



Cross-cultural adaptation and validity of an adapted Kannada (South Indian Language) version of Scoliosis Research Society (SRS-30) Questionnaire for idiopathic scoliosis

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Received: 3 November 2019 / Accepted: 24 October 2020 / Published online: 5 January 2021
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Abstract

Study design Validation study.

Background Scoliosis Research Society-30 (SRS-30), Milwaukee-USA, questionnaire is a useful and valid instrument for evaluation of health-related quality of life (HRQOL) including pain in idiopathic scoliosis. There has not been a single validation or translation attempt of any of the SRS questionnaires in Indian languages until now.

Objectives The objective of this study was to translate and cross culturally adapt SRS-30 questionnaire in one of the widely spoken south Indian language, Kannada for its accuracy.

Methods The permission for the cross cultural adaptation and validation of SRS-30 questionnaire into Kannada language was taken from the Scoliosis Research Society, Milwaukee, USA. The American Association of Orthopaedic Surgery and the international quality of life assessment (IQOLA) guidelines were used for this adaptation. The translated version of SRS-30 questionnaire was tested on twenty nine girls with idiopathic scoliosis before and after scientific exercise approach to scoliosis (SEAS). The average age of the girls was 11.3 years. Internal consistency of the instrument was determined with Cronbach α .

Results The Kannada version of SRS-30 questionnaire showed an overall internal consistency of 0.845 and 0.905 for pre and post SEAS, respectively.

Conclusion The south Indian language, Kannada, version of SRS-30 showed high internal consistency for all domains and for the overall score, proving its validity and reliability for analysing HRQOL in idiopathic scoliosis patients.

Keywords Quality of life · Idiopathic scoliosis · SRS-30 · Validity · Reliability · Cronbach α

Introduction

Idiopathic scoliosis is a type of spinal deformity that may interfere with the quality of life [1]. The effective exercise regime plays a key role in reducing the progression of spinal curve and in improving the quality of life (QOL), in idiopathic scoliosis [2]. SEAS (scientific exercise approach

to scoliosis) is employed for conservative management of scoliosis and entails an individualised exercise protocol. The SEAS consists of an active self-correction with a primary objective of improving the stability of spine. The exercise implemented through SEAS exclusively intends to train neuro-motor function leading to self-correction of posture during the activities of daily living [3]. The measurement of health status provides a quantifiable ranking of an individual's self-assessment of well-being. The use of health-related quality-of-life (HRQOL) measures provides the foundation for an assessment of the utility of operative and non-operative interventions and is the standard by which one may establish accountability for care and an evidence-based approach to health care [4, 5]. Haher initiated the development of a disease-specific HRQOL instrument to measure the many facets of spinal deformity. The original questionnaire consisted of 24 items divided into seven domains SRS-24 [6]. Asher et al. [7] modified the instrument to address its

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shortcomings. Similar domains were merged, a new domain (mental health) was added and the historical recall questions were eliminated. The result was a 23-item questionnaire [modified SRS (MSRS) or SRS-23] with five domains (pain, self-image, function/activity, mental health, and satisfaction). In 2003, question number 4 was rephrased, moved from the pain to self-image domain, and seven historical recall questions were added resulting in the current version, the SRS-30 [8]. Asher et al. [7] further refined the tool to address diminished internal consistency (Cronbach's alpha) for the Function domain in adolescent idiopathic scoliosis patients. [9] The original English, health-related questionnaires must be translated and validated in other languages to ensure their global acceptance. There are reports of Turkish [10], Spanish [11], Chinese [12], Portuguese and Brazilian [13], Finnish [14], German [15], Thai [16], Arabic [17], Swedish [18], French [19], Greek [20], Dutch [21], Polish [22], validations of the SRS-22, SRS-24 and SRS-30 but none of the SRS-30 has been cross culturally adapted in any Indian language so far. The past decade has seen wide application of SRS-30 in various areas of quality of life of patients who have different spinal deformities e.g. surgical waiting time [23], ethnic and cultural difference [13, 24] satisfaction levels on patients with Parkinson disease after surgery [25] and it is applicable to both non operative and operative treatments. However, to maintain the global validity of the questionnaires there is a need for regular adaptation into other languages so that the cultural and lingual differences are taken care of. Therefore, the purpose of this study was to perform cross-cultural adaptation and evaluate the validity of the adapted south Indian language, Kannada version of SRS-30 questionnaire.

