



Psychometric Properties and Clinical Utility of the CNA Pain Assessment Tool (CPAT)

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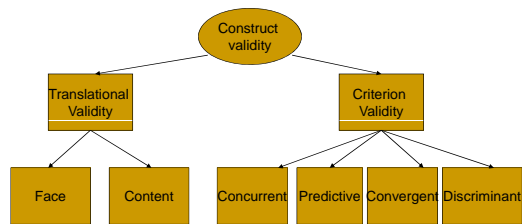
Objectives

- Discuss the concepts of reliability and validity used to improve the psychometric soundness of instruments
- Describe the development of the CPAT
- Report the results of the psychometric testing and clinical utility of the CPAT

Definitions

- Validity: the ability of the instrument to measure the attributes of the construct under study
- Reliability: the ability of the instrument of measure the attributes consistently

Construct Validity Diagram



DeVries, H. et al (2007). A psychometric Toolbox for Testing Validity and Reliability. J of Neg Scholarship, 39(2), 155-164

Construct Validity

- Degree to which the instrument measure the construct it is intended to measure
 - Contrasting group method
 - Hypothesis testing
 - Factor analysis

Translational validity

- Face validity
 - subjective assessment
 - Weakest form of validity
- Content validity
 - Items in tool sample the complete range of study attribute

Criterion Validity

- Definition: the evidence of a relationship between the attributes in a measurement tool with its performance on some other variable.
 - Predictive validity
 - Concurrent validity
 - Convergent validity
 - Discriminant validity

Reliability

- Stability reliability
 - Test-retest: administration of the same test to the same group of people at different times.
 - Inter-rater reliability; the degree to which two raters, acting independently, assign the same rating to the attribute being measured
- Equivalence reliability
 - Coefficient alpha: how well the sub-parts (items) in the tool fit together conceptually

CPAT: Development Phase 1

- Purpose: to develop a pain assessment tool to be utilized by certified nursing assistant direct care providers for nursing home residents with dementia
- Initial 41 behavior items obtained from literature review, expert opinion, and direct care providers.
- 5 domains: facial expression (9 items), behavior (8), mood (6), body language(9) and activity level (9)
- Correlated against objective indicators: past medical history of known painful condition, present diagnosis of painful condition, pain medication use (time 1 assessment)
- Correlated against 26 MDS indicators related to function, mood, behavior, medication use. (time 2 assessment)

CPAT phase 1

- Time 1: CNA's instructed and administered CPAT over 6 month interval
 - 182 participants; 2619 assessments
 - P value of <.05 and OR >1.5; 26 items retained
- Time 2
 - 105 participants; 2527 assessments
 - P value of <.05 and OR >1.0; 24 items retained
- Final Phase 1 CPAT: collapsed to 12 items

Statistically Significant Items for the Presence of Pain

Item	OR	CI	P value
Scared	2.61	0.61-0.97	.063
Fearful	2.67	1.12-4.48	.023
Calling out	2.69	1.39-5.21	.003
Moaning	2.94	1.67-5.16	.002
Whining	1.98	1.14-3.43	.016
Tense	1.69	1.07-2.65	.023
Rigid	2.53	1.21-5.29	.014
Hand wringing	2.27	1.05-4.87	.036

4 additional items significant for the absence of pain.

CPAT: Phase 1

Category	Score	
	0	1
Facial expression	Relaxed	Scared/fearful
Mood	Normal	Calling out/fearful
Behavior	Pleasant	Whiny
Body Language		Tense/rigid
Activity Level	Moves easily	Hand wringing

Cervo, F. et al (2007). Am. J. of Alzheimer's Disease and other Dementias. 22: 112-119

Expert Critique

- State of the Art Review of Tools for Assessment of Pain in Nonverbal Older Adults
- Criteria for evaluation: conceptualization, subjects, scoring and feasibility, reliability, validity
- <http://prc.coh.org/pain-noa.htm>
 - The tool is conceptually supported (purpose, item generation, content validity). However, there is no evidence of reliability; validity support is limited.
 - More information is needed as to the specific actions the CNAs were instructed to take without nursing assistance if pain were found to be present.

