

# Measuring the Level of Knowledge and Awareness about Scoliosis in Saudi Arabia

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## Abstract

**Background:** Scoliosis is a serious condition occurring in 1% to 4% of the population. This study was conducted and designed to educate society about scoliosis and measure the knowledge and awareness about it. **Methods:** This was a cross-sectional study conducted on members of the Saudi Society who have consented to participate in this research between the 8th of January and 5th of February 2023. **Results:** A total of 427 people agreed to participate in the study. The highest percentage of the participants was female 69.1%. About 41% participants out of 427 were in the age group 18-25 years. Most of the participants were from the Middle Region. (71.9%) of participants were unfamiliar with scoliosis, while (72.1%) had no prior knowledge of the condition. **Conclusion:** This study indicates insufficient awareness and knowledge about scoliosis in Saudi Arabia. Therefore, further studies are needed to raise awareness about scoliosis and help people to learn more about this condition.

## Keywords

Scoliosis, Awareness, Knowledge, Saudi, Cross-Sectional

## 1. Introduction

Scoliosis is defined as a sideways curvature of the spine that occurs in 1% to 4% of the population. It can happen to people of any age but the most diagnosed with it are adolescents, it often affects females more than males [1] [2] [3].

There are many causes of scoliosis but the most common type of scoliosis is an unknown cause which is named “idiopathic scoliosis (IS)” [4].

The other types may be caused by certain neuromuscular conditions, such as cerebral palsy or muscular dystrophy.

Birth defects affect the development of the spine’s bones, previous surgery on

the chest wall as a baby, wear and tear of the spine with age, injuries to or infections of the spine, and Spinal cord abnormalities [5].

Symptoms and signs of scoliosis include uneven waist or shoulders, one hip higher than the other, visibly curved spine, prominence on one side of the back when bending forward, and some people may have back pain. This symptom is usually common in adult patients [6] [7].

The treatment depends on the type of scoliosis, age, and degree of deviation. There are three options for treatment including bracing, observation, and surgery [5].

Immature patients with curves less than 25° must be monitored and when the curves are between 25° and 50°, then recommended back brace is recommended. Surgery is usually performed when the degree of curvature is greater than 45° in immature patients and greater than 50° in mature patients [5].

Scoliosis is a serious condition and early detection is beneficial because it can change the direction of the disease [4].

Therefore, this study aimed to educate society about scoliosis and measure its knowledge and awareness.

## **2. Methods**

### **2.1. Study Design and Setting**

This is a randomized, self-administered cross-sectional study conducted on members of the Society who have consented to participate in this research between the 8th of January and to 5th of February 2023.

We included a total of 427 participants who shared their responses during the study period both male and female, and we excluded the Participants below the age of 18 years.

This study utilized a self-administered, online questionnaire that was distributed through social media outlets (e.g., Twitter, WhatsApp) across Saudi Arabia the questionnaire was created, and designed using the Google Forms platform.

The questionnaire was constructed based on research objectives and it was divided into three parts. The first one is the demographic characteristics of respondents such as gender, age, region, and education levels. The second one consists of five questions to measure the participant's level of knowledge regarding scoliosis.

The third one is to see if there is enough awareness about scoliosis in Saudi Arabia and it consists of three questions.

### **2.2. Data Analysis**

Data were expressed as frequency (%). Analysis was made by IBM SPSS Statistics for Windows, version 23 (IBM SPSS, IBM Corp., Armonk, N.Y., USA). Pearson chi-square test was used for comparison between groups. P-values of <0.05 were considered statistically significant.

### 2.3. Consent to Participate

We informed all the participants about the aim of this study and we asked if they approve to participate in this study, and we guaranteed complete confidentiality to them.

### 3. Results

A total of 427 people agreed to participate in the study and shared their responses. **Table 1** shows: the highest percentage of the participants were female (69.1%), (41%) of participants were in the age group 18 - 25 years, the majority of the participants were from the middle region (83.1%), in addition, the majority of the participants (55%) have bachelor's degree.

**Table 1.** Demographic characteristics of participants (n = 427).

Characteristics	Frequency (%)
<b>Gender</b>	
Male	132 (30.9%)
Female	295 (69.1%)
<b>Age groups</b>	
18 - 25 years	175 (41.0%)
26 - 35 years	108 (25.3%)
36 - 45 years	58 (13.6%)
>46 years	86 (20.1%)
<b>Regions</b>	
Middle	355 (83.1%)
North	20 (4.7%)
South	26 (6.1%)
West	17 (4.0%)
Eastern	9 (2.1%)
<b>Educations</b>	
Elementary	1 (0.2%)
Intermediate	9 (2.1%)
Secondary	90 (21.1%)
Diploma	73 (17.1%)
Bachelor's degree	235 (55.0%)
Graduate studies	19 (4.4%)
<b>Did anyone in your family have scoliosis before?</b>	
Yes	34 (8.0%)
No	229 (53.6%)
I don't know	164 (38.4%)

**Table 2** demonstrates the questions that are related to Participants' knowledge of scoliosis.

The majority of the Participants did not know about scoliosis, its symptoms, or if it has a cure or not.

