Chinese Version of Functional Index for Hand OsteoArthritis (FIHOA): Translation, validation and reliability study

Chan PSC¹, Tsang SWD¹, Lo HTS¹, Kong TS², Lee HY², Leung CM², Liu TY², Luo WY², Wong MWJ²

(1) Occupational Therapy Department, Prince of Wales Hospital
(2) Department of Rehabilitation Sciences, Hong Kong Polytechnic University
Service Gap - Common assessment for hand OA

Subjective verbal feedback:
- Interview
- Pain VAS

Objective data:
- ROM
- Pinch strength
- Grip strength
- Presence of swelling
- Presence of deformity

→ Cannot reflect patient real functional impact and actual performance

Performance-based task simulation
→ Time consuming
→ ✗ complex reflect actual performance

Self-rated inventory:
1. DASH → upper arm functioning
2. Chinese version of Michigan Hand Outcomes Questionnaire → hand function

→ long questionnaire
→ time-consuming
→ complex scoring method
→ less sensitive to hand OA
A possible choice: Functional Index for Hand Osteoarthritis (FIHOA)

- Semi-quantitative questionnaire, self-rated or physician-administered
- Rate level of difficulty experienced in 10 daily tasks in 4-point scale
  - Total score: 0 (no functional impairment) - 30 (maximal functional impairment)
- More quantitative in documenting functioning changes
- Measurement of treatment efficacy and effectiveness

Advantages of choosing FIHOA:

✓ Validated and proved reliable, valid and responsive (Dreiser, 1995, 1997, 2000)
✓ Fast (~2 minutes)
✓ Free of charge
✓ Easily accessible
Study aim

1. Cross-culture translate, adapt and validate Functional Index for Hand OsteoArthritis (FIHOA) into Chinese version
2. Evaluate the validity, reliability and internal consistency of the questionnaire
3. Provide possibility for clinicians to apply FIHOA on Hong Kong OA hand Chinese patients in the future
Flow of Study

Translation and adaptation: forward and backward translations, collection of expert panel opinion

Pilot Testing (N=10)
Collect data at PWH

Data collection (N=32)
Collect data at PWH

Validation
SPSS analysis

Content validity
Face validity
Trial of translated ver FIHOA & look for amendments

Construct validity
Test-retest reliability
Internal consistency

JUL
AUG
OCT
手部關節病功能指數 (FIHOA)

請為自己做出下列動作的能力評分。

1. 扭動插在鎖中的鑰匙
2. 用刀切肉
3. 使用剪刀
4. 單手舉起裝滿水的瓶子
5. 握實拳頭
6. 綁鞋帶或打繩結
7. 使用智能手機打字
8. 繫鈕扣
9. 長時間 (10 分鐘或以上) 持續書寫
10. 使用筷子

評分準則
0：可以做到，沒有難度
1：可以做到，略有難度
2：可以做到，難度極高
3：無法做到

Step 1: Translation and adaptation:
forward and backward translations, collection of expert panel opinion

compared backward translated FIHOA with original English FIHOA
→ No significant semantic difference was found after comparison

Collect panel questionnaires and analyze the results

Satisfied face validity and content validity
- Unanimous feedback (100%) indicated that they can understand the instruction
- Nearly all feedback (98%) indicated that they understand the wordings and meanings of the 10 items
- Unanimous feedback (100%) on Item 1-9 are highly relevant to hand function

Amended FIHOA by translator 1 and translator 2 as prefinal version
Step 2: Pilot Testing (N=10)

Pilot Testing FLOW

10 subjects recruited by PWH OTs

Gaining consents by signing consent forms

Fill in Pre-final Chinese-FIHOA

Trial of Study Process
→ ensure questionnaires are understandable
→ uncover hidden problem

* Observed no confusion of items by subjects
* Process smooth without prominent problems
* → finalized Chinese FIHOA

Gender: Male 2 Female 8

Age:
- 56-60: 1
- 61-65: 5
- 66-70: 1
- 71-75: 2
- 76-80: 0
- 81-85: 1
Step 3: Data collection (N=32)

