

Research Article

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## The Korean language version of Stroke Impact Scale 3.0: Cross-cultural adaptation and translation

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### | Abstract |

**PURPOSE:** Stroke is one of most common disabling conditions and it is still lacking of measuring patient's functioning level. The aim of the study was to develop Korean language version of stroke impact scale 3.0.

**METHODS:** Korean version of stroke impact scale 3.0 was developed in idiomatic modern Korean with a standard protocol of multiple forward and backward translations and an expert reviews to achieve equivalence with the original English version. Interviews with clinicians who were currently managing patients with stroke were also conducted for language evaluation. A reliability test was performed to make final adaptation using a pre-final version. To assess the reliability of the translated questionnaire, the intraclass correlation coefficient (ICC) was calculated for each domain of the scale.

**RESULTS:** Thirty subjects (16 male, 14 female) aged from 20 to 75 years old participated to review the translated questionnaire. Reliability of each domain of the questionnaire was found to be good in strength (ICC=0.74), ADL (ICC=0.81),

mobility (ICC=0.90), hand function (ICC=0.80) and social participation (ICC=0.79), communication (ICC=0.77) with total (ICC=0.76). However, domains of memory and thinking (ICC=0.66), and emotion (ICC=0.27) and showed poor reliability.

**CONCLUSION:** This study indicates that the Korean version of SIS 3.0 was successfully developed. Future study needed for obtaining the validity of the Korean version of SIS 3.0.

**Key Words:** Cross-cultural adaptation, Stroke impact scale, Stroke

### I. Introduction

The concept of functional measurement is now widely used by clinicians and clinical researchers because it provides information which differs considerably from that arising from the traditional measurement of clinical signs and symptoms. Instead of focusing on signs and symptoms used for diagnostic purposes, functional scales measure the impact of a disease on the performance of everyday functioning. Function is considered the most important aspect of health problem (Waddell, 2004) and clinical relevance in stroke outcome measures can be optimized by incorporating a framework of health and disability. It

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has been suggested that the international classification of functioning, disability and health (ICF) provides the conceptual framework for measuring disability and health. In the ICF model, outcome measures may be at the levels of body functions and structure, activities and participation, which environmental and personal factors could interact with (Cieza and Stucki, 2004; Geyh et al, 2004).

Stroke is one of most common disabling conditions (Bath and Lees 2000). Large number of functional scales measuring stroke have been developed and published in English. The most commonly used stroke outcome measures are Fugl-Meyer Assessment, Modified Ashworth, Mini Mental State Examination, Barthel Index, Functional Independence Measure, Berg Balance Scale, Motor Assessment Scale, Modified Rankin Handicap Scale, Stroke Specific Quality of life, and Stroke Impact Scale (Tse et al, 2013). The Fugl-Meyer Assessment, Modified Ashworth and Mini Mental State Examination are instruments for measuring at the body function level (Salter et al, 2005a), and Barthel Index, Functional Independence Measure, Berg Balance Scale, Motor Assessment Scale and Modified Rankin Handicap Scale are measuring tools for activities (Salter et al, 2005b). Stroke Specific Quality of life and Stroke Impact Scale are designed for measuring for participation. The SIS is the multi-dimensional instrument and it is most widely used in stroke research (Salter et al, 2005c, Tse et al, 2013).

The world Health Organization provides ICF as a conceptual framework that could help classification of the scales and support to choose the appropriate measure for a particular purpose (WHO, 2001). Although measuring health status is an important component of research and clinical practice and many scales are appearing in the literature, only few validated scales for stroke exist. Further, non-English speakers are often excluded from clinical trials and epidemiological studies for reasons including the lack of valid and reliable cross-cultural measurements. The purpose of this study was to translate

and culturally adapt one of the most-used stroke disability questionnaires – the stroke impact scale – into the Korean language, and evaluate their reliability to achieve a good cross-cultural adaptation.

## II. Methods

### 1. Translation and cultural adaptation procedure

The procedure used here followed the guidelines proposed by Beaton et al (2000). The goal was to establish Korean cultural adaptations of the original English version of the stroke impact scale 3.0. The translators participated were composed of four different groups. Two of them speak Korean as their mother tongue, and the other 2 groups speak bilingual in English and Korean.

