Cross-cultural adaptation of the Satisfaction and Recovery Index among Japanese people with musculoskeletal disorders

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Abstract. [Purpose] The primary aim was to cross-culturally adapt the Satisfaction and Recovery Index (SRI) among Japanese people. The secondary aim was to preliminarily investigate the convergent validity of the SRI with the SF-12v2® Health Survey among ambulatory patients with musculoskeletal disorders. [Participants and Methods] A provisional Japanese SRI was developed after forward and backward translations and confirmation from its original developer. This study included 30 outpatients diagnosed with musculoskeletal disorders at an orthopedic clinic in Japan. All participants underwent the SF-12v2® Health Survey and the provisional Japanese SRI. They were then asked to provide comments about the provisional Japanese SRI. Pearson’s r was calculated to examine the convergent validity between the SF-12v2® Health Survey scores and the provisional Japanese SRI scores. [Results] The provisional Japanese SRI was accepted as the final version due to no serious concerns raised by the participants. Only the mental component scores of the SF-12v2® Health Survey had a statistically significant correlation (r=0.45), indicating partial evidence of the convergent validity of the provisional Japanese SRI. [Conclusion] This study developed the Japanese SRI with preliminary validity evidence among ambulatory patients with musculoskeletal disorders.

Key words: Patient-reported outcome measure, Recovery, Validity

INTRODUCTION

A patient-reported outcome measure (PROM) centered on patients is essential to delivering patient-centered clinical practice, a core of the 21st-century health care system and education within the health professions education. One of the commonly used patient-centric PROMs is the patient-specific functional scale (PSFS). In the PSFS, patients identify important activities as items, making it a more patient-centric PROM when compared with PROMs including structured items, such as the Medical Outcomes Survey Short-Form (SF). However, an unstructured PROM such as this does not allow for between-patient comparisons. Thus, a semistructured PROM, wherein patients rate the importance of structured items and the magnitude of the psychometric properties to be investigated (e.g., disability and satisfaction) is considered to be a promising patient-centric PROM and thus has been developed recently.

The Satisfaction and Recovery Index (SRI) is an example of a semistructured PROM that is region-agnostic. The SRI was developed by considering the low use of PROMs in clinical practice, possibly due to the length of PROMs, the cost of copyrighted scales, or the complicated scoring algorithms. In the SRI, patients rate the importance of nine items and their satisfaction on two 11-point scales. These items were generated via content validity examinations using a focus group that included patients with the whiplash injuries, incorporating feedback from expert panels, and conductive cognitive interviews.
with patients with upper extremity disorders. The SRI demonstrated a single factor loading in the exploratory factor analysis, convergent validity with the SF-12v2® Health Survey, and better responsiveness than the SF-12v2® Health Survey among ambulatory community-dwelling people with traumatic musculoskeletal injuries. Furthermore, the SRI is free.

The SRI is considered a promising PROM when considering “recovery”. Criteria for recovery are often determined using a cut-off score calculated from a regional condition-specific PROM and use “return to pre-injury status” in clinical practice and research for musculoskeletal disorders. However, it is sometimes difficult to recall a patient’s pre-injury status, particularly for those with a long history. Therefore, the SRI can be a promising, widely applicable, and easy-to-use tool in musculoskeletal practice; however, to date, the SRI has not been cross-culturally adapted into Japanese. The development of the Japanese version of the SRI was thus considered vital to enhancing the quality of clinical practice and research for musculoskeletal disorders. The primary aim of the current study was to undertake cross-cultural adaptation of the SRI into Japanese, and the secondary aim was to preliminarily investigate the convergent validity of the SRI with the SF-12v2® Health Survey among ambulatory patients with musculoskeletal disorders.

PARTICIPANTS AND METHODS

The approval of the SRI’s adaptation into Japanese was obtained from its developer, David M. Walton. This study was approved by the institutional research committee (Saitama Prefectural University, No. 21010), where the anonymous paper-based survey was conducted.

The cross-cultural adaptation consisted of five steps. In Step 1, two English-Japanese bilingual translators (YT and the author) independently translated the SRI into Japanese. One translator, the author, was a physical therapist who understood the SRI, and the other was not a healthcare provider and was unfamiliar with the SRI. In Step 2, a combined Japanese draft was developed with discussions among the two forward translators. In Step 3, the combined Japanese draft was then back-translated into English independently by two English-Japanese bilingual translators (HH and OT) who were unfamiliar with the SRI. In Step 4, the developer reviewed and commented on the two drafts in English to confirm their conceptual equivalences to the original. While considering the comments, a provisional draft was developed after discussions among the four translators. Modifications to ensure semantic, idiomatic, experiential, and conceptual equivalences were recorded.

Using convenience sampling, volunteers were recruited in an outpatient orthopedic clinic in Japan. Inclusion criteria were: having Japanese as their native language, ≥18 years of age, and being outpatients referred to physical therapy with a diagnosis of musculoskeletal disorders. Exclusion criteria were patients with a diagnosis of cognitive, neurological, or respiratory disease.

