Spine

HEALTH SERVICES RESEARCH

Cross-Cultural Adaptation and Validity of an Adapted Brazilian Portuguese Version of Scoliosis Research Society–30 Questionnaire

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Study Design. Prospective clinical study developed at a tertiary teaching facility to test an adapted Brazilian Portuguese version of the Scoliosis Research Society–30 (SRS-30) questionnaire.
Objective. To perform cross-cultural adaptation and evaluate the validity of the adapted Brazilian Portuguese version of SRS-30 questionnaire.
Summary of Background Data. Quality-of-life measurement is a common practice to assess spine diseases. The SRS questionnaires have been proven to be a valid tool in the clinical evaluation of patients diagnosed with idiopathic scoliosis in United States. However, adaptation into languages other than the source language is necessary to allow multinational use respecting cultural and lingual differences.
Methods. A translation/retranslation of the English version of the SRS-30 into Brazilian Portuguese was conducted, and all steps for cross-cultural adaptation process were performed, including a pretest with 20 patients. Sixty-four postoperative patients were submitted to the final version of the Brazilian SRS-30 questionnaire, through oral interviews. The average age of all patients who joined the study was 18.5 years. Internal consistency of the instrument was determined with Cronbach α coefficient.
Results. The study demonstrated high Cronbach α values for 4 of the corresponding domains (pain, 0.68; self-image, 0.75; mental health, 0.78; and function/activity, 0.57). However, the Cronbach α value for satisfaction domain (0.28) was considerably lower than the original English questionnaire. The overall Cronbach α values achieved 0.85 for all domains.

Conclusion. The adapted Brazilian version of the SRS-30 questionnaire can be used to assess the outcome of treatment for Brazilian Portuguese-speaking patients with idiopathic scoliosis.
Key words: quality of life, adolescent idiopathic scoliosis, surgery, treatment/outcome, validation. **Spine 2012;37:E60–E63**

The assessment of quality of life (QOL) related to health has been a common practice in the evaluation of degenerative diseases of the spine and their treatment outcomes since the past century. Even though adolescent idiopathic scoliosis (AIS) is associated with visible cosmetic deformities of the spine, it usually presents with little pain and low morbidity over time, and its outcome has been traditionally assessed through radiographic studies.[1,2] However, in recent years there has been a growing interest in instruments that allow the evaluation of patients' perception of their problem as well as satisfaction with the outcome of treatment (conservative or surgical).

To address these specific issues, in 1999 the Scoliosis Research Society (SRS) proposed a questionnaire with 24 items (SRS-24), which was tested and validated through a multicenter study on 244 patients with AIS.[3] In 2000, the SRS-24 was modified by Asher et al[4] for internal validation and consistency, creating a 22-item questionnaire (*the Scoliosis Research Society–22 Patient Questionnaire*, SRS-22) believed to be a better instrument to assess patients with AIS. In 2003, an additional modification added 8 questions to the former instrument, creating the SRS-30 designed to assess, among other things, the final outcome of patients with AIS who underwent surgical correction.[2]

To allow a global use of this questionnaire, it must be translated and validated for languages other than English. There are reports of Turkish,[5] Spanish,[6] and Chinese[7] validations of the SRS-22 and SRS-24, but none of the SRS-30 and, specifically, none into Portuguese.

The objective of this study was to present the Brazilian version of the SRS-30 questionnaire, analyzing its specific domains and items and comparing it with the SRS translated into other languages, as well as to evaluate the internal consistency of this instrument in patients with AIS. A secondary objective was to identify the existing evidence on the SRS questionnaires (SRS-22, SRS-24, and SRS-30) published in the English literature.

MATERIALS AND METHODS

Translation

The translation of the SRS-30 into Brazilian Portuguese followed the American Association of Orthopedic Surgery and the *International Quality of Life Assessment* (*IQOLA*) guidelines.[8,9] The original version of the SRS-30 was translated from English into Portuguese by 2 professional translators with general and technical experience translations, and then translated back into English by another 2 independent professional translators with the same expertise. After this step, the work was checked by the review committee composed of 2 experienced spine surgeons and the translators involved in the steps mentioned earlier. The 2 versions of the translated questionnaire were then compared with the original in English for equivalence. The last version (translated back into English) created the final version in Portuguese.

The next step was the application of the Portuguese version of the SRS-30 on 20 patients with AIS, which allowed final adjustments to the instrument before commencement of the validation process. (For the final version of the Brazilian Portuguese SRS-30 questionnaire, see Supplementary Digital Content 1, http://links.lww.com/BRS/A569.)

The SRS Questionnaire and Literature Review

The literature review process included specific search strategies in the main electronic databases and selection of potential titles that encompassed translated versions of the SRS-22, SRS-24, and SRS-30.

