Introduction/Background
Leadership is a critical factor for implementing evidence-based practice. The Implementation Leadership Scale (ILS) is a valid and reliable instrument that focuses specifically on leadership for implementing EBP. The ILS measures the degree to which a leader is proactive, knowledgeable, supportive, and perseverant in their efforts to implement EBP. The ILS includes 12 items scored on a scale of 0 (not at all) to 4 (a very great extent). The ILS has been validated in mental health clinics with clinicians, alcohol and drug use treatment agencies with counselors, and child welfare services with social workers and other allied health professionals. It has shown to be an efficient and pragmatic scale for capturing leadership behaviors with which to implement EBP. However, this scale or the other similar instrument does not exist in Chinese and also it is unclear how ILS items and constructs would be interpreted and understood in Chinese mainland settings.

Purpose
The purpose of this study was to translate the ILS into Chinese and validate the translated ILS into Chinese nursing context.

Methods
We followed the guideline for translation, adaptation and validation of instruments or scales for use in cross-cultural health care research. The data collection took 18 months, from March 2017 to August 2018.

1. Forward Translation: The original ILS (English) was translated into written simplified Chinese (target language) independently by two bilingual translators who had experience living in China and Western countries (termed bicultural).

2. Comparison of the Two Forward Translation Versions: A forward-translation committee compared the two translated ILS versions and examined discrepancies between words, sentences, and meanings. The committee was composed of five nursing scholars in China with different experiences and clinical backgrounds.

3. Blind Backward Translation: The preliminary Chinese ILS (Post-Forward Translation) was then translated back into English by two different independent translators with qualifications similar to those of the forward translators.

4. Comparison of the Two Backward Translation Versions: Similar to the forward translation comparisons, a backward translation committee was established to compare the backward translation versions and resolve discrepancies. This committee included one doctorate candidate who was bilingual in Chinese and English, two nursing professors and the ILS tool developers.

5. Linguistic Validation: Linguistic validation assesses the clarity, intelligibility, appropriateness, and cultural relevance of the target language version to the target population. Cognitive interviewing methods were used to evaluate how participants understood and responded to the title, instructions, response scaling, domains, and items in the Chinese ILS. A convenience sample was used to recruit participants from an academic health institution that provides comprehensive health care services for all age groups in China. Participants included nursing staff and leaders who had worked more than three years in their current positions. Data analysis was based on cognitive process including 1) comprehension (encoding processes), 2) recall
(retrieval processes), 3) inference (judgment processes), 4) mapping (response processes), and 5) editing (processes used to edit answers).

6. Content validation: Content validation focuses on whether a scale has appropriate items sampled to adequately represent the construct being measured. Ten experts, who were knowledgeable about the construct of leadership in the content area of EBP in healthcare, were recruited to evaluate the relevance of the specific items for representing the concepts being measured. Content validity was evaluated using Item-level content validity index, Scale-level CVI/averaging calculation, Scale-level CVI/universal agreement calculation, Item-level modified Cohen’s coefficient kappa

7. Psychometric testing: A convenience sample was used to recruit nursing staff who had worked more than one year in their current positions. All the participants were from academic health institutions in China. Validity, reliability and acceptability of the Chinese ILS were tested. Confirmatory factor analysis and Correlation with Multifactor Leadership Questionnaire were used to test structural validity and structural validity respectively. In terms of reliability, Internal consistency was tested using Cronbach Alpha. Four domains of acceptability were evaluated, which included Time length to complete the tool (seconds), easy to response (0-4, “Not at all” to “Very great extent”), relevancy (0-4), clarity (0-4).

Results
The translation process took 12 months. In the forward and backward translation (two rounds respectively), 24 translation issues were identified, of which semantic equivalence issues were most frequent (n=16). Three main solutions were used to address the translation challenges and issues.

Two rounds of cognitive interviews were conducted. Ten nurses participated in each round, resulting in a response rate of 71% and 83% in rounds one and two respectively. Thirty-three linguistic issues were found, of which comprehension issues were most frequent (n=21).

Ten experts (71% response rate) participated in content validation. All content validity indexes reached recommended standards. The final Chinese ILS has three significant adaptations to the original instrument.

We recruited 234 nurses (response rate:85.26%) from 35 units (mean 6.67 nurses/unit, 3/unit to 16/unit). In confirmatory factor analysis, item level factor loadings ranged from 0.79 to 0.95 and domain level ranged from 0.87 to 0.98. Also, all the model fit index showed the structural validity was good. Convergent Validity with Multifactor Leadership Questionnaire was adequate (r=0.40-0.63, p<0.05). Cronbach Alpha for each domain was from 0.86 to 0.95, which means good reliability. Participants spent average 80 seconds (30 to 240) finishing the Chinese ILS.

