

# **Psychometric properties of the Staffordshire Questionnaire for Adolescent Idiopathic Scoliosis (SQ-AIS): convergent validity, internal consistency and test-retest reliability**

Enza Leone<sup>1</sup>, Nachiappan Chockalingam<sup>1</sup>, Robert Needham<sup>1</sup>, Aoife Healy<sup>1</sup>, Nicola Eddison<sup>1,2</sup>, Nikola Jevtic<sup>3</sup>, Vinay Jasani<sup>4</sup>

<sup>1</sup>Centre for Biomechanics and Rehabilitation Technologies, Science Centre, Staffordshire University, Leek Road, Stoke on Trent, ST4 2DF, United Kingdom

<sup>2</sup>Royal Wolverhampton NHS Trust, Wolverhampton, WV10 0QP, United Kingdom

<sup>3</sup>Scolio Centar, Novi Sad, 403916, Serbia

<sup>4</sup>University Hospitals of North Midlands NHS Trust, Stoke on Trent, ST4 6QG, United Kingdom

## **Background**

Adolescent Idiopathic Scoliosis (AIS) is a structural spinal deformity impacting health-related quality of life (HR-QoL). The Scoliosis Research Society-22 revised (SRS-22r) questionnaire is standard for HR-QoL assessment, though it has limitations in validity, reliability, and language appropriateness. To address these, the Staffordshire Questionnaire for Adolescent Idiopathic Scoliosis (SQ-AIS) was developed, covering six domains: general health, pain, function/activity, self-image/appearance, mental health, and intervention. Higher scores reflect better HR-Qo (scores are not attributed to the intervention section). The psychometric properties of SQ-AIS remain unexplored.

## **Aim**

This study evaluated the SQ-AIS's psychometric properties, specifically convergent validity, internal consistency, and test-retest reliability.

## Method

A cross-sectional study was conducted with AIS patients at the International Schroth Scoliosis Therapy (ISST) Camp, a seven-day intensive scoliosis treatment held in Novi Sad, Serbia. Participants from two camps (November 2023–January 2024) were included. Convergent validity was assessed through correlations between SQ-AIS and SRS-22r scores at total and domain levels (Pearson's/Spearman's). Correlation categories were: very weak (<0.19), weak (0.2–0.39), moderate (0.4–0.59), strong (0.6–0.79), and very strong ( $\geq 0.8$ ). Internal consistency (Cronbach's  $\alpha \geq 0.7$ ) and test-retest reliability (ICC, classified from poor <0.50 to excellent >0.90) were evaluated. Pre- and post-camp SQ-AIS scores were compared. Analyses were performed in SPSS 27.0, with ethics approval obtained.

## Results

The cohort included 29 patients (79.3% female), mean age 18.2 years (SD=3.35). Thoracic curves ranged from 15° to 59° (median 40.14, IQR 21) and lumbar curves from 18° to 63° (mean 39.50, SD=13.96). SQ-AIS showed statistically significant correlations with SRS-22r across domains (0.325–0.779), with weaker correlations in function/activity ( $\rho=0.325$ ), moderate in mental health ( $r=0.572$ ), and strong in pain, self-image, and total scores (0.645–0.779). Internal consistency was high ( $\alpha=0.772$ –0.919), and test-retest reliability was good to excellent (ICC=0.833–0.957), though moderate for the total score (0.557, CI -0.225 to 0.829) (Tab. 1).

Table 1. SQ-AIS test-retest reliability

<b>SQ-AIS</b>	<b>T0</b>	<b>T1</b>	<b>ICC (95% CI)</b>
SQ-AIS – general health	3.82 ± 0.44	3.60 (0.73)	0.833 (0.676, 0.913)
SQ-AIS – pain	4.69 (0.42)	4.69 (0.55)	0.955 (0.915, 0.976)
SQ-AIS – function/activity	5.00 (0.09)	5.00 (0.08)	0.957 (0.918, 0.977)
SQ-AIS – self-image/appearance	3.85 (1.02)	3.74 ± 0.59	0.896 (0.805, 0.945)
SQ-AIS – mental health	4.01 ± 0.60	4.22 (0.86)	0.919 (0.842, 0.958)
SQ-AIS – total score	4.44 (0.40)	3.94 ± 0.39	0.557 (-0.225, 0.829)

*Normally distributed data is presented as mean ± standard deviation (SD), while non-normally distributed data is presented as median (interquartile range, IQR).*

## Discussion and conclusion

SQ-AIS demonstrates strong reliability and validity, aligning with SRS-22r, particularly in pain and self-image domains. The function/activity domain showed weaker correlations likely because SRS-22r includes broader impacts, like financial strain and family effects, while SQ-AIS focuses on daily activities. The moderate test-retest reliability for the total SQ-AIS score may reflect lower post-camp scores ( $3.94 \pm 0.39$  vs  $4.44$  (0.40), see Tab.1) due to patients' reassessment of HR-QoL after intensive treatment. SQ-AIS appears to be a valuable alternative to SRS-22r, capturing both stable and evolving aspects of AIS impact on HR-QoL.

## References

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