The SRS-30 is composed of 5 domains as follows: *function/activity*, containing 5 items (questions 5, 9, 12, 15, and 18) and 2 additional items directed to the postoperative (PO) outcome (questions 25 and 26); *pain*, 5 items (questions 1, 2, 8, 11, and 17) including 1 extra item directed to the PO outcome (question 27); *self-image/cosmesis*, 6 items (questions 4, 6, 10, 14, 19, and 23) including 3 extra items directed to the PO outcome (questions 28, 29, and 30); *mental health*, 5 items (questions 3, 7, 13, 16, and 20); and *satisfaction with management*, 2 items (questions 21 and 22) including 1 PO item (question 24). Each question was graded from 1 (worst case scenario) to 5 (best case scenario). Questions with only 3 possible answers were graded as 1, 3, or 5 (from the worst possible to the best possible outcome), discarding the even scores. Question 23 containing 9 possible answers should be graded from 1 to 5 points for each pair of answers, except for answer number 5, which receives 3 points. The scores of each domain can vary from 5 to 45 points, except for the domain of satisfaction, which ranges from 3 to 15 points. The total sum of the 4 first domains is 135 points and, when added to the satisfaction domain, may total a maximum of 150 points. The results are usually expressed in averages for each domain. The questionnaire takes about 5 minutes to be completed and may be repeated at different intervals to assess the progress of the disease. There are some extra scoring instructions that must be considered. For unanswered questions, reduce questions answered denominator by an appropriate number. Delete questions with more than 1 response, and domain cannot be scored if there are fewer than 3 questions answered.

Validation

For validation the instrument was tested on 64 consecutive patients (55 girls and 9 boys) with AIS who had undergone surgical correction at the same tertiary teaching institution from 2003 to 2007, with a minimum 2-year PO follow-up (average 4.7 years). After informed consent, patients answered correctly all the questions of the Brazilian Portuguese version of the SRS-30 questionnaire. No item or questions were excluded.

Statistical Analysis

Statistical analysis was carried out using a commercially available software package (SPSS v. 13 for Windows). Qualitative variables are presented in absolute frequencies. Quantitative variables were analyzed on the basis of averages, standard deviations, and minimum and maximum values. Internal consistency was tested using Cronbach α coefficient, which may range from 0 to 1.0. The Cronbach α coefficient value will be higher as the interrelations between the tested items increase.

RESULTS

A total of 64 patients responded to the final Brazilian Portuguese version of the SRS-30 questionnaire. The average age of the studied population was 18.5 years (ranging from 13 to 24 years). The average PO follow-up period was 4.7 years, and the average SRS-30 score was 125.3 points.

Table 1 presents the average, standard deviation, and minimum and maximum range of variables such as age, PO follow-up period, and SRS-30 scores for the domains of function, pain, appearance, mental health, and satisfaction. Table 2 represents the internal consistency of data based on Cronbach α coefficient for each of the domains on the Brazilian Portuguese version of the SRS-30 questionnaire. The Cronbach α coefficient results for the domains of pain, appearance, and mental health were good and satisfactory. As for satisfaction, even though the average score for the domain was 13.7 points (ranging from 3 to 15 points), the Cronbach α was low (0.29). The Cronbach α for the total scale was 0.85.

DISCUSSION

The great majority of instruments designed to assess QOL were developed in English. There is, obviously, a need to adapt these questionnaires into other languages so that they may be used in countries that do not have English as their native tongue.[10–13] To maintain the validity and equivalence of these translated versions of the QOL questionnaires, it is also essential to adapt them to the cultural characteristics of different countries.[13–16]

A total of 8 translations and validations of the SRS-22 and SRS-24 were published into languages other than English. However, to our knowledge, there were no translations of the SRS-30 found in Western literature.[2]

TABLE 1. Results of the Quantitative Variables for Age, PO Follow-up Period, and Each Domain for the Brazilian Portuguese Version of the SRS-30 Questionnaire on the 64 Patients With AIS					
Variable	N	Average	SD	Minimum	Maximum
Age, yr	64	18.5	3.5	13	24
Postoperative follow-up, months	64	56.9	39.4	24	82
Function	64	27.7	4.2	19	34
Pain	64	26.4	3.5	12	30
Appearance	64	37.2	4.8	24	45
Mental health	64	20.3	3.5	7	25
Satisfaction	64	13.7	1.6	10	15
Overall SRS-30	64	125.3	12.7	86	145
SRS-30 indicates Scoliosis Research Society–30.					

In 2009, Niemeyer et al[10] translated the SRS-22 into German and also made a cultural adaptation of this questionnaire. The translated and adapted version of the SRS-22 was mailed to patients with AIS that had undergone either surgical or conservative treatment. Results of this study show satisfactory internal consistency and a high Cronbach α coefficient value for 4 domains (pain, 0.75; self-image, 0.84; mental health, 0.88; and satisfaction, 0.61). However, the Cronbach α coefficient was low for the domain function/activity when compared with the original version in English.