Test-Retest FLOW

32 subjects recruited by PWH OTs

Gaining consents by signing consent forms

Filling in 3 Questionnaires:
1. Translated Chinese Version of FIHOA
2. Chinese (QMH, HK, Version) Disability of Arm, Shoulder and Hand
3. The Chinese (Hong Kong) SF-36 Health Survey.

one week interval

Fill in Translated Chinese Version of FIHOA for second time through:
1. face to face meeting during health education talk/ follow up consultation
2. phone call
Selection Criteria:

Subject (N=32)
individuals with OA hands from PWH OT department

Inclusion Criteria:
- OA hand patients with degenerative joint disease
- both gender
- age range: 56-85

Exclusion Criteria:
- Illiteracy
- Blurred vision
- Intellectual disabled
- Diagnosis of neurocognitive or neurological disorders
- Mentally unfit
- Hand RA and other arthritis
- Recent hand traumatic injury

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

Age

<table>
<thead>
<tr>
<th>Year range</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>56-60</td>
<td></td>
</tr>
<tr>
<td>61-65</td>
<td></td>
</tr>
<tr>
<td>66-70</td>
<td></td>
</tr>
<tr>
<td>71-75</td>
<td></td>
</tr>
<tr>
<td>76-80</td>
<td></td>
</tr>
<tr>
<td>81-85</td>
<td></td>
</tr>
</tbody>
</table>

Affected hand

- Dominant hand: 25.0%
- Both hands: 43.8%
- Non-dominant hand: 31.3%

Year of onset

- >10 years: 12.5%
- 6-10 years: 18.8%
- 2-5 years: 37.5%
- <=1 year: 31.3%
Validation
SPSS analysis

N=32
1. 1st FIHOA
2. DASH-HK
3. SF-36

N=30
2nd FIHOA

do one week
interval

1st FIHOA vs DASH-HK
Convergent Validity

1st FIHOA vs SF-36 (MCS)
Discriminant Validity

1st FIHOA vs 2nd FIHOA
Test-Retest Reliability
(Item-item)

1st FIHOA & 2nd FIHOA
Test-Retest Reliability
(Total-total)

Internal consistency

Item-total correlation
Convergent Validity: FIHOA vs DASH-HK

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Range</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st FIHOA</td>
<td>32</td>
<td>7.69</td>
<td>5.50</td>
<td>6.9</td>
<td>24</td>
<td>2.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.50 12.25</td>
</tr>
<tr>
<td>DASH-HK</td>
<td>32</td>
<td>33.2</td>
<td>29.3</td>
<td>21.9</td>
<td>71.7</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29.3 52.4</td>
</tr>
</tbody>
</table>

↓ score = ↑ functioning 😊
↓ score = ↑ functioning 😠

SPSS Result:
High correlation (p<0.05)

(Mukaka, 2012)
Discriminant Validity: FIHOA vs SF-36 MCS

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Range</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st FIHOA</td>
<td>32</td>
<td>7.69</td>
<td>5.50</td>
<td>6.9</td>
<td>24</td>
<td>2.25</td>
</tr>
<tr>
<td>SF-36 MCS</td>
<td>32</td>
<td>44.5</td>
<td>42.8</td>
<td>11.8</td>
<td>40.6</td>
<td>35.0</td>
</tr>
</tbody>
</table>

↓ score = ↑ functioning
↑ score = ↑ mental health

SPSS Result:

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>FIHOA_1</th>
<th>SF36_MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>-.587**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

Significant (p<0.05)
Test-retest reliability: FIHOA Total score

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Range</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>50</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st FIHOA</td>
<td>30</td>
<td>7.67</td>
<td>5.00</td>
<td>6.92</td>
<td>24</td>
<td>2.75, 5.00, 10.75</td>
</tr>
<tr>
<td>2nd FIHOA</td>
<td>30</td>
<td>7.20</td>
<td>6.00</td>
<td>5.33</td>
<td>21</td>
<td>3.75, 6.00, 10.00</td>
</tr>
</tbody>
</table>

SPSS Result:

ICC = 0.825
Good Test-retest Reliability

<table>
<thead>
<tr>
<th>Intraclass Correlation</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Measures</td>
<td>.825^a</td>
</tr>
<tr>
<td>Average Measures</td>
<td>.904</td>
</tr>
</tbody>
</table>
Internal Consistency: item-total score

