

## Scoliosis Surgical Treatment Outcomes with relevance of Quality of Life (QoL), through SRS22; Clinical recovery, Psycho-social status and management satisfaction



### Medical Science

**KEYWORDS :** Adolescent Idiopathic Scoliosis, SRS-22r, Quality of Life, pain, surgical correction, Saudi Arabian population

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### ABSTRACT

*An ambidirectional cohort study was conducted on Adolescent Idiopathic Patients (AIS) in King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia, during July to September 2015, to see the outcome in terms of Health related Quality of life and domains of SRS-22r; revised version in Saudi Arabia of SRS-22, a Patient-Reported-Outcome tool developed initially by USA in English language. 47 AIS diagnosed and surgically operated patients were identified from medical records matching the inclusion criteria, contacted through telephone. They were recruited after conversation by study team member and consenting to participate and responding by filling the SRS-22r questionnaire. All patients responded with answering all questions. Negative moderate correlation of age with pain domain while negative weak correlation with self-perceived image, function domain, mental health domain and management domain was identified. However significant difference was observed with SRS-22 global score. Score of satisfaction with management founds considerably lower as compared to all other domains, i.e. pain, self-perceived image, function and SRS22 global score. Hence, considerable differences in all domains scores and in most of the questions of the SRS-22*

### Introduction

Adolescent idiopathic scoliosis (AIS) is a twisting condition of the spine with abnormal curvature of more than 10°, characterized by rotation of the vertebrae without their malformation and is further categorized into Infantile, Juvenile, and Adolescent type by age of onset and Neuromuscular type by systemic affects. Its prevalence is approximately 1–3% [1,2], worldwide with 6 to 9 million only in USA.

Adolescent Idiopathic Scoliosis has many complicated sequences due to its onset at growing age and conversion to adult type, at the time when a person is about to step in the professional and social world. Quality of Life is highly affected with not only physical, but also mental and social deprivations, low self-perceived image, low self-esteem and lack of confidence.

Majority of the studies on AIS have mainly focused either on the prevention of curve progression or surgical techniques and their outcomes. Whereas studies on the clinical recovery, psycho-social status and management satisfaction is scarce. A number of trends in patient evaluation have recently resulted in the development and growing use of patient-reported outcome measurements designed for assessing the functional status and health-related QOL (HRQOL).

In the field of scoliosis, the Scoliosis Research Society (SRS)-22 questionnaire has been widely used [3]. We revised it with translating version in Arabian language in SRS-22r. Several studies have reported the significance, reliability and validity of Scoliosis Research Society-22 (SRS22) in adolescent patients undergoing surgical treatment of idiopathic scoliosis [4-8]. The aim of this study was to determine the post-surgical treatment HRQOL, psycho-social status and clinical recovery of patients with AIS. A study conducted by Kei Watanabe et al in 199 to see variance of cultural differences role in quality of life of Scoliosis patients among Japanese and American population showed the significant change at certain domains of SRS-22 [9]. Comparison of surgery duration is studied and observation therapy with the prognosis I also deeply taken into account by researchers.

### Materials and Methods

An ambidirectional cohort study was conducted after getting IRB approval from King Saud University IRB, for attached study site of King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia from July 2015 to September 2015. All surgically treated patients of either gender having Adolescent-Idiopathic-Scoliosis were included whereas scoliosis patients with congenital or neuromuscular causes and those who had no surgical correction, with other musculo-skeletal deformities and were unable to give consent or fill out the SRS-22r questionnaire were excluded.

Study tool was SRS-22r, a Scoliosis Research Society Questionnaire for assessment of Health Related Quality of Life with 22 questions with Patient-Reported –Outcomes (PRO). The questionnaire was translated in Arabic for the Saudi Arabian population. SRS-22r Questionnaire is divided in domains of *pain, self-perceived image, function, management satisfaction, and psychological (mental health) assessment*.

