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Assessing Idiopathic Scoliosis Knowledge Levels Among Malaysian Physiotherapists and Associating Their Clinical Experience

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Abstract

Physiotherapists play a significant role in the conservative management of idiopathic scoliosis (IS) patients. This study aimed to determine the level of knowledge on IS among practising physiotherapists and the associate between years of clinical experience and the level of knowledge. A total of 63 physiotherapists responded to the International Society on Scoliosis Orthopaedic and Rehabilitation Treatment (SORSOT) questionnaire. The findings demonstrated that the level of knowledge among the physiotherapists was poor, particularly regarding the prevalence, diagnosis, and treatment of IS. There was a significant association between years of clinical experience and the level of knowledge.

Keywords: idiopathic scoliosis; physiotherapists; bracing; treatment

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1.0 Introduction

Scoliosis is a three-dimensional spine and trunk deformity with more than 10 degrees of curvature measured by the Cobb angle method (Negrini et al., 2018). This condition affects individuals from infancy through adulthood and can develop at any stage of life. Approximately 80% of scoliosis cases are idiopathic scoliosis (IS), typically occurring in children and adolescents between ages 10 and 15 with an unknown cause. Complications associated with IS vary depending on the severity of the curvature, the age of onset, and the effectiveness of treatment. The most notable complication is physical deformities such as uneven shoulders, a tilted waistline, and rib prominence. A much more severe complication includes pain, reduced lung capacity, and compromised cardiovascular function, which can impact the patient's quality of life.

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The appropriate treatment for IS depends on the severity and likelihood of progression, which involves conservative approaches such as observation, exercise, and bracing to surgical interventions. However, the treatment approach depends on gender, curve magnitude, skeletal maturity, and menarchal status (Busscher et al., 2010).

When referred to a physiotherapist, early detection of IS can avoid surgery and favor conservative treatment as physiotherapy provides non-surgical measures such as bracing and exercise to improve postural alignment, enhance muscle strength, and mitigate pain. In Malaysia, the trend of self-referral to physiotherapy is growing, especially within the private sector. Therefore, practising physiotherapists must have proficiency and clinical expertise to screen for and identify signs and symptoms suggestive of IS (Theroux et al., 2013).

Previous studies suggested that healthcare professionals lack adequate knowledge about scoliosis, particularly diagnosis and treatment (Du Toit et al., 2020). Whilst research has shown the importance of physiotherapy in providing intervention through scoliosis-specific exercises to manage and slow the progression of IS, no studies are looking at the knowledge of practising physiotherapists regarding the fundamentals of IS in Malaysia. Physiotherapists with good knowledge of scoliosis can accurately assess their patients and provide early interventions grounded in evidence-based care. As a result, the patient's financial burden associated with surgery, which typically costs between RM 70,000 and RM 80,000 in Malaysia, can be avoided. This substantial expense often compels patients to seek financial aid from Humanitarian Funds.

Therefore, the main objectives of this study are (1) to determine the level of knowledge of IS among practising physiotherapists registered under the Malaysian Physiotherapist Association (MPA) in Malaysia and (2) to associate between years of clinical experience and level of knowledge among the physiotherapists.

2.0 Literature Review

2.1 Prevalence of IS in Malaysia

Approximately 0.4% to 7% of adolescents from Asian countries have IS with a Cobb angle over 10 degrees (Wong et al., 2005; Zheng et al., 2016). In Malaysia, IS affects 2% to 3% of the population, accounting for 600,000 and 900,000 people (Deepak et al., 2017; Htwe et al., 2013). Our study from six different primary schools in the Kuala Langat district found that 5.6% of female students between ages 10 and 12 were positive for IS (Din et al., 2021).

IS develops during puberty and is globally shown to be more prevalent in females than males. An epidemiology study demonstrated that the female-to-male ratio is 2:1 (Konieczny et al., 2013). It is unknown why females are more prone to developing scoliosis. However studies believe that factors such as genetic, hormones, mechanical, and biological may contribute to this gender disparity (Marya et al., 2022; Sung et al., 2021). In some countries, as the curve progresses, the ratio can increase up to 10:1 respectively (Schreiber et al., 2023).