**Table 3** demonstrates the questions that are related to Participants' awareness about scoliosis and if they have enough awareness about scoliosis in their region and the most response (67.4%) no, and positive responses to support organizing exhibitions in schools, universities, and public places to raise awareness about scoliosis.

The difference between right and wrong answers of Participants' knowledge and awareness about scoliosis shows in **Table 4**.

94 (22%) of the participants have a good score about scoliosis; while 333 (78.0%) participants has bad knowledge.

The mean of right answers about participant's knowledge and awareness about scoliosis concerning gender and age shows in **Table 5** and **Table 6**.

There are no significant differences between the male and female or the age groups.

**Table 2.** Participants' knowledge about scoliosis (n = 427).

Questions	Frequency (%)
<b>Q1K. Have you ever heard about scoliosis before?</b>	
Yes	120 (28.1%)
No	307 (71.9%)
<b>Q2K. How's your knowledge about scoliosis?</b>	
Good	39 (9.1%)
Average	80 (18.7%)
I don't know	308 (72.1%)
<b>Q3K. Do you think scoliosis affects more?</b>	
Female	58 (13.6%)
Male	40 (9.4%)
Both	329 (77.0%)
<b>Q4K. Do you think there is a cure for scoliosis patients?</b>	
Yes	157 (36.8%)
No	11 (2.6%)
I don't know	259 (60.7%)
<b>Q5K. Do you know the symptoms of scoliosis?</b>	
Yes	77 (18.0%)
No	350 (82.0%)

**Table 3.** Awareness of scoliosis (n = 427).

Questions	Frequency (%)
<b>Q1A. Have you ever attended any campaign or activity regarding scoliosis awareness?</b>	
Yes	12 (2.8%)
No	405 (94.8%)
Yes, but it did not benefit me	10 (2.3%)
<b>Q2A. Do you think there is enough awareness about scoliosis in your region?</b>	
Yes	11 (2.6%)
No	288 (67.4%)
I don't know	128 (30.0%)
<b>Q3A. Do you support organizing exhibitions in schools, universities, and public places to raise awareness about scoliosis?</b>	
Yes	406 (95.1%)
No	21 (4.9%)

**Table 4.** Participants' knowledge and awareness about scoliosis right answers and wrong answers (n = 427).

Questions	Right answer	Wrong answer	Significance
<b>Knowledge</b>			
Q1K. Have you ever heard about scoliosis before?	120 (28.1%)	307 (71.9%)	<b>0.001</b>
Q2K. How's your knowledge about scoliosis?	39 (9.1%)	388 (90.9%)	<b>0.001</b>
Q3K. Do you think scoliosis affects more?	58 (13.6%)	369 (86.4%)	<b>0.001</b>
Q4K. Do you think there is a cure for scoliosis patients?	157 (36.8%)	270 (63.2%)	<b>0.001</b>
Q5K. Do you know the symptoms of scoliosis?	77 (18.0%)	350 (82.0%)	<b>0.001</b>
<b>Awareness</b>			<b>0.001</b>
Q1A. Have you ever attended any campaign or activity regarding scoliosis awareness?	12 (2.8%)	415 (97.2%)	<b>0.001</b>
Q2A. Do you think there is enough awareness about scoliosis in your region?	11 (2.6%)	416 (97.4%)	<b>0.001</b>

**Continued**

Q3A. Do you support organizing exhibitions in schools, universities, and public places to raise awareness about scoliosis?	406 (95.1%)	21 (4.9%)	<b>0.001</b>
Total score (8 - 21)	16.36 ± 0.12 (9 - 21)		
Good score (8 - 14.5)	94 (22.0%)		
Bad score (15 - 21)	333 (78.0%)		

**Table 5.** Comparison between right answers about participant's knowledge and awareness about scoliosis concerning gender.

Questions	Male (n = 132)	Females (n = 295)	Significance
<b>Knowledge</b>			
Q1K. Have you ever heard about scoliosis before? (n = 120)	17 (12.9%)	103 (34.9%)	0.001
Q2K. How's your knowledge about scoliosis? (n = 39)	9 (6.8%)	30 (10.2%)	0.177
Q3K. Do you think scoliosis affects more? (n = 58)	15 (11.4%)	43 (14.6%)	0.231
Q4K. Do you think there is a cure for scoliosis patients? (n = 157)	36 (27.3%)	121 (41.0%)	0.004
Q5K. Do you know symptoms of scoliosis? (n = 77)	12 (9.1%)	65 (22.0%)	0.001
<b>Awareness</b>			
Q1A. Have you ever attended any campaign or activity regarding scoliosis awareness? (n = 12)	2 (1.5%)	10 (3.4%)	0.228
Q2A. Do you think there is enough awareness about scoliosis in your region? (n = 11)	2 (1.5%)	9 (3.1%)	0.287
Q3A. Do you support organizing exhibitions in schools, universities and public places to raise awareness about scoliosis? (n = 406)	119 (90.2%)	287 (97.3%)	0.003
Total score (8 - 21)	17.12 ± 0.19 (10 - 21)	16.02 ± 0.15 (9 - 20)	0.001
Good score (8 - 14.5)	14 (10.6%)	80 (27.1%)	0.001
Bad score (15 - 21)	118 (89.4%)	215 (72.9%)	

**Table 6.** Comparison between right answers about participant's knowledge and awareness about scoliosis in relation to age group.

