K. S. (2000). Improving assessment and treatment of pain in cognitively impaired nursing home residents. *Annals of Long Term Care*, 8(9), 36-42.

Jones, K. R., Fink, R., Hutt, E., Vojir, C., Pepper, G. A., Scott-Cawiezell, J., et al. (2005). Measuring pain intensity in nursing home residents. *Journal of Pain and Symptom Management*, 30(6), 519-527.

Nygaard, H. A., & Jarland, M. (2006). The checklist of nonverbal pain indicators (CNPI): Testing of reliability and validity in Norwegian nursing homes. *Age and Ageing*, 35(1), 79-81.

**Key to panel rating**

3= Available evidence is strong

2= Available evidence supports need for further testing

1= Available evidence is insufficient and/or tool revisions are needed

0= Evidence is absent

**Contact address for tool developer:**

Karen S. Feldt, PhD

APRN, Chief of Community Health

ERA Care Communities Suite 2110

1325 4<sup>th</sup> Ave.

Seattle, WA 98101

Email: [kfeldt@eracare.com](mailto:kfeldt@eracare.com)

**Evaluation completed by:**

K. Herr, D. Decker, K. Bjoro, The University of Iowa

**Revision 06/08 by:**

K. Herr, H. Bursch, B. Black, The University of Iowa.

Contact information: [keela-herr@uiowa.edu](mailto:keela-herr@uiowa.edu)