2.2 Physiotherapist Knowledge of IS

Studies assessing the knowledge of IS among practising physiotherapists are very limited. However, the existing studies showed that the study on knowledge proficiency on IS among practising physiotherapists globally is poor. A study conducted across nine provinces in South Africa showed a lack of understanding regarding the diagnosis and treatment modalities required for effectively managing patients with IS (Du Toit et al., 2020). Furthermore, the study highlighted a significant knowledge gap concerning conservative treatment methods for IS. Similarly, a study conducted in Turkey found that physiotherapists significantly lacked knowledge in diagnosing the criteria for scoliosis (AKGÜL et al., 2022). Studies assessing the knowledge of IS among physiotherapist students conducted in the United States of America, Poland, and the United Kingdom also failed to demonstrate an acceptable level of knowledge (Black et al., 2017; Ciazynski et al., 2008; Drake et al., 2014).

A recent study demonstrated that years of working experience influence the knowledge of Brazilian physiotherapists based on the 2016 SOSORT guidelines to provide conservative treatment approaches to improve the quality of life for patients with IS. The findings suggested that physiotherapists with over six years of working experience have better knowledge of scoliosis. Meanwhile, those with less than six years of experience showed a lack of grasp, especially in managing patients with IS.

Therefore, this study aims to address the following research questions:

1. What is the level of knowledge of IS among registered physiotherapists in Malaysia?
2. Is there an association between the registered physiotherapist's years of clinical experience and the knowledge level?

3.0 Methodology

This study employed a quantitative descriptive approach by collecting data from an adopted questionnaire, as shown in Table 1. The survey comprising 15 close-ended multiple choice questions was previously validated (Du Toit et al., 2020) and transcribed onto an online platform using Google Forms. Using Raosoft sample size calculator, a total of 71 survey questionnaires were distributed online. The physiotherapists were required to sign the informed consent form before answering the questionnaire. The inclusion criteria required physiotherapists to be registered with the Malaysian Physiotherapy Association (MPA) and should understand English language. The exclusion criteria included physiotherapy students and individuals who were not members of the MPA. Based on the exclusion criteria, only 63 were recruited. This study was approved by the Research Ethics Community (REC) of Universiti Teknologi MARA (UiTM) with the reference number REC/11/2021 (UG/MR/868).

Table 1. Research Instrument

Variables	Items	Author	Source
Demographic	6	Develop by researchers	-
Definition	10	Ciazynski et al., 2008	Based on 2011 SOSORT
Cause		Drake et al., 2014	guidelines (Negrini et al., 2012)
Development			
Prevalence			
Diagnosis			
Treatment			
Bracing			
Conservative treatments			
Physiotherapist Confidence	5	Adapted by Du Toit et al., 2020	Based on 2016 SOSORT
Screening			guidelines (Negrini et al., 2018)
Assessment			
Management			
Education			

The data was extracted from Google Forms, and descriptive statistics was used to describe the demographics and responses for each question. Meanwhile, Fisher’s exact test was used to associate the level of knowledge of IS with years of clinical experience, area of expertise, and experience in treating IS using Statistical Package for Social Science (SPSS) version 20.0.

4.0 Findings

Research Question 1: What is the level of knowledge on IS among registered physiotherapists in Malaysia?

4.1 Demographic profile of registered physiotherapists

Sixty-three registered physiotherapists under the Malaysian Physiotherapy Association participated in this study, and their demographic profile is described in Table 1. More than half of the participants were aged between 20-29 (68.3%), with 71.4% being female. More than half of the participants work at a physiotherapy centre (58.7%). Most physiotherapists have less than three years of working experience (36.5%). A total of 81% of the participants are experts in the field of musculoskeletal and spine. Almost all the physiotherapists in this study have experience treating scoliosis patients (95.2%).

Table 1. Demographic profile of registered physiotherapists

Profile	Frequency	Percentage (%)
Age		
20 – 29 years	43	68.3
30 – 39 years	18	28.6
40 – 49 years	2	3.2
Gender		
Male	18	28.6
Female	45	71.4
Workplace		
Government Hospital	16	25.4
Private Hospital	10	15.9
Physiotherapy Centre	37	58.7
Years of Clinical Experience		
< 1 year	7	11.1
1 - < 3 years	23	36.5
3 – 5 years	12	19.0
5 – 10 years	12	19.0
10 – 20 years	9	14.3
Area of Expertise		
Musculoskeletal & Spine	51	81.0
Others	12	19.0
Experience in Treating Scoliosis Patient		
Yes	60	95.2
No	3	4.8

Question 1: The definition of IS

Out of 63 physiotherapists, only 21 (33.3%) could define and identify IS as a three-dimensional deformity of the spine from infancy to puberty (Fig. 1).