Translation procedure was involved independent forward translation, backward translation, review translated versions to develop pre-final versions of the scale and pilot test for final adaption of the scale. The forward translation from English to Korean was made by two groups of translators who were using Korean as their mother tongue. Group 1 was composed of academic and clinical professionals involved in physiotherapy. Group 2 translators had no medical or health professional background. Each group produced a Korean version of the questionnaire independently. The translations from each translator were then compared and discrepancies that might reflect ambiguous wording in the original or discrepancies in the translation process were discussed. Then, one common translation, synthesized version was produced with general agreement from each translator.

The backward translation was made to verify that the meanings of the scales were preserved. Back translation (Korean to English) was carried out by working from the synthesized version and these translators were blinded to the original version. Two versions of the back translation were made by two groups of bilingual in Korean and

English. The expert committee comprised of four clinical academics who had significant experience in the use of disability questionnaires, then integrated all the versions of the questionnaires and developed a pre-final version of the questionnaire for pilot testing. All the translations were reviewed and a consensus version was made by the committee. When unclear items were identified by this process, the translation and back-translation processes were repeated for clarification. ICF language was recommended for words, if it contains the same concept as ICF has. The pilot test was performed to make final adaptations.

## 2. Subjects

Subjects whose mother tongue was Korean volunteered. Anyone who was seeking treatment for their health problems resulted in stroke during the study period or anyone who was illiterate was not included in the study.

## 3. Procedure and analysis

The questionnaire was collected twice from each subject on two different occasions for test-retest reliability. Reliability can be defined as the extent to which a statistically derived measure from a sample gives the same results on repeated sampling under the same conditions. After completing each questionnaire on the first occasion, subjects were asked to fill in the same questionnaire again within seven days. The interval between occasions was 3 days to 7 days depending on subject availability. Each subject was interviewed after completing the questionnaires on the 2<sup>nd</sup> occasion to explore what they thought was meant by each questionnaire item. Language evaluation was also performed by clinicians who were currently treating patients with stroke. To assess the reliability of the translated questionnaire, the intraclass correlation coefficient (ICC), as described by Shrout and Fleiss (1979) was calculated for each domain of the Korean version of the SIS 3.0, across the two measurement occasions.

## III. Results

### 1. General characteristics of subjects

Thirty subjects (16 male, 14 female) aged from 20 to 75 years old completed the pre-final version of the translated questionnaire to check for any misunderstandings and deviations in the translation. Subjects were varied in the sense of having different educational levels from elementary school to university education and different types of working environment eg. labouring, office work, health professional, or unemployed including retired.

### 2. Cultural adaptation and reliability

A few adaptations were made based on recommendations from the expert committee and examination of the data collected in the study. They were 2 items in the daily activity domain, 'cut your food with a knife and fork' and 'make a bed' were adapted to 'use a spoon and chopsticks' and 'arrange bedclothes' respectively. Participants frequently commented that 'affected' should be expressed 'paralyzed' in general. Especially clinicians strongly recommended it to use as 'paralyzed' to make their patients easier to understand. In the domain of memory and thinking, solve everyday problems were not clear concepts to use in Korean, so these needed to be supplemented with explanatory details and examples to help patients give their answers. The participants were sometimes confused with 3 items in the emotion domain as concepts of those items were opposite to the others (see the Table 1). Accordingly, those items were recommended to use a notice board and/or a mark for such confusion.

The translated questionnaire was found to have good reliability (ICC=0.77 (95% CI: 0.56-0.88)). The reliability of the domains of ADL (ICC=0.81 (95% CI: 0.64-0.91)), mobility (ICC=0.90 (95% CI: 0.80-0.95)), hand function (ICC=0.80 (95% CI: 0.63-0.90)) were excellent. The domains of the translated version of strength (ICC=0.74 (95% CI: 0.53-0.87)), communication (ICC=0.77 (95% CI:

0.57-0.88)), and social participation (ICC=0.79 (95% CI: 0.61-0.89)) were shown to be good reliability. However, the reliability of the domains of memory and thinking (ICC=0.66 (95% CI: 0.41-0.82)), and emotion (ICC=0.27 (95% CI: -0.11-0.57)) were found to be poor.

