Tool: **Pain Behaviors for Osteoarthritis Instrument for Cognitively Impaired Elders (PBOICIE)**
Tool developer: **Tsai, P., Beck, C., Richards, K., Phillips, L., Roberson, P., Evans, J.**
Country of origin: **USA**
Reviewed: **06/08**

Conceptualization **Panel rating: 1**	
Purpose	PBOCIE is an observational assessment tool developed to assess osteoarthritis (OA) pain in the knee or hip for severely cognitively impaired elders.
Conceptual basis	Assessment of OA pain in nonverbal elders is based upon the following assumptions: 1. OA pain is aggravated by physical activity 2. Verbal and non-verbal pain behaviors that are specifically related to OA can be identified and are not related to any other painful conditions. 3. Caregivers can reliably observe and rate pain. 4. Elders with severe dementia would present with the same pain behaviors as non-CI elders who are able to provide verbal self-report.
Item Generation	<u>Stage 1</u> Authors compiled pain behaviors from other observational instruments, OA pain assessment instruments, relevant literature, and AGS guidelines. A total of 49 behaviors were selected for testing. Of the 49 items that were initially selected 16 items were retained for further study (see content validity). <u>Stage 2</u> Following pilot testing the 16-item tool was further reduced to 10-items. Characteristic 1: Distorted ambulation or gesture • Excessive stiffness • Shifting weight • Clutching or holding area • Rigid, tense body posture • Massaging affected area Characteristic 2: Audible expression of distress • Sigh, moan, grasp, groan • Words expressing discomfort or pain: “ouch,” “that hurts,” cursing during movement, and exclamations of protest, “stop,” “that’s enough.” Characteristic 3: Facial/non-audible expressions of distress • Clenching teeth • Fidgeting Characteristics 4: Changes in daily routine • Restricted movement <u>Stage 3</u> The authors finalized a 6-item tool consisting of two parts. The final 6 items had correlation coefficients with the total score ranging from .44 to .71 ($p < .05$). <u>Characteristic 1: Distorted ambulation or gesture</u>

	• Excessive stiffness • Shifting weight • Clutching or holding area • Rigid, tense body posture • Massaging affected area Characteristic 2: Facial/non-audible expressions of distress • Clenching teeth
Content Validity	<u>Stage 1:</u> Six content experts used a 5 point scale (0 definitely not a pain behavior to 4 definitely a pain behavior) to rate each item's relevance to pain in severely CI elders with OA of the knee or hip. The content validity indexes, i.e, the proportion of items that received a rating of 3 or above by the experts, were calculated and items scoring a 3 or a 4 by 5 out of 6 experts were retained. The content validity index had to be at least 0.83 to be retained and anything lower than 0.80 was deleted. Of the 49 items that were initially identified by the first author, 16 items were retained for further testing. <u>Stage 2:</u> This portion of the study included a pilot testing of the 16-item tool. The authors found that 6 of the 16 items were not observed before or 30 minutes after administering analgesic including: grunting, chanting or calling out, crying or tears, asking for help, talking about pain, taking medications, and increasing periods. Consequently, the tool was reduced to 10 items with the frequencies of observations for the remaining 10-items falling between 1 and 6 for 30 minutes before and 30 minutes after administering the analgesics. <u>Stage 3:</u> The tool was further reduced to 6 items by removing the following 4 pain indicators for low inter-item correlations: sigh, moan, grasp or groan; words expressing discomfort; fidgeting; and restricted movement.
-Panel Commentary	Development of the PBOICIE was a series of staged evaluations based primarily on expert consensus and statistical evaluation. The initial 49 items were reduced to 6 items, two of which are consistent with AGS guidelines: body movement and facial expressions. However, no further information was provided in regards to the initial 49 items that were selected for testing. PBOICIE was developed to be used with a specific pain problem (OA), thus the development cannot be generalized to patients experiencing persistent pain. The initial item reductions was based on only 8 patients, which raises concern that key indicators may have been eliminated.
Subjects **Panel rating: 1**	
Subjects	<u>Stage 2</u> Subjects: 8 CI elders with a diagnosis of OA of knee or hip. Average Age: 85.13 ± 7.49 Cognitive impairment: average MMSE 3.63 ± 3.78 <u>Study 3:</u> Setting: recruited cognitively intact elders from a senior health clinic. Subjects: 32 non-CI community dwelling elders. Average age: 72.97 ± 7.88 Gender: female 26 (81.3%), male 6 (18.7%) Cognitive impairment: none, average MMSE: 28.91 ± 1.30 Diversity: White 24 (75%), non-specified minorities 8 (25%)