Question 2: Causes of IS

Forty-two (66.7%) physiotherapists answered correctly that there is no specific cause for the development of scoliosis (Fig. 2).

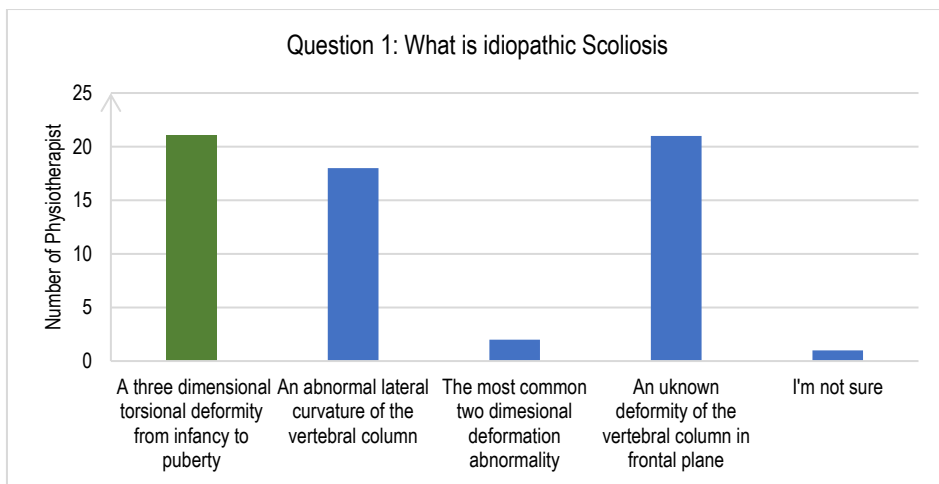


Fig 1: Definition of IS

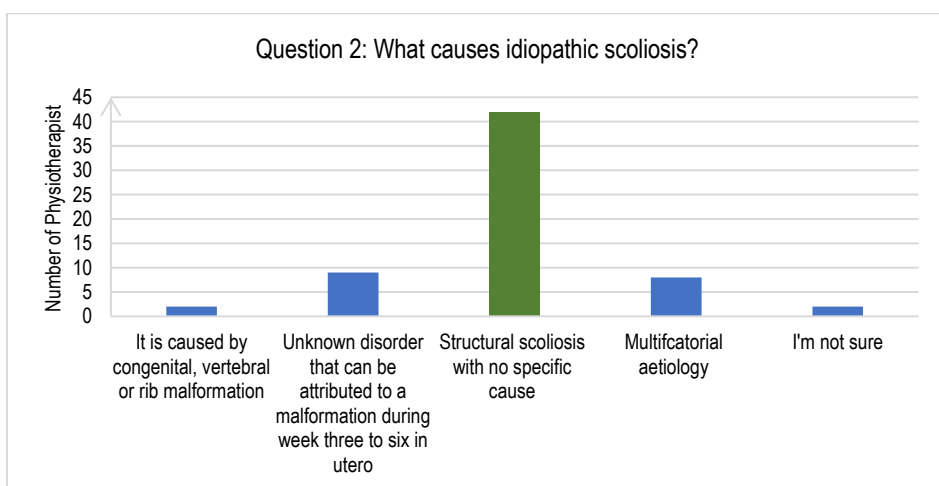


Fig 2: Causes of IS

Question 3: Development of IS

In Figure 3, most of the physiotherapists (84.1%) recognised that idiopathic scoliosis can develop at any point during childhood and adolescence.