Materials and methods

The cross-cultural adaptation process was performed using the American Association of Orthopaedic Surgery and the International quality of life assessment (IQOLA) guidelines [26, 27]. The original version of the SRS-30 was translated from English into south Indian language, Kannada by two independent professional translators having general and technical experience in document translations. The translated Kannada versions of SRS-30 were then translated back into English by two different translators having same experience independently. The process was checked by the institutional review committee composed of one Methodologist, one Spine surgeon, one Orthopaedic surgeon, one Paediatrician and one Physical therapist in addition to the translators. The two translated versions (Kannada and English) questionnaires were then compared with the original, English SRS-30 questionnaire for comparability. The last version (translated back into English) generated the final version in south Indian language, Kannada. The final

Kannada version of the SRS-30 is composed of two sections pre-intervention and post-intervention with five domains;

- (1) Function/activity, enclosing 4 items (questions 3, 8, 10, and 13) and 2 extra items focused to the post-intervention outcome (questions 2 and 3).
- (2) Pain, 4 items (questions 1, 2, 5 and 12) plus 1 additional item directed to the post-intervention outcome (question 4).
- (3) Self-image/appearance, 4 items (questions 4, 6, 7 and 9) with 2 extra items directed to the post-intervention outcome (questions 5 and 6).
- (4) Mental health, 1 item (questions 11) and one additional item focussed to the post-intervention outcome (questions 10)
- (5) Satisfaction with management that includes only post-intervention items (questions 1, 7, 8 and 9). Each question was graded from 1 (worst case) to 5 (best case).

For analysis each question's internal consistency reliability was tested using Cronbach α . A pre-test was carried out on six girls with idiopathic scoliosis who were administered the final Kannada version of SRS-30 questionnaire and underwent SEAS procedure. The repeatability and reliability of the instrument was done on 23 girls with idiopathic scoliosis who underwent SEAS and under the exercise programme for 2 years. The average age of the girls was 11.3 years. Informed consent was obtained; patients answered all the questions of the south Indian language Kannada version of the SRS-30 questionnaire.

Ethical issues

The institutional ethics committee approved this transcultural adaptation of the South Indian language Kannada version of the SRS-30 questionnaire.

Statistical analysis

Calculation of domain scores followed the suggestion scheme from SRS five-point scale (5 = best outcome, 1 = worst outcome). The results were analysed using a commercially available.

Software package (SPSS 23) for Windows. Internal consistency reliability was tested using Cronbach α in pre-intervention and post intervention respectively.

Results

The average age of the participants was 11.3 years (ranging from 10 to 13 years). The average post-intervention (SEAS) follow-up period was 2 years.

Table 1 Internal consistency reliability (Cronbach's alpha) for Kannada version (pre-intervention)

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
0.845 ^a	0.876	12

^a0.845 which indicates high level of internal consistency of all domains

Table 2 Distribution of the results in the final Kannada version of SRS-30 (pre-intervention)

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
(q1)	27.96	18.358	0.291	0.847
(q3)	27.50	17.380	0.730	0.827
(q4)	27.81	19.042	0.180	0.851
(q5)	27.85	16.135	0.632	0.824
(q6)	27.62	16.326	0.635	0.825
(q7)	26.88	18.106	0.401	0.841
(q8)	26.69	16.302	0.745	0.819
(q9)	26.58	18.174	0.651	0.835
(q10)	26.46	17.138	0.738	0.825
(q11)	26.58	15.934	0.784	0.815
(q12)	27.73	11.965	0.659	0.853
(q13)	26.54	17.138	0.405	0.842

Table 3 Internal consistency reliability (Cronbach's alpha) for Kannada version (post-intervention)

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
0.905 ^a	0.941	8

^a0.905 which indicates high level of internal consistency of all domains

Pre-intervention Table 1 shows internal consistency reliability (Cronbach's alpha) value. Table 2 illustrates the distribution of internal consistency for each question, including the mean value and variance of the final Kannada version of the SRS-30.