A total of 47 subjects were recruited prospectively after identification of inclusion criteria from the medical record files of orthopedic department of KKUH. They were contacted on telephone by study staff detailing them about study on telephone. On consenting to participate, they were provided the study questionnaire through email with instructions. All patients responded by sending back the SRS-22r questionnaire by mail answering all the questions. Most of the patients, 31 out of 47, accounting 66%, had surgery done more than 2 years back.

### Results

A total of 47 patients were included in the study. The mean age of the patients was 21.08 ±4.64 years (range: 14-37). Female preponderance was found to be higher 40 (85.1%) as compared to males 7 (14.9%). In majority 31 (66%) of the patients, surgery was performed >2 years ago followed by 1-2 years and 6-12 months 6 (12.8%) each, whereas <6 months duration of surgery was observed in 4 (8.5%). Mean value of SRS-22 domains were 4.30 ±0.99 for the pain domain.

Descriptive analysis is shown in detail in table 1. Mean of pain domain 4.31 ±0.57, self-perceived image 3.92 ±0.75, function domain 4.14 ±0.75, mental health domain 3.82 ±0.82, satisfaction with management 3.01 ±0.46 whereas SRS-22 global score was 3.95 ±0.53 (Table 2).

Correlation of age SRS-22 items and global score is shown in table 3. Correlation of age shows negative moderate correlation with pain domain (r -0.429, p-value 0.003), negative weak correlation with self-perceived image (r -0.195, p-value 0.19), negative weak correlation with function domain (r -0.16, p-value 0.26), negative weak correlation with mental health domain (r -0.24, p-value 0.09), negative weak correlation with satisfaction with management domain (r -0.07, p-value 0.61), negative moderate correlation with SRS-22 global score (r -0.32, p-value 0.02).

Insignificant difference was observed between gender and SRS-22 items and global score (p-value >0.05) whereas significant difference was observed between duration of surgery and pain domain (p-value 0.05) (Table 4&5).

Mean pain domain, self-perceived image domain, mental health domain, SRS-22 global score was higher among patients with 6-12 months of duration of surgery while mean function/activity domain was found higher among patients with >2 years of duration of surgery (Figure 1-6).

**DISCUSSION**

The findings of this study showed negative moderate correlation of age with pain domain while negative weak correlation with self-perceived image, function domain, mental health domain and management domain. However significant difference was observed with SRS-22 global score. Our findings are found consistent with several previous similar studies [9,10].

In this study, score of satisfaction with management founds considerably lower as compared to all other domains, i.e. pain, self-perceived image, function and SRS22 global score. These findings also found somewhat similar with other studies as well. In a study by Haher *et al*, largest differences were in the pain and overall level of activity domains [11]. Similarly, Bridwell *et al* reported in their study that the scores to questions 3, 5, 11, and 14 demonstrated significant improvements after surgery and that 86% of the patients were satisfied with their surgical treatment [12]. Merola *et al* reported that the scores of all 4 domains dem-

onstrated significant improvement after surgery in the longitudinal follow-up analysis [13].

Therefore, the SRS outcomes instrument has been established as the only standard, well-validated, and disease-specific questionnaire for idiopathic scoliosis [8]. However, surgical correction needs further discussion in respect of its time to conduct when patient self-esteem does not interrupt to a level when self-image perception is worsened, or patient feel isolated within him or herself. It is to see that what cultural values depicts to the adolescents does affects the patients as well. A large scale study is recommended exploring each variable of each domain of SRS-22r. All five Domains still needs improvements with the context of patient understanding of illness and its ill effects versus treatment with improvements as its goal in all areas building Quality of Life. Patients family members, especially who are directly connected physically, mentally or socially, should have part in this SRS-22r domains, answering how the different treatment modalities works for them and their patient at home, profession or occupation, public places.

**Conclusion:**

AIS patients' life evolves through multiple factors having multi-directional impacts on physical, mental and social growth. These may differ to an extent in certain parts of the world having different societal and family values and norms, though general consequences for this population globally. Does the differences of geographical and regional values, activities affects differently to this AIS population?