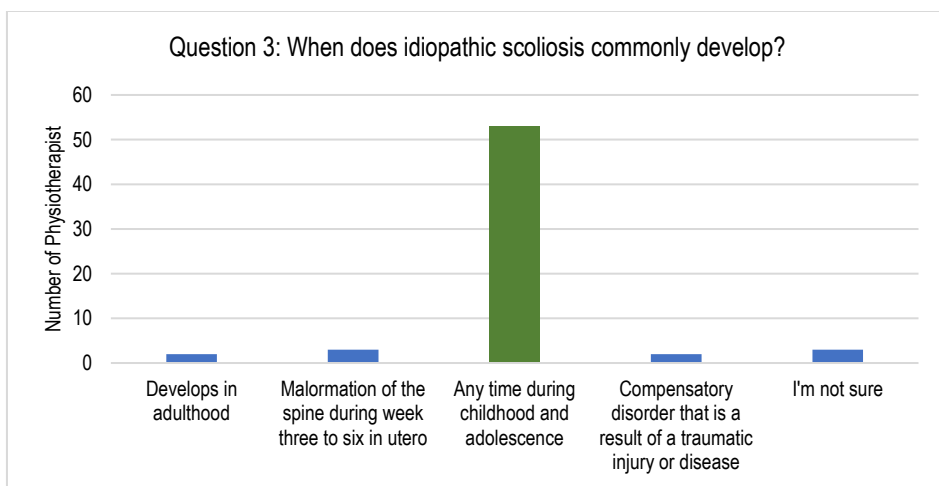


Fig 3: Development of IS

Question 4: Prevalence of IS

Only almost a quarter of physiotherapists (23%) know that the prevalence of IS within the scoliosis population is 80%. The remaining 77% either answered wrongly or were not sure (Fig. 4).

Question 5: Diagnosis of IS

A total of 20 (31.7%) participants were able to answer the question regarding how IS diagnosis is confirmed. Most participants (64.5%) thought that a Cobb angle of 20° or greater, a rib hump, and an asymmetrical iliac crest confirmed the IS diagnosis (Fig. 5).