-Panel Commentary	Stage 2 Using 5 subjects per tool as a minimum for this review, a minimum sample of 30 subjects (6 items x 5 subjects) would be needed. Thus, a sample of 8 CI elders is insufficient for tool evaluation. However, the sample of 32 non-CI elders that was manipulated for validation purposes would suffice. Gender is imbalanced, but this is expected for the population distribution. Minority inclusion is noted, although the specific minority groups that are represented are not identified. No information regarding setting for the initial tool development is provided, but it is noted that the validity testing was conducted using community dwelling non-CI elders. The authors focus on a specific population with a specific diagnosis of OA pain. Consequently, the researchers attempt to limit participation to elders that do not have any other expected causes for pain, but without a verbal report it is difficult to make definitive statements about the actual source of pain.
Administration, Scoring, Feasibility **Panel rating: 0**	
Administration, Scoring, Feasibility	Administration The administration procedure of the PBOICIE is described for initial use by the research assistants for a research protocol. However, at this time no further information for administration within the practice setting is provided. Scoring The final tool consisted of 6 items. A Dichotomous scale (absent or present) with scores total ranging from 0-6 was used. The authors state that if one behavior on the PBOICIE is observed then it is indicative of the presence of pain.
-Panel Commentary	The justification for the cut off points for identifying a patient as having pain versus not having pain are not clearly established. There is no further information regarding clinical utility, administration or feasibility available. At this time a user manual is not available.
Reliability **Panel rating: 1**	
Internal consistency	Stage 3 Alpha reliability of the 6 item tool was .57 measured before analgesics and .68 measured 30 minutes after analgesics.
Interrater reliability	Stage 2 Based on a comparison of four patients there was perfect agreement between RA 1 and the first author. Stage 3 RA 1 coded PBOICIE and the first author checked inter-rater reliability every 15 to 20 observations. RA 1 received an average of 90% agreement and .76 Cohen's kappa reliability with first author for five participants during the 7 month coding period. RA 2 was trained for one day by the creator of the Keefe observational assessment tool. RA 2 had 98% (.82 Cohen's kappa reliability) with Dr. Keefe's research staff for 5 observations. Inter-rater reliability was checked every 10 observations with an average of 99% (.89 Cohen's kappa reliability) for eight observations during the 7 month coding period. RA 1 and RA 2 were not blinded to the non-CI verbal reports of pain. To reduce bias both RA's viewed all videotapes and rated pain behaviors using

	the PBOICIE or Keefe's method. Also the RA's were not allowed to view the pain scores during the coding period.
Intrarater reliability	RA 1 had an average 92.5% intra rater agreement and .77 Cohen's kappa reliability over a month of rating 5 participants.
-Panel commentary	There was low internal consistency for the 6-item instrument. Interrater and intrarater reliabilities were strong when administered by research assistants. However, there has been limited evaluation of reliability in the clinical practice setting. Authors manipulated a careful procedure for evaluating reliability for the course of the study. RA 1 and RA 2 were blinded in stage 2, but not blinded in stage 3. However, since stage 3 lasted 2 years the authors suggests that after 2 years the RA's would not be able to recall reports. Consequently, even though the RA's were aware of the patient's self-report of pain the suggested time delay would decrease the potential for bias.
Validity: Criterion or construct **Panel rating: 1**	
Construct validity/ **Criterion related validity**	<u>Construct Validity</u> <u>Stage 2</u> RA 1 videotaped CI elders 30 minutes before and 30 minutes after analgesic administration while they performed an activity protocol. RA 1 later viewed the tapes and counted the number of pain behaviors that occurred 30 minutes before and 30 minutes after analgesic administration using the PBOICIE. RA 1 remained blinded to the elder's pain experience. Pilot data with only 8 subjects showed a trend toward reduced pain behaviors on the PBOICIE 30 minutes after administering analgesics (3.86 ± 1.68 vs. 3.00 ± 1.00) ($p < .23$) <u>Convergent Validity</u> <u>Stage 3</u> Elders who were able to provide verbal report of pain and demonstrated pain behaviors were used to evaluate validity of the 10-item PBOICIE and its ability to discriminate elder's pain behaviors before and after analgesic intake. PBOICIE was compared with Keefe's observational tool and VDS using a revised version of the behavior observation activity protocol developed by Keefe et al. RAs determined the most painful time during the day from self-reports by elders and obtained data on their medication, prior to the pain behavior observations. Verbal reports of pain were obtained using the VDS then elders were videotaped while performing the activity protocol 30 minutes before and 30 minutes after they were administered analgesics. The RAs later viewed the videotapes and counted/recorded the number of pain behaviors 30 minutes before and after analgesics were administered, using both the PBOICIE and Keefe's method. The PBOICIE score was associated with Keefe's rating of pain behaviors having a Pearson coefficient of .55 ($p < .01$) when measured 30 minutes before analgesic and .36 ($p < .05$) when measured 30 minutes after analgesic. The PBOICIE was not associated with the verbal self-reports of pain having a Pearson's coefficient of .11 when measured 30 minutes before analgesic and .05 when measured 30 minutes after analgesics. Results showed that elders had fewer pain behaviors 30 minutes after analgesic administration than before (1.97 ± 1.98 vs. 2.9 ± 1.89, $p < 0.001$), which provides preliminary evidence that the 6-item PBOICIE has the ability to discriminate pain behaviors before and after analgesic administration.
-Panel commentary	Preliminary construct and convergent validity was established, but there is

	still concern related to the number of subjects that was used for item reduction as the use of 8 CI elders is insufficient for initial tool testing. Therefore, further validity testing of the 6-item tool is necessary. There is also a potential for bias since non-CI elders reported pain prior to being videotaped and having the RA complete the PBOICIE. Another concern related to recognizing pain is that analgesic affects cannot be noted 30 minutes after administration, but rather that an observation time of at least an hour is more appropriate. Finally, the literature suggests an association between self-report and observed behaviors of .30, thus the very low correlation of .11 between verbal report and the PBOICIE raises concern.
Summary of panel evaluation of pain assessment tool	
The development of the PBOICIE was based on a thorough review of the literature and expert opinion. Since the tool was developed to identify pain in a specific population with a specific diagnosis of OA there are limitations to its use in the practice setting. The sample size used for the preliminary evaluation and reduction of the indicators raises concern. Further study regarding administration, clinical utility and feasibility in the practice setting is needed. Preliminary reliability is strong for the final tool, but there are some issues related to the establishment of validity. A major concern is that the PBOICIE was not associated with verbal self-report of pain, even though it was associated with Keefe's observational method.	

Sources of evidence

Tsai, P., Beck, C., Richards, K., Phillips, L., Roberson, P., Evans, J. (2008). The pain behaviors of osteoarthritis instrument for cognitively impaired elders (PBOICIE). *Research in Gerontological Nursing*

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

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