The results of this present study clearly indicated definite differences in all domains scores and in most of the questions of the SRS-22. Because the SRS instrument is the only standard, well-validated, and disease-specific questionnaire for idiopathic scoliosis, the authors believe the instrument is very useful worldwide despite culture-related differences in patients' perceptions. We believe it to be very beneficial to translate and adapt for other countries or languages, and that a cross-cultural comparison of the content of the SRS instrument such as the SF-36 is necessary in the future.

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**Table 1: Descriptive analysis of SRS-22 questionnaire**

	Mean	Standard Deviation	Minimum	Maximum
Which of the following best describes the amount of pain you have experienced during the past 6 months?	3.68	1.01	2	5
Which one of the following best describes the amount of pain you have experienced over the last month?	4.21	0.99	1	5
Do you experience back pain when at rest?	4.11	1.02	2	5
Which one of the following best describes your medication usage for your back?	4.62	0.92	2	5
In the past three months, have you taken any sick days from work/school due to back pain and, if so, how many?	4.87	0.53	2	5
How do you look in clothes?	4.32	1.06	2	5
Which of the following best describes the appearance of your trunk, defined as the human body except for the head and extremities?	3.6	1.26	1	5
If you had to spend the rest of your life with your back as it is right now, how would you feel about it?	3.45	1.47	1	5
Do you feel that your condition affects your personal relationships?	4.28	1.09	1	5
Do you feel attractive with your current back condition?	3.87	1.13	1	5
What is your current level of activity?	3.91	1.15	2	5
Does your back limit your ability to do things around the house?	3.72	1.01	1	5
Does your back condition limit your going out with friends/family?	4.13	1.05	1	5

What is your current level of work/school activity?	4.28	1.01	1	5
Are you and/or your family experiencing financial difficulties because of your back?	4.62	0.94	2	5
In the past six months, have you felt down hearted and blue?	4.04	1.02	1	5
During the past 6 months, have you been a very nervous person?	2.77	1.14	1	5
In the past 6 months, have you felt so down in the dumps that nothing could cheer you up?	4.45	0.95	1	5
Have you felt calm and peaceful during the last six months?	3.94	1.05	1	5
Have you been a happy person during the past six months?	3.89	0.93	1	5
Are you satisfied with the results of your back management?	4.4	0.9	2	5
Would you have the same management again if you had the same condition?	1.62	0.94	1	5

**Table 2: Details of distribution of SRS-22 items and global score**

	Minimum	Maximum	Mean	Standard Deviation	Variance
Pain	2.8	5	4.31	0.57	0.32
Self-perceived image	2.4	5	3.92	0.75	0.58
Function	1.6	5	4.14	0.75	0.57
Mental Health	1.4	5	3.82	0.82	0.68
Satisfaction with management	2	4	3.01	0.46	0.21
SRS-22 global score	2.22	4.77	3.95	0.53	0.28

**Table 3: Details of correlation according to age (n=47)**

	Duration of Surgery	
	r	p-value
Pain	-0.429	0.003
Self-perceived image	-0.195	0.19
Function	-0.16	0.26
Mental Health	-0.24	0.09
Satisfaction with management	-0.07	0.61
SRS-22 global score	-0.32	0.02

Correlation is significant at the 0.01 level

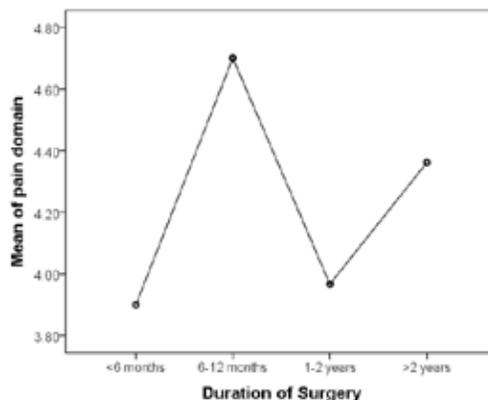
**Table 4: Comparison of SRS-22 items and global score with gender (n=47)**