Journal of Assessment of Pain in Nonverbal Older Adults with Dementia: A State of the Science Review. J of pain and symptom management. 31: 170-192

CPAT: Development and psychometric testing phase 2

- Research question 1: Does the CPAT have sufficiently strong psychometric properties to warrant its use and dissemination as an objective measure of pain in nursing home patient with dementia?
- Research question 2: What is the clinical utility of the CPAT as perceived by the CNA's

Methods

- Setting: 3 suburban regional long-term care facilities
- Eligibility criteria: moderate to severe dementia
 - MMSE score: 19 or less (0-30)
 - Global Deterioration Scale: 5 or greater (1-7)
 - Alzheimer's or non-Alzheimer's type dementia
- Exclusion criteria
 - Reversible cognitive impairment, delirium, severe sensory impairment

CNA Training

- 30 minute CNA training sessions by (co-I)
- Instructed to observe resident for 1 minute, check off one box in each category, record a total pain score.
- Each CNA completed two practice tests for each of the testing periods.
- Discussion and feedback sessions after the training period
- Modified, enhanced 45 minute training included descriptors for each indicator
- Instruction Sheet given to each CNA

Directions:

1. Observe Resident in each of the five (5) categories.
2. Place an 'X' in the appropriate box
3. Record total score and action taken at the bottom of the page

Category	Score	
	0	1
1. FACIAL EXPRESSION	<input type="checkbox"/> Relaxed	<input type="checkbox"/> Scared/Fearful
2. BEHAVIOR	<input type="checkbox"/> Normal	<input type="checkbox"/> Calling Out/ Moaning
3. MOOD	<input type="checkbox"/> Pleasant	<input type="checkbox"/> Whiny
4. BODY LANGUAGE	<input type="checkbox"/> Restful	<input type="checkbox"/> Tense/Rigid
5. ACTIVITY LEVEL	<input type="checkbox"/> Moves Easily	<input type="checkbox"/> Hand Wringing
TOTAL SCORE (0-5)		

CPAT Indicators: examples

- Relaxed Facial Expression- looks calm; smiling; no particular expression; eye contact and interest in surroundings; looks of pleasure or contentment; looks at ease
- Scared/Fearful Facial Expression- looks worried or frightened; anxious expression; looks alarmed; troubled or concerned expression; looks nervous
- Normal Behavior- not calling out or moaning; no distressing vocalizations; speech is pleasant or neutral
- Calling Out/Moaning Behavior- mournful or murmuring sounds; phrases or words being used over and over in an anxious, uneasy or distressed tone; troubled calling out; groaning; chanting; grunting

Psychometric Testing

- **Inter-Rater Reliability;** Two raters observe a resident simultaneously and each will complete a CPAT.
- **Test-Retest Reliability;** The same rater administers the CPAT to the resident twice with a five minute interval between the tests.
- **Construct Validity;** Assess the resident before and after a known painful or uncomfortable event such as bathing, dressing, repositioning, transferring, or toileting.
- **Criterion Validity ;** CPAT was completed and later compared to the DS-DAT.
 - **DS-DAT:** Discomfort Scale-Dementia of Alzheimer's Type

Demographics N=145

Long Island State Veterans Home	60 (41%)
Maria Regina Residence	43 (30%)
Gurwin Jewish	42 (29%)
Age (years) mean (range)	84.3 (62-101)
Male	72 (50%)
Global Deterioration Scale; mean (range)	6.0 (5-7)
MMSE; mean	7.8 (19-0)
Score 0-9	75 (52%)
Score 10-19	70 (48%)

Reliability Testing		
Item	Initial Training Results [95% CI]	Modified Training Results [95% CI]
Inter-rater reliability	ICC=0.57 [0.37,0.71]	ICC=0.71[0.58,0.80]
Test-retest	ICC=0.50[0.32, 0.64]	ICC=0.67[0.53,0.77]
Internal Consistency		
IRR	$\alpha = 0.75$ [0.64,0.84]	$\alpha=0.77$ [0.68,0.84]
TRR	$\alpha = 0.72$ [0.61,0.84]	$\alpha=0.84$ [0.69, 0.78]
Construct validity	$\alpha=0.77$ [0.67,0.85]	
Criterion validity	$\alpha=0.81$ [0.73,0.87]	
Composite score	$\alpha=0.77$ [0.69,0.83]	

Validity Testing	
Item	Results
Construct validity (pre/post uncomfortable activity)	P=.043 mean of difference=0.33 [95%CI 0.01,0.65]
Criterion validity (CPAT and DS-DAT scale)	Spearman's rank correlation coefficient=0.25, p=.048

Practicality of Instrument Survey	
(1=totally agree, 10=totally disagree)	
Item	Mean score n=18
This pain scale was easy to use	1.61
This pain scale was not time consuming	1.44
This pain scale is appropriate to use in cognitively impaired residents	2.33
This pain scale is able to differentiate the level of pain residents are in	3.75
This pain scale will help me in my decision making regarding treatment of pain for cognitively impaired residents	2.44

Discussion

- CPAT is a reliable and valid instrument to assess pain in nursing home residents with dementia
- CPAT is an easy to use and clinically practical pain assessment tool

Future Directions

- Incorporate CPAT into American Medical Directors Association Guidelines for pain assessment and treatment and evaluate process
- Examine CPAT's ability to measure response to treatment