1st FIHOA

Item-Total Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item1</td>
<td>7.06</td>
<td>40.899</td>
<td>.628</td>
<td>.584</td>
<td>.921</td>
</tr>
<tr>
<td>Item2</td>
<td>6.78</td>
<td>37.983</td>
<td>.730</td>
<td>.821</td>
<td>.916</td>
</tr>
<tr>
<td>Item3</td>
<td>6.72</td>
<td>37.112</td>
<td>.805</td>
<td>.898</td>
<td>.911</td>
</tr>
<tr>
<td>Item4</td>
<td>6.94</td>
<td>40.835</td>
<td>.626</td>
<td>.625</td>
<td>.921</td>
</tr>
<tr>
<td>Item5</td>
<td>7.03</td>
<td>40.805</td>
<td>.727</td>
<td>.702</td>
<td>.917</td>
</tr>
<tr>
<td>Item6</td>
<td>6.97</td>
<td>38.289</td>
<td>.837</td>
<td>.833</td>
<td>.910</td>
</tr>
<tr>
<td>Item7</td>
<td>7.00</td>
<td>40.129</td>
<td>.682</td>
<td>.735</td>
<td>.918</td>
</tr>
<tr>
<td>Item8</td>
<td>6.88</td>
<td>41.339</td>
<td>.595</td>
<td>.800</td>
<td>.923</td>
</tr>
<tr>
<td>Item9</td>
<td>6.84</td>
<td>38.459</td>
<td>.754</td>
<td>.757</td>
<td>.914</td>
</tr>
<tr>
<td>Item10</td>
<td>6.97</td>
<td>38.547</td>
<td>.741</td>
<td>.738</td>
<td>.915</td>
</tr>
</tbody>
</table>

Corrected item-total correlation: 0.595-0.837 for 1st & 0.400-0.710 for 2nd
> 0.4 is considered Satisfactory (Yoosefinejad, Motealleh, & Babakhani, 2017)

Cronbach’s Alpha if item deleted:
~0.90 (0.910-0.923) for all items in 1st FIHOA
~0.85 (0.835-0.862) for all items in 2nd FIHOA
Similar correlation=no problematic item
Discussion on Results

1. **Convergent validity (FIHOA vs DASH):** significant positive correlation ($r=0.754$, $p<0.001$)
   - FIHOA is measuring a domain of hand functions, in OA patient

2. **Test-retest reliability:** good ICC
   - FIHOA is a reliable scale for assessing OA hands
   - lower than other translations (*Chinese*: 0.825, *Dutch*: 0.96, *Italian*: 0.96)
   - small sample size (*Chinese*: 32, *Dutch*: 72, *Italian*: 72)

3. **Internal consistency:** excellent Cronbach’s Alpha (>0.8)
   - items have strong correlation to each other
   - including culturally-adapted items (item 3, 7, 10)
Strength of this Study

1. First Chinese version of FIHOA:
   - The **first version** of FIHOA translated to **Chinese**
   - Enable usage in Hong Kong

2. Adapted up-to-date and culturally-related items:
   1. Add item: “use of chopsticks” – using chopsticks as **important hand function** in Chinese social culture (Li-Tsang, Lee & Hung, 2006)
   2. Add item: “use mobile phone to type” – Digital in our daily life: 96.8% of people in Hong Kong have their own mobile phone (Hong Kong Census and Statistics Department, 2018)
   3. Deleted original item 7 (For women - able to sew? For men - use a screwdriver? ) and item 10 (accept handshake without reluctance) in daily functioning are nowadays in Hong Kong
   4. shaking hands is not common in Hong Kong culture

---

*Note: The text includes some images of a smartphone and a handshake.*
Clinical Significance of Chinese-FIHOA

- Chinese FIHOA
- The **only Chinese questionnaire** on hand OA that measures functional impact
- Act as a **free, fast and simple** screening test (~2mins for each administration)
- **Culturally-related and up-to-date** items that fit Hong Kong people lifestyle
- Especially suitable for occupational therapists
Thank you