Post-intervention Table 3 depicts post-intervention internal consistency reliability (Cronbach's alpha) value. Table 4 shows the post-intervention distribution of internal consistency for each question, including the mean value and variance of the final Kannada version of the SRS-30.

The overall pre-intervention and post-intervention Cronbach's alpha values showed a high level of internal consistency.

Table 4 Distribution of the results in the final Kannada version of SRS-30 (post-intervention)

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
(q1)	24.97	4.892	0.860	0.877
(q2)	25.83	6.076	0.936	0.886
(q3)	24.97	6.534	0.298	0.924
(q4)	24.97	4.963	0.719	0.898
(q5)	25.83	6.076	0.936	0.886
(q8)	25.07	4.924	0.763	0.891
(q9)	24.86	5.980	0.829	0.887
(q10)	24.83	6.076	0.936	0.886

Discussion

It is necessary to adapt questionnaires transculturally to avoid ambiguous questions and instructions, specific to certain cultures [27]. The majority of questionnaires that have been designed to assess QOL were developed in English. There has always been a need to develop these questionnaires in various languages other than English to adapt them to the regions worldwide, where English is not the spoken language [10, 14, 28, 29]. The instruments have been translated into a handful of languages other than English and one among them, the Brazilian Portuguese version of the SRS-30 seems to be an internally consistent instrument to assess QOL in patients with idiopathic scoliosis, with a high overall Cronbach α coefficient of 0.85. [12] It is also important to adapt any translated versions of QOL questionnaires to the cultural differences in various places to maintain their equivalence and validity. [10, 30–32] The SRS questionnaire outcomes may be influenced by different cultures and ethnic backgrounds, when applied to idiopathic scoliosis; a similar condition may evoke different manifestations depending upon ethnicity, specifically in response to questions involving pain, activity and appearance. [24, 33] As for example the Turkish version of SRS-30 revealed a lower overall Cronbach's α 0.71 as compared to the original English version value of 0.86. The Spanish version of the SRS questionnaire reveals a similar discrepancy in Cronbach's α value when compared to original English SRS questionnaire. The inconsistencies reported could be attributed to the cultural differences when comparing United States, the place where SRS questionnaires originated, to different places of its application. Conservative lifestyle of Turkish families, as opposed to a more liberal US lifestyle, could have been more important in determining the frequency of going out than dictated by the spinal disorders [10]. To facilitate precise and unequivocal understanding of the questionnaire with a focus on the ethnicity and socioeconomic background in a section of

Indian population, the SRS-30 questionnaire was reformed to test its reliability and validity.