A questionnaire package was given to the eligible patient after the initial session of physical therapy session, and when completed, was submitted to a data-collection box at the clinic. The package included: demographic items (age and gender); symptom locations and symptom duration; the 4-item Pain Intensity Measure (P4) for pain intensity; a 1-week recall form of the SF-12v2® Health Survey; and the provisional draft of the Japanese SRI. The symptom locations were assessed using a body chart divided into 20 parts, as used in a previous study. The symptom duration was selected from three options: acute, lasting for <7 days; subacute, lasting for ≥7 days and ≤3 months; chronic, lasting for >3 months. The P4 consists of four 11-point numerical rating scales for averaged pain intensity during the last 2 days in the morning, afternoon, and evening, and during activities. The P4 is a reliable scale for pain intensity, with a higher total score indicating greater pain intensity (0–40). The 1-week recall form of the SF-12v2® Health Survey includes 12 items with 8 psychometric properties (physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health). From the 8 psychometric properties, 2 summary scores are calculated (physical component score [PCS] and mental component score [MCS]) using Japanese correction formulas, where a score of 50 is the Japanese standard, and higher scores indicate a better health status. The SRI included a dummy item (Items 6) to ensure attention. The score of the SRI is calculated by the following formula from 9 items, excluding Item 6:

\[
\text{Weighted score} = \text{Satisfaction} \times \text{Importance} \quad (1)
\]

\[
\text{SRI score} = \left[ \frac{\text{Sum of weighted scores}}{\text{Sum of importance scores}} \right] \times 100 \quad (2)
\]

The provisional draft of the Japanese SRI was attached at the bottom of the questionnaire package. Immediately below the SRI, participants were asked to freely provide comments when they had difficulty in understanding any expressions or contents of items.

Sample size estimation was based on a minimum sample size of 30 for the pilot testing of the cross-cultural adaptation process. A criterion for the acceptance of an item in the pilot testing of the provisional draft of the Japanese SRI was whether <5% of comments indicated “unable to understand” as per the criterion in a previous study. The mean, median, standard deviations, and score range of the importance score of the SRI were calculated.

For the preliminary investigation of the convergent validity of the SRI with the SF-12v2® Health Survey, Pearson’s correlation coefficients were calculated between the SRI score and PCS scores and between the SRI score and MCS scores. For a satisfactory convergent validity criterion, moderate positive correlations (r=0.4–0.7) were expected between the SRI and...
the PCS or MCS. Statistical analysis was conducted using the Statistical Package for the Social Sciences (version 21.0, IBM Corporation, Armonk, NY, USA) with a 5% threshold for statistical significance.

RESULTS

The discussions undertaken to develop the provisional draft of the Japanese SRI were summarized (Supplementary material 1). The data of 30 participants were analyzed (Table 1), and participants’ symptom locations are presented in Fig. 1. One participant had an incomplete SRI; as such, importance scores and Pearson’s correlation coefficients were calculated among 29 participants. The pilot test results are summarized in Table 2, where the provisional draft of the Japanese SRI was considered to be accepted as the final Japanese version (Supplementary material 2). The importance score for each item is summarized in Table 3. Pearson’s correlation coefficients between the SRI score and PCS scores and between the SRI score and MCS scores were 0.21 (p=0.26) and 0.45 (p=0.01), respectively.

DISCUSSION

The current study undertook a cross-cultural adaptation of the SRI into Japanese. The SRI requires respondents to rate two contents: importance and satisfaction. There was only one participant who did not understand the structure of the SRI (3.3%); another study using a similar 2-content structure PROM demonstrated acceptance from respondents per a robust respondents’ comprehensibility assessment13. Therefore, the SRI structure is considered to be acceptable among ambulatory patients with musculoskeletal disorders. Further, the distributions of importance score demonstrated high median values and wide score ranges for each item. These distributions indicate that items are not all equally important across all participants and confirm the patient-centric nature of the SRI.

The SRI scores statistically significantly correlated with the MCS, indicating convergent validity. However, a statistically significant correlation between the SRI and PCS was not detected. These findings are different from the findings in the previous study14. Possible reason for the difference includes the difference in the target population. The previous study included those with traumatic musculoskeletal injuries whereas the current study included those with any musculoskeletal disorders. Another possible reason could be the low sample size; a post-hoc power analysis demonstrated a power of 0.3 for the correlation between the PCS and SRI scores. However, the lack of correlation between the SRI scores and the PCS may indicate the importance of a specific PROM for functions, for example, the PSFS 2.02, when recovery is particularly examined from a perspective of physical functions.

Table 1. Summary of the 30 participants

| Variables                                      | n=30 |
|------------------------------------------------|------|
| Gender [n of males], %                         | 18   |
| Age (years), mean (SD)                         | 44.7 (18.3) |
| Symptom duration [n of acute], %               | 5    |
| Symptom duration [n of subacute], %            | 9    |
| Symptom duration [n of chronic], %             | 16   |
| 4-item Pain Intensity Measure (0–40), mean (SD)| 17.2 (8.1) |
| Satisfaction Recovery of Index score (0–100), mean (SD)* | 71.3 (18.3) |
| SF-12v2® Health Survey: physical component score, mean (SD)† | 48.4 (0.8) |
| SF-12v2® Health Survey: mental component score, mean (SD)‡ | 50.7 (0.6) |

* n=29
† Score of 50=Japanese average status.
‡ SD: standard deviation.

Fig. 1. Symptom locations of 30 participants.
It is important to note that the Japanese SRI is provided with open access for free use. In order to facilitate the use of the SRI in clinical practice and research, the identification of minimum detectable changes and minimum clinically important changes would be required.

Potential limitations in the current study include the small sample size for a robust examination of the construct validity. Furthermore, the sample in the current study has an unintentional bias toward patients with low back pain. For a comprehensive examination of the validity of the SRI in the population of Japanese patients with musculoskeletal disorders, a far larger cohort with more variety in musculoskeletal disorders is required.

In conclusion, this study developed the Japanese SRI. There was a preliminary evidence of the convergent validity of the SRI toward MCS of the SF-12v2 Health Survey. The Japanese SRI is free to use and thus may become a standardized PROM to investigate recovery from musculoskeletal disorders.

Funding and Conflict of interest
None.

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