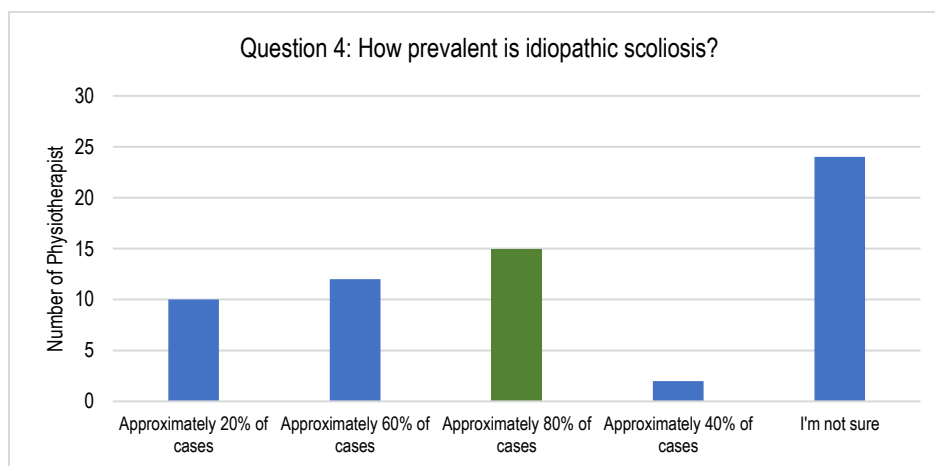


Fig 4: Prevalence of IS

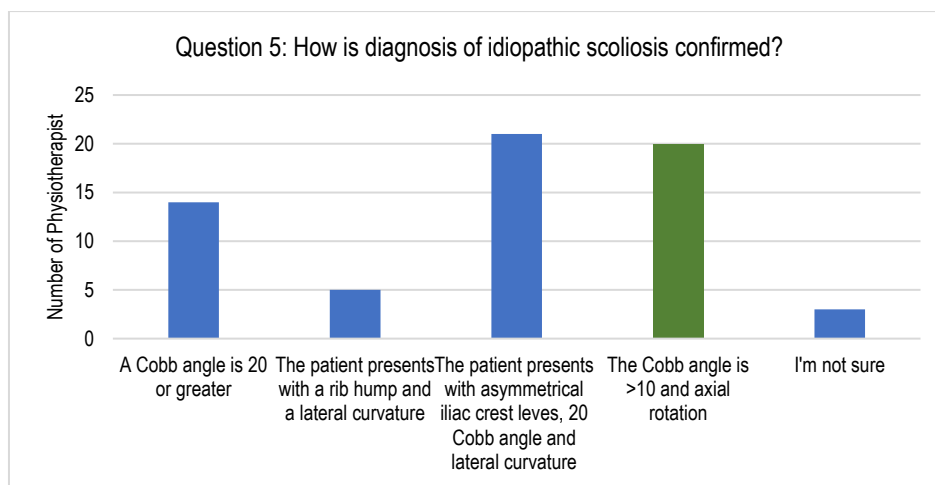


Fig 5: Diagnosis of IS

Question 6: Treatment of IS

Out of all the treatment options, only 12 participants (19%) knew the correct treatment for IS. Half the physiotherapists thought postural education, rotational breathing and stretching should be part of the treatment (Fig. 6).

Question 7: Bracing

Most participants knew when bracing should be recommended for patients with IS. 60.3% correctly answered that patients with IS whose curve is $\pm 20^\circ$ Cobb angle or higher are recommended for bracing (Fig.7).

Question 8: Physical activity

Most of the physiotherapists (44.4%) assumed that pilates was the most beneficial physical activity for patients with IS. Seventeen of them (27%) chose swimming, 11 (17.5%) chose yoga, and another five (7.5%) chose gyrotonic as the most beneficial physical activity.

Question 9: Harmful physical activity

Almost half (41.3%) of the participants answered that martial arts as the most harmful physical activity for patients with IS. Nineteen (30.2%) answered gymnastics, nine (14.3%) thought ballet dancing, and three (4.8%) physiotherapists assumed cycling was the most harmful physical activity for patients with IS. Another six (9.5%) physiotherapists were unsure which physical activity would be the most harmful for patients with IS.