In this study, all five domains indicated high level of internal consistency. As all the patients in this study were treated at early stage of idiopathic scoliosis, therefore the domain 1: (question 1 and 2) from original version of SRS-30 were rephrased as (during the past 6 months have you felt back pain, if (yes), the amount of pain?), mild, moderate or severe. (Question 11) was omitted because all patients in this study were treated conservatively. (Question 17): (3 month was changed to 6 months—to line up with the question: 1). Domain 2: (question 5) was omitted as all patients were active and (question 9), options was put as ‘school activities’ in place of ‘percentage of activities.’ (Question 12): was modified to does your back pain limit your ability to do things around the house/school? (Question 15): (financial problems related to spinal disorders) was rephrased as (experiencing difficulties because of your back?). Some of the reasons are that question 15 is not in line with the other questions of the function domain and might create a perception bias resulting from the sub-optimal ability of adolescent schoolchildren to judge their family financial situations [21]. In the Turkish version, the authors found the question ambiguous, as all Turkish subjects who participated in the study were fully insured and did not pay for the treatment [10]. The (question 18): “Do you go out more or less often than your friends?; after discussion, consensus was reached that the phrase “Do you go out...” denotes social activity more than going out for a specific date and was replaced by: “Does the condition of your spine limit your ability to go out with your family/friends?” The changes in question number 18 were also introduced in all 3 versions of SRS-22—in its original English version, Spanish, as well as Turkish version [10]. Domain 3 (Question 4) was omitted, the item regarding (“spend the rest of your life with your back shape as it is right now as this item did not seem to be optimal in our study age group who had early treatable condition). Question 6: how do you look in clothes? The term ‘traditional clothes’ was added to ‘clothes’ in the original question to modify it keeping in mind the ethnic wear perception of Indian subcontinent. (Question 14 and 19): do you feel that your back condition affects your personal relationships was modified to, do you feel that your back condition affects your relationship with friends? Do you feel attractive with your current back condition was modified to, Do you feel that your trunk asymmetry affects your self-image? Despite the changes in lifestyle standards, Indian population still retain their conservative character. It must, therefore, be remembered that these factors may play a bigger role in determining the internal consistency. Domain 4: (question 13, 16 and 20) were omitted as these items could have viewed equivocal to teenage school going

patients. To simplify (questions 3 and 7), during the past 6 months have you been a very nervous person? In the past 6 months have you felt so down in the dumps that nothing could cheer you up, were replaced and put in one question together, during the past 6 months, have you been anxious or worried? Although none of the participants were illiterate, the majority had low educational and socioeconomic backgrounds. Domain 5 (question 21 and 22) were omitted as SEAS was the preliminary back treatment for the participants in our study.

In the post-intervention stage (question 25), has your back treatment changed your function and daily activity? Was changed to “Has your treatment changed your back condition? With responses as ‘improved/worsened/no changes. Question 26; has your back treatment changed your ability to enjoy sports/hobbies? Was replaced to simplify the items to has your treatment changed your ability to enjoy sports? (Question 28) has your treatment changed your confidence in personal relationships with others? Was rephrased to, how would you rate your self-image on a scale of 1 (low) to 9 (high). Keeping in mind conservative culture in India (question 29) was omitted as this item could have created confusion and would have resulted in cultural influence. In the domain of mental health, satisfaction with management (post-intervention), four extra questions 1, 7, 8 and 10 were added to represent the internal consistency of pre-intervention and post intervention data. It would have been hard to assess the internal consistency of pre and post intervention stages without additional questions of 1, 7, 8 and 10 included post-intervention. The internal consistency reliability report of Cronbach α equal to 0.845 and 0.905 indicated high level of internal consistency in pre and post intervention respectively. The number of questions is agreeable when taking into consideration the interest and knowledge of the participants. The present study focused on the Cronbach α values analysis and not on other measurement properties because a small sample size was available (Tables 3, 4).

To conclude the modified original English SRS-30 version into south Indian language, Kannada, is reliable, valid, and appropriate for use in Kannada-speaking patients with idiopathic scoliosis. Thus, this tool seems to be an internally consistent tool to clinicians and researchers to assess QOL in patients with idiopathic scoliosis in the Kannada-speaking populations, with a high overall Cronbach α coefficient of 0.845 and 0.905 which indicated high level of internal consistency in both the pre-intervention and post intervention cases respectively.

Acknowledgements We are thankful to Prof (Dr).Janardhana Aithala P, Spine Orthopaedic Surgeon, Department of Orthopaedics, Yenepoya Medical College Hospital, Yenepoya (Deemed to be University) Karnataka-India, for his timely guidance and a vital role in the accomplishment of this research study.

Funding Yenepoya Research Centre YU/seed Grant/063-2018.

Compliance with ethical standards

Conflict of interest The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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