#### IV. Discussion

The result of the study confirms that this has been achieved for the Korean versions of SIS 3.0 here. The cross-cultural adaptation of English language scale requires a process of translation, back translation, and making sure that the concepts in the original items have been satisfactorily obtained in idiomatic translation into another language (Beaton et al, 2000).

The SIS 3.0 comprises fifty-nine items divided into 8 domains; strength, memory and thinking, emotion, communication, hand function, ADL, and social participation (Duncan et al, 2003). The emotion domain of the SIS was less reliable than the other domains in repeated measures. Similar results have been reported previously in other language versions of SIS 3.0 including the English version (Duncan et al, 1999, Carod-Artal et al, 2008, Vellone et al, 2010, Mohammad et al, 2014). It may be that concepts of some items in the emotion domain contain opposite to the others that could make participants confused on their responses. Accordingly, it may be recommended marks for notice inserted in those items or they may be made reversely presented in the questionnaire.

With increasing focus on evidence-based therapy, not only are valid and reliable outcome measures needed, but valid and reliable cross-cultural adaptation of standard measures are also required. Even expert translations could fail to achieve questions that are comparable to the original English in their meanings. It is therefore important to consider the concept, cultural relevance, and the connotations of words and phrases. We had chosen words more culturally

equivalent rather linguistically, eg 'cut your food with knife and fork', 'make a bed'. The item of 'solve everyday problems' was found to have different connotations that needed to be supplement explanation inserted. The Korean version of SIS 3.0 developed here was successful, however, the acceptable measurement properties of the SIS 3.0 should be obtained to use in research and clinical areas. Therefore, future study should be needed to have its measurement properties.

#### V. Conclusion

This study indicates that the Korean version of SIS 3.0 was successfully developed. The Korean version of SIS 3.0 could be used in clinical areas. The validity of the scale should be obtained in the future study.

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## Appendix:

## 뇌졸중 영향 척도

다음은 (본인의) 뇌졸중 결과로 야기된 신체 문제에 대한 질문입니다.

1. 지난 1주일 동안, 뇌졸중으로 인해 손상 받은 신체 부위의 힘은 어느 정도입니까?	매우 강함	강함	보통	약함	전혀 없음
1) 마비측 팔의 힘					
2) 마비측 손의 잡는 힘					
3) 마비측 다리의 힘					
4) 마비측 발과 발목의 힘					

다음은 (본인의) 기억과 생각에 대한 질문입니다.

2. 지난 1주일 동안, 다음 항목에서 얼마나 어려움이 있었습니까?	전혀 어려움이 없음	약간 어려움이 있음	다소 어려움이 있음	매우 어려움이 있음	극도의 어려움이 있음
1) 사람들이 방금 말한 것 기억하기					
2) 전날에 일어난 일들 기억하기					
3) 해야 할 일 기억하기 (예. 약속 일정 지키기, 약 복용하기)					
4) 요일 기억하기					
5) 집중하기					
6) 빠르게 생각하기					
7) 일상적인 문제 해결하기					

다음은 뇌졸중이 발병한 후 (본인의) 기분 변화와 감정 조절 능력에 대해 어떻게 느끼는지에 대한 질문입니다.

3. 지난 1주일 동안, 본인은 얼마나 자주 다음과 같이 느꼈습니까?	전혀 없음	약간 있음	다소 있음	대부분 있음	항상 있음
1) 슬프다고 느낌					
2) 주변에 아무도 없다고 느낌					
3) 본인이 다른 사람에게 부담이 된다고 느낌					
4) 본인은 기대하는 것이 아무것도 없다고 느낌					
5) 자신의 실수에 대해 자책함					
6) 이전과 같이 뭔가를 즐길 수 있음					
7) 상당히 불안함					
8) 삶이 가치가 있다고 느낌					
9) 적어도 하루에 한 번 이상 미소 짓기와 웃기					

다음은 (본인이) 읽은 것을 이해하고 대화에서 들은 것을 이해하는 능력 및 다른 사람과 의사소통을 하는 능력에 대한 질문입니다.