In 2007, Hashimoto et al[11] validated the SRS-22 in Japanese, using it for patients with AIS. Although internal consistency was lower in the Japanese version than in the English version of the SRS-22, it was found to be a valid instrument for clinical evaluation of Japanese patients with AIS.[11]

In 2006, Takeshita et al[12] examined the validity of the Japanese version of the SRS-24 questionnaire (the modified version of the SRS-22 questionnaire) in patients with scoliosis. The author compared SRS-22, SRS-24, and SF-36 results. The items of SRS-24 related to internal consistency showed a moderate score in Cronbach α coefficient (0.51–0.69). The domains of pain, self-image, and mental health showed excellent internal consistency on the SRS-22, and the domain of function had a moderate score (>0.61). The author concludes that the Japanese version of the SRS-22 is more reliable than the SF-36 and other QOL instruments to assess patients with scoliosis.[12]

In 2005, Alanay et al[5] studied the validity and consistency of the SRS-22 adapted into Turkish. The majority of domains (pain, self-image, mental health, and satisfaction) presented high Cronbach α coefficients. Only the function/activity domain presented a low Cronbach α coefficient when compared with the original in English, showing that this was a highly reproducible instrument when translated into the Turkish language.

In 2004, Bago et al[13] and Climent et al[6] presented their results with the translated and culturally adapted Spanish version of the SRS-22, using the same series of patients with scoliosis for 2 distinct publications. Both studies reported adequate internal consistency for the majority of the items of the SRS-22 and an excellent reproducibility for clinical research.

In 2004, Monticone et al[14] presented the results of the Italian translation and cultural adaptation of the SRS-22 questionnaire, showing it to be a reproducible, easy, and reliable instrument. However, because all patients in this series were treated conservatively, the item regarding satisfaction with treatment (item 21) became naturally hard to assess. Another possible bias of this study was that a number of patients responded to the questionnaire at home, and another group of patients responded to the questionnaire at the clinic, creating the possibility of variations on the response to item 12.[14]

In 2007, Cheung et al[7] translated, validated, and adapted the SRS-22 into Chinese. This Chinese version was tested on 50 patients with scoliosis, presenting a high Cronbach α coefficient in 4 domains: function/activity, pain, self-image, and mental health. The author concludes that the Chinese version of the SRS-22 has satisfactory internal consistency and excellent reproducibility.

In the SRS-30 questionnaire as well as in all the other translated versions, the questions are presented in a closed manner. This renders data analysis easier and also allows direct comparisons with outcome observed by the physician on PO evaluations. The content of the items in each of the domains allows the evaluation of both the objective, easy-to-assess data

TABLE 2. Internal Consistency		
Subdomain	Number of Items	Cronbach α
Function	7	0.579
Pain	6	0.682
Appearance	9	0.751
Mental health	5	0.781
Satisfaction	3	0.288
Total SRS-30	30	0.853
SRS-30 indicates Scoliosis Research Society–30.		

(such as item 1 on the pain domain) and the subjective data coming from patients' interpretation, (such as item 19 on the function/activity domain), as well as their emotional reactions to certain facts, events, or even other people (as shown in item 16 of the mental health domain). The number of questions is satisfactory when taking into consideration the interest and level of knowledge of the patients about the studied subject.

In this study, some patients found it very hard to comprehend the questions of the instrument. Although none of the participants were illiterate, the majority had low educational and socioeconomical backgrounds. Thus, to try to help the patients understand the questions, a trained interviewer assisted them during the process of completing the questionnaire. Only a small number of patients proved little uncomfortable while responding to some of the items in the SRS-30 questionnaire.

For clear interpretation of the internal consistency, unidimensionality should be assessed by factor analysis. The present study focused in the Cronbach α values analysis and not on other measurement properties because a small sample size was available. Initially, 165 patients that were submitted to scoliosis surgery from 2003 to 2007 were selected for this study, but only 64 fulfilled all the inclusion criteria to participate in it.[17]

CONCLUSION

Despite these cultural challenges, the Brazilian Portuguese version of the SRS-30 seems to be an internally consistent instrument to assess QOL in patients with AIS, with a high overall Cronbach α coefficient of 0.85.

> ## ➢ Key Points
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> ❑ QOL instruments are important to assess the outcome of surgical treatment in patients with AIS. The SRS has developed 3 instruments for assessing QOL in patients: the SRS-22, SRS-24, and, most recently, the revised SRS-30, which contains questions on the PO outcome.
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> ❑ Translations and cultural validations of these instruments are necessary to allow international use.
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> ❑ The SRS-30 is translated and validated for the first time in Western literature into Brazilian Portuguese.

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