Most participants strongly agree that these questions are easy to answer (56.8%), relevant (66.7%), clarity (66.6%)

Conclusions
The findings in this study showed that the translated ILS could be conceptually understood in the Chinese nursing context (conceptual equivalence; item equivalence), correctly reflect the intended English meaning (semantic equivalence). Also, the wording, format, instruction and scaling of the Chinese ILS could be accepted by targeted respondents (operational equivalence). Finally, the Chinese ILS showed acceptable initial psychometric properties with respect to measuring implementation leadership in Chinese nursing context (statistic equivalence). The Chinese ILS has the potential to be a foundational factor in research on the development of implementation leadership in Chinese nursing; it can provide a common language for
investigators conducting research in China to investigate and understand leadership within implementation science.

In this study, we used a rigorous and systematic methodology to translate and validate the ILS into Chinese nursing context. This process could serve as an example to facilitate the translation and validation of the ILS or other measurement tools into other cross-cultural contexts with different languages.

---

**Title:**
Translation and Validation of the Implementation Leadership Scale in Chinese Nursing Context

**Keywords:**
Cross-cultural validation, Implementation leadership and Knowledge translation

**References:**
Abstract Summary:
Leadership is a critical factor for implementing evidence-based practice. By attending the session, participants will learn about the concept and measurement of implementation leadership and the main strategies to translate and validate the Implementation Leadership Scale in the cross-cultural context with different language.

Content Outline:
Introduction/Background
- Leadership is considered a critical factor for the implementation of evidence-based practice in different settings and among different professional groups.
- The concept of implementation leadership
- A systematic review on the measurement of leadership in the implementation of evidence-based practice
- Introduction of the Implementation Leadership Scale
- Measuring the degree to which a leader is proactive, knowledgeable, supportive, and perseverant in their efforts to implement EBP
- Twelve items scored on a scale of 0 (not at all) to 4 (a very great extent)
- Well developed and widely used in different settings

Purpose
- To translate and the ILS into Chinese
- To validate the translated ILS into Chinese nursing context

Methods
- Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline
- Translation: Forward Translation (English to Chinese), Comparison of the Two Forward Translation (Chinese) Versions, Blind Backward Translation (Chinese to English), Comparison of the Two Backward Translation (English) Versions
- Linguistic validation: Using cognitive interview to evaluate how Chinese nursing staff and leaders understood and responded to the translated ILS (Chinese)
- Content validation: To evaluate the relevance of the specific items for representing the concepts being measured using Content Validity Index, which includes Item-level content validity index, Scale-level CVI/averaging calculation, Scale-level CVI/universal agreement calculation, Item-level modified Cohen’s coefficient kappa
- Psychometric testing
- Validity: Structural validity (Confirmatory Factor Analysis), Convergent validity (Correlation with the Multifactor Leadership Questionnaire)
- Reliability: Internal consistency (Cronbach Alpha)
- Acceptability: Time length, Easy to response, Relevancy, Clarity

Results
- Translation
- Two rounds of forward translation and backward translation
- 24 translation issues were identified: 16 semantic equivalence issues, five conceptual equivalence issues, two item equivalence issues, one operational equivalence issue
- Three main solutions to address the translation challenges and issues
- Linguistic validation
Two rounds of cognitive interviews with 20 participants
- 33 translation issues were identified: 21 comprehension issues, five recall issues, three inference issues, three mapping issues, one editing issue
- Content validation
- Ten experts, who are knowledgeable about the construct of leadership in the content area of EBP in healthcare
- Content Validity Index showed good Content validation
- Three significant adaptation and the final version of the Chinese ILS
- Psychometric Testing
- 234 nurses from 35 units
- It showed that the Chinese ILS had good validity, reliability and acceptability

Conclusion
- The Chinese ILS has the potential to be a foundational factor in research on the development of implementation leadership in Chinese nursing; it can provide a common language for investigators conducting research in China to investigate and understand leadership within implementation science.
- In this study, we used a rigorous and systematic methodology to translate and validate the ILS into Chinese nursing context.

The rigorous and systematic methodology in this study can facilitate the translation and validation of the ILS into other languages or other measurement tools into Chinese or other language.

Primary Presenting Author
Jiale Hu, MScN, RN
University of Ottawa
Clinical Investigator
Ottawa ON
Canada

Author Summary: Jiale (Gary) Hu is an international nursing PhD student funded by a Trillium Scholarship at University of Ottawa. He used to work as a nurse anesthetist in China. Now he is serving as an adjunct professor at Department of Nurse Anesthesia, Virginia Commonwealth University, USA. He is interested in pain after surgery and knowledge translation in anesthesia and analgesia.