4. 지난 1주일 동안, 다음 항목에서 얼마나 어려움이 있었습니까?	전혀 어려움이 없음	약간 어려움이 있음	다소 어려움이 있음	매우 어려움이 있음	극도의 어려움이 있음
1) 본인 앞에 있는 사람의 이름 부르기					
2) 대화하는 동안 본인에게 이야기 한 내용 이해하기					
3) 질문에 답하기					
4) 사물의 이름을 정확하게 말하기					
5) 그룹의 사람들과의 대화에 참여하기					
6) 전화로 통화하기					
7) 정확한 전화번호를 선택하고 번호를 눌러 다른 사람에게 전화하기					

다음은 (본인이) 일상생활에서 수행하는 활동에 대한 질문입니다.

5. 지난 2주일 동안, 다음 항목에서 얼마나 어려움이 있었습니까?	전혀 어려움이 없음	약간 어려움이 있음	다소 어려움이 있음	매우 어려움이 있음	극도의 어려움이 있음
1) 수저 사용하기					
2) 옷 입기					
3) 씻기					
4) 발톱 깎기					
5) 화장실에 제 시간에 가기					
6) 소변 조절(실수하지 않고)					
7) 대변 조절(실수하지 않고)					
8) 간단한 집안일(예, 먼지 털기, 이부자리 정리, 쓰레기 버리기, 설거지)					
9) 쇼핑하기					
10) 힘든 집안일(예, 청소하기, 빨래하기 또는 마당 관리)					

다음은 집과 지역사회에서 (본인의) 이동능력에 대한 질문입니다.

6. 지난 2주일 동안, 다음 항목에서 얼마나 어려움이 있었습니까?	전혀 어려움이 없음	약간 어려움이 있음	다소 어려움이 있음	매우 어려움이 있음	극도의 어려움이 있음
1) 균형을 잃지 않고 앉아있기					
2) 균형을 잃지 않고 서 있기					
3) 균형을 잃지 않고 걷기					
4) 침대에서 의자로 이동하기					

5) 한 구획/블록 걷기					
6) 빠르게 걷기					
7) 계단으로 한 층 올라가기					
8) 계단으로 여러 층 올라가기					
9) 차에 타고 내리기					

다음은 뇌졸중으로 인해 영향을 가장 많이 받은 손을 사용하는 능력에 대한 질문입니다.

7. 지난 2주일 동안, 다음 항목에서 뇌졸중으로 인해 손상 받은 손을 사용하는 데 얼마나 어려움이 있었습니까?	전혀 어려움이 없음	약간 어려움이 있음	다소 어려움이 있음	매우 어려움이 있음	극도의 어려움이 있음
1) 문손잡이 돌리기					
2) 캔이나 병 열기					
3) 신발 끈 매기					
4) 넥타이 매기					
5) 동전 집기					

다음은 본인이 평소에 했던 활동에 참여하는 능력과 본인에게 의미 있고 삶의 목적을 찾는 것을 도와주는 데 뇌졸중이 얼마나 영향을 주는지에 대한 질문입니다.

8. 지난 4주일 동안, 다음 항목에서 얼마나 제한이 있었습니까?	전혀 없음	약간 있음	다소 있음	대부분 있음	항상 있음
1) 직업(유급, 자원봉사 등)					
2) 사회 활동					
3) 정적인 여가 활동(공예, 독서)					
4) 활동적인 여가 활동(스포츠, 쇼핑, 여행)					
5) 가족이나 친구로서의 역할					
6) 영성 활동이나 종교 활동에 참여					
7) 원하는 대로 본인의 생활을 조절하는 능력					
8) 다른 사람을 도와줄 수 있는 능력					

**9. 뇌졸중 회복**

다음 0에서 100까지의 척도에서 100은 완전한 회복을 나타내고 0은 전혀 회복되지 않은 것을 나타냅니다. 어느 정도 뇌졸중이 회복되었는지를 다음의 척도에 표시하세요.