	Duration of Surgery	
	p-value*	95% CI
Pain	0.67	-0.37 to 0.57
Self-perceived image	0.95	0.61 to 0.65
Function	0.75	-0.72 to 0.53
Mental Health	0.31	-0.33 to 1.02
Satisfaction with management	0.06	-0.71 to 0.02
SRS-22 global score	0.94	-0.45 to 0.43

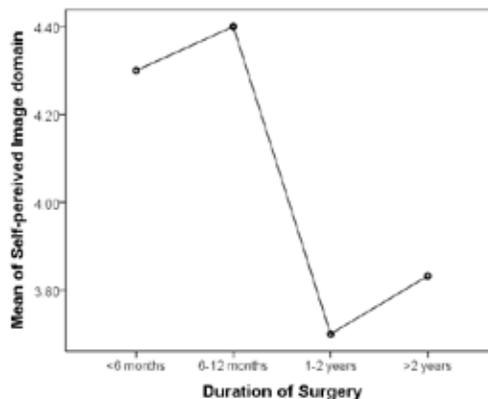
\*Independent t-test applied

**Table 5: Details of ANOVA study according to duration of surgery (n=47)**

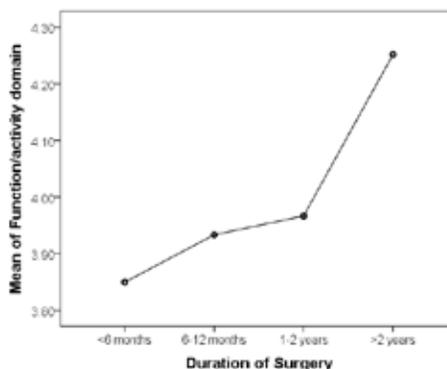
	Duration of Surgery	
	f	p-value
Pain	2.67	0.05
Self-perceived image	1.48	0.23
Function	0.65	0.58
Mental Health	0.27	0.85
Satisfaction with management	1.37	0.26
SRS-22 global score	0.84	0.47



**Figure 1: Mean pain domain and duration of surgery**



**Figure 2: Mean self-perceived image domain and duration of surgery**



**Figure 3: Mean function/activity domain and duration of surgery**

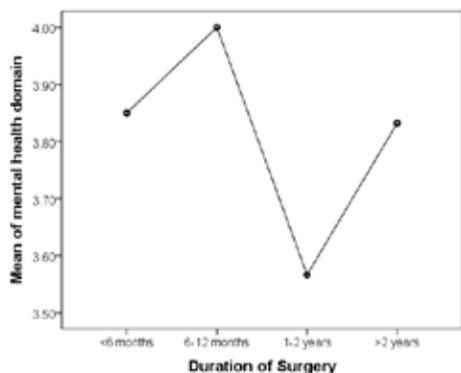


Figure 4: Mean mental health domain and duration of surgery

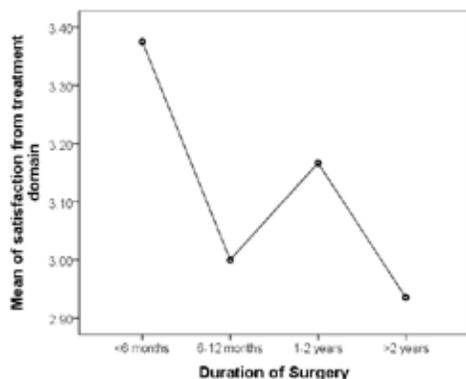


Figure 5: Mean treatment satisfaction domain and duration of surgery

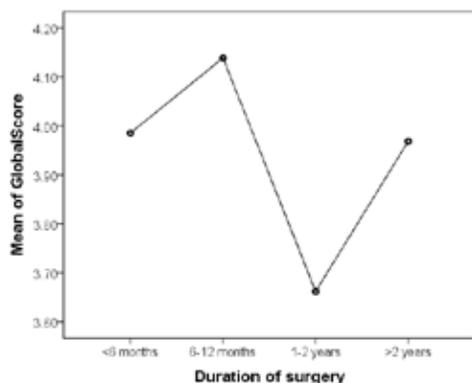


Figure 6: Mean Global Global score and duration of surgery

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