Questions	18 - 25 years (n = 175)	25 - 35 years (n = 108)	36 - 45 years (n = 58)	≥46 years (n = 86)	Significance
<b>Knowledge</b>					
Q1K. Have you ever heard about scoliosis before? (n = 120)	47 (26.9%)	33 (30.6%)	10 (17.2%)	30 (34.9%)	0.122
Q2K. How's your knowledge about scoliosis? (n = 39)	14 (8.0%)	17 (15.7%)	3 (5.2%)	5 (5.8%)	0.042
Q3K. Do you think scoliosis affects more? (n = 58)	21 (12.0%)	22 (20.4%)	6 (10.3%)	9 (10.5%)	0.120
Q4K. Do you think there is a cure for scoliosis patients? (n = 157)	74 (42.3%)	36 (33.3%)	18 (31.0%)	29 (33.7%)	0.261
Q5K. Do you know symptoms of scoliosis? (n = 77)	26 (14.9%)	22 (20.4%)	6 (10.3%)	23 (26.7%)	0.040
<b>Awareness</b>					
Q1A. Have you ever attended any campaign or activity regarding scoliosis awareness? (n = 12)	7 (4.0%)	3 (2.8%)	-	2 (2.3%)	0.447
Q2A. Do you think there is enough awareness about scoliosis in your region? (n = 11)	9 (5.1%)	1 (0.9%)	-	1 (1.2%)	0.046
Q3A. Do you support organizing exhibitions in schools, universities and public places to raise awareness about scoliosis? (n = 406)	166 (94.9%)	102 (94.4%)	57 (98.3%)	81 (94.2%)	0.676
Total score (8 - 21)	16.33 ± 0.18 (9 - 21)	16.18 ± 0.27 (9 - 20)	16.86 ± 0.30 (11 - 20)	16.31 ± 0.28 (11 - 21)	0.416
Good score (8 - 14.5)	35 (20.0%)	26 (24.1%)	9 (15.5%)	24 (27.9%)	0.279
Bad score (15 - 21)	140 (80.0%)	82 (75.9%)	49 (84.5%)	62 (72.1%)	

#### 4. Discussion

As far as we know this is the first study in Saudi Arabia to measure the level of Knowledge and Awareness About scoliosis among members of society.

The questionnaire was published on social media, all over the Saudi region but the (83.1%) of our participants were from the middle region, this might not reflect on the whole Saudi society.

Although most of the participants had high educational level (Bachelor's degree) but unfortunately, they have poor knowledge regarding scoliosis.

We asked all the participants if they heard about scoliosis before and (71.9%) answered No, its symptoms (82%) answered No and whether it has a cure or not (60.7%) don't know, this means the majority of our participants don't have any idea about scoliosis.

The last part of the questionnaire was to see if there is enough awareness in their region or if you ever attended any campaign regarding scoliosis and most of the participants answered No. (95.1%) support organizing exhibitions in schools, universities, and public places to raise awareness about scoliosis.

This showed that Health education about scoliosis should be promoted in all regions, and we encourage the government to create national scoliosis screening

program and detection at an early stage to avoid future complications.

## 5. Conclusions

In summary, this study indicates insufficient awareness and knowledge about scoliosis among our participants. Most participants were from the (middle region) and it is not reflected in the whole Saudi region.

Therefore, further studies are needed to measure the awareness and knowledge level about scoliosis in other regions of Saudi Arabia, according to the Ministry of Health there is International Scoliosis awareness day on June 25th to raise awareness about scoliosis, early detection and help people to learn more about this condition.

## 6. Limitations

- Not enough references regarding scoliosis.
- The sample size is relatively very small compared to the population of Saudi Arabia.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## **Annex**

### **Demographic characteristics of respondents**

#### **Gender**

Male

Female

#### **Region**

The middle region

Northern region

Southern region

Western region

Eastern region

#### **Education level**

Elementary Education

Intermediate Education

Secondary education

Diploma

Bachelor's degree:

Graduate Studies

#### **Age**

18 - 25

26 - 35.58

36 - 45

46>

### **Measure the participants' level of knowledge regarding scoliosis have you ever heard about scoliosis before?**

Yes

No

### **How's your knowledge about scoliosis?**

Average

Good

I don't know

### **Do you think scoliosis affects more?**

Male

Female

Both

### **Did anyone in your family had scoliosis before?**

Yes

No

I don't know

### **Do you think there is a cure for scoliosis patients?**

Yes

No

I don't know

### **Do you know what are the symptoms of scoliosis?**

Yes

No

**Awareness about scoliosis.**

**Have you ever attended any campaign or activity regarding scoliosis awareness?**

Yes

No

Yes, but it didn't benefit me

**Do you think there is enough awareness about scoliosis in your region?**

Yes

No

I don't know

**Do you support organizing exhibitions in schools, universities and public places to raise awareness about scoliosis?**

Yes

No