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Letter to the Editor

Cross Validity of the Korean Version of SRS-22 in Korean Patients with Idiopathic Scoliosis

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Dear Editor-in-Chief

In 1999, the Scoliosis Research Society first developed the Scoliosis Research Society Outcome Questionnaire (SRS-22), an instrument used to measure the health-related quality of life of patients with scoliosis (1). Since then, the revised questionnaire has been translated not only into English but also into various languages and is being widely used (1-3). The SRS-22 consists of five domains covering function (5 questions), pain (5 questions), self-image (5 questions), mental health (5 questions), and satisfaction (2 questions) with treatment. The five items of the mental health domain share the contents of the mental health domain in the Short Form-36 (SF-36).

According to the statistics recently released by the Korea Health Insurance Review and Assessment Service (HIRA) in South Korea, the number of patients treated for spinal diseases increased from about 7.9 million in 2014 to 8.6 million (approximately 7 million increase during 3 years) in 2017. In particular, adolescents with scoliosis were reported to account for 10% of this statistic (4).

We aimed to translate the SRS-22 into Korean, which has been translated in various languages and verified, to perform the cross validation of the Korean version of the SRS-22, and to apply it to rehabilitation outcome assessment in adolescents with idiopathic scoliosis.

For cross validity, the English version of the SRS-22 was translated into Korean by a person who is fluent in English and Korean and was subsequently cross-validated by a professional translator and an interpreter. In addition, the Korean version of the SRS-22 was finally used in this study after assessing the appropriateness of its content in 20 adolescents. The data for the cross validity testing were collected from 1,042 elementary school students in Incheon Metropolitan City, South Korea. These subjects were those who responded to the questionnaire among 1,143 adolescents who participated in a brief interview with vertebral structure analysis and assessment through Formetric 4D. Concerning the general characteristics of the subjects, there were 552 male adolescents and 490 female adolescents, consisting of 597 subjects with scoliosis and 445 normal subjects. The mean age was 11.20 ± 1.22 years, the mean height was 144.59 ± 10.05 cm, the mean body weight was 39.58 ± 10.65 kg, and the mean body mass index was 18.66 ± 3.23. The statistical analysis was performed using SPSS 25 software (Chicago, IL, USA).

Factor and reliability analyses were performed for

the data collected for cross validity, and the t-test and Fisher's Z transformation using the correlation coefficient were performed for item total correlation analysis and external validity testing. First, as a result of the factor analysis, items 5 (function), 11 (pain), and 14 (self-image) were deleted due to factor overlapping or low factor loading, and a total of 19 items were structured into five factors accordingly.

At this time, the factor value ranged from 0.438 to 0.867, the cumulative description amount was 50.95%, the eigenvalue was from 1.36 to 3.31, and the commonality was from .345 to .630. Second, the results of reliability of each sub-factor showed Cronbach's alpha = 0.61 ~ 0.84, indicating a relatively high reliability. Third, the results of the inter item total correlation analysis showed that the correlation between all sub-factors and total score was significant at P=.001, and the correlation was high, ranging from 0.564 to 0.848 (Table 1). Fourth, the results of comparison of the mean score for each sub-factor between the scoliosis and normal groups showed significant differences in function, pain, and self-image factors. Fifth, the results of Fisher's Z testing using the correlation coefficient showed a significant difference in function factor between the scoliosis and normal groups (Table 2).

The results of the analysis of the collected data revealed that the Korean version of the SRS-22 had secured validity and reliability. Therefore, it is judged that the Korean version of the SRS-22 can be fully used for rehabilitation outcome assessment in Korean adolescents with idiopathic scoliosis. Thus, it is considered that its validity verification will be needed in various ways through collecting data on rehabilitation outcome assessment using the SRS-22.

Conflict of Interest

The author declares that there is no conflict of interest.

Table 1: Results of the inter items total correlation

Factor	*1*	*2*	*3*	*4*	*5*	*6*
1) Function	(.74)					
2) Pain	.327**	(.77)				
3) Self-image	.385**	.299**	(.76)			
4) Mental health	.345**	.446**	.416**	(.84)		
5) Satisfactory	.275**	.242**	.502**	.292**	(.61)	
6) Item total	.606**	.564**	.848**	.728**	.660**	-

* $P < .05$, ** $P < .01$

Table 2: Results of *t*-test and Fisher's transformation

Factor	*Group*	*t-test*			*Fisher's Z*	
		M	SD	*t*	Correlation	Z
Function	Normal	4.48	.29	10.61**	.642**	1.66*
	Scoliosis	4.29	.28		.591**	
Pain	Normal	3.20	.24	-15.68**	.588**	1.07
	Scoliosis	3.42	.21		.542**	
Selg-image	Normal	4.20	.70	3.01**	.847**	-0.17
	Scoliosis	4.13	.68		.850**	
Mental health	Normal	4.51	.39	-.43**	.733**	0.27
	Scoliosis	4.52	.37		.725**	
Satisfactory	Normal	3.94	.68	-.23**	.668**	0.37
	Scoliosis	3.94	.70		.655**	

* $P < .05$, ** $P < .01$

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