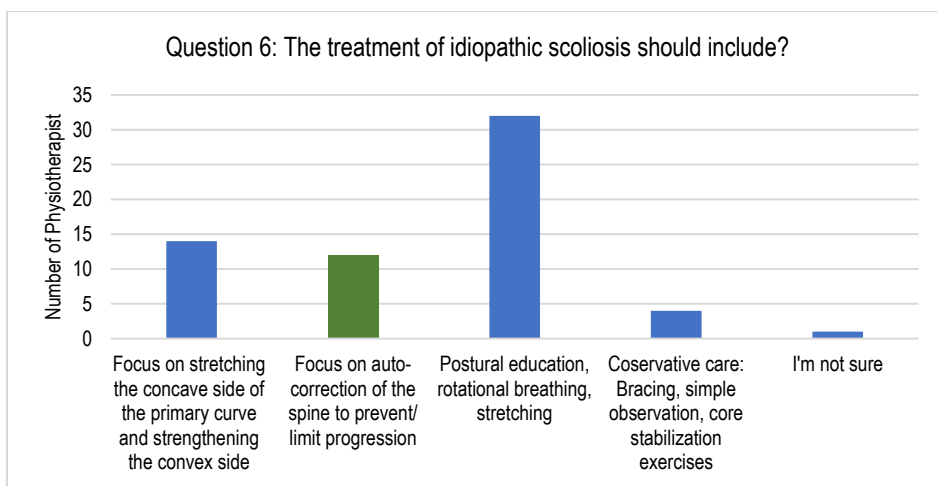


Fig 6: Treatment of IS

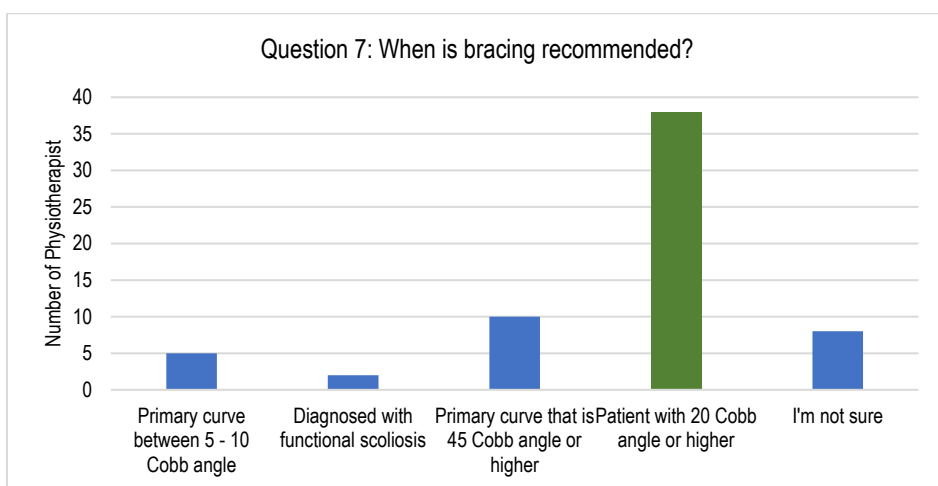


Fig 7: Bracing for IS

Question 10: Type of conservative treatment

Twenty-two physiotherapists (34.9%) were familiar with Lehner-Schroth Weiss conservative treatment. Nineteen (30.2%) said they were familiar with side shift treatment, while sixteen (25.4%) answered none.

Question 11: Effective conservative management

Most physiotherapists (82.5%) recognised Physiotherapeutic Scoliosis Specific Exercise (PSSE) as the most influential conservative management for IS. Meanwhile, five (7.9%) were not sure, while four (6.3%) chose bracing as the most effective treatment, and two (3.2%) answered other conservative management.

Question 12: Adam's forward bending test and Scoliometer

More than half of the participants (69.8%) said they were confident in their ability to use the Adam forward bend test and Scoliometer in the assessment of IS. In comparison, fifteen (23.8%) said they were unsure, and four (6.3%) said they were not confident.

Question 13: Providing educational support

87.3% of physiotherapists are confident in providing educational support to patients. In comparison, seven (11.1%) said they were unsure whether they could provide educational support to the patient, and one (1.6%) said they could not.

Question 14: Patient management

More than 80% of the participants (84.1%) answered they were confident in treating patients with IS, while eight (12.7%) were unsure if they could manage. However, two (3.2%) physiotherapists were not confident in managing patients with IS.

Question 15: Physiotherapy exercise intervention

Nearly all participants (95.2%) believed that physiotherapy exercise intervention could be beneficial in treating patients with IS, while three (4.8%) participants were not sure.

4.2 Level of knowledge on IS among registered physiotherapists

The total score received by physiotherapists after completing the questionnaire is shown in Table 2. The scores were calculated based on seven questions that included knowledge of IS (Du Toit et al., 2020). A physiotherapist with a total score of ≥ 6 was considered to have good knowledge of IS. Those with scores ≤ 5 was considered to have a moderate level of knowledge, while participants with a score of ≤ 3 indicate a poor level of knowledge.

Table 2. The total score received by physiotherapists (n=63)

Score	Frequency (%)
0	1 (1.6)
1	8 (12.7)
2	17 (27.0)
3	14 (22.2)
4	6 (9.5)
5	12 (19.0)
6	3 (4.8)
7	2 (3.2)

Table 3 describes the level of knowledge on IS among physiotherapists registered with the MPA. Out of 63 physiotherapists, only five (7.9%) demonstrated a good level of knowledge, while 18 (28.6%) had a moderate level of knowledge, and more than half (63.5%) had a poor level of knowledge of IS.

Table 3. Level of knowledge on idiopathic scoliosis among physiotherapists

Categories	Frequency	Percent (%)
Poor level	40	63.5
Moderate level	18	28.6
Good level	5	7.9

4.3 Association between years of clinical experience and level of knowledge

Research Question 2: Is there an association between the registered physiotherapist's years of clinical experience and the knowledge level?

The findings in Table 4 demonstrate a significant relationship between years of clinical experience and the level of knowledge of IS ($p < 0.05$). However, there is no association between the area of expertise and experience in treating scoliosis and the level of knowledge on IS.

Table 4. Association between clinical experience, area of expertise, and experience in treating patients with IS with the level of knowledge

Variable	Good level n (%)	Moderate level n (%)	Poor level n (%)	X ² statistic	P-value
Years of clinical experience	<1	0 (0.0)	2 (28.6)	5 (71.4)	14.080 0.034^a
	1 - <3	0 (0.0)	8 (34.8)	15 (65.2)	
	3 – 5	0 (0.0)	1 (8.3)	11 (91.7)	
	5 – 10	2 (16.7)	5 (41.7)	5 (41.7)	
	10 – 20	3 (33.3)	2 (22.2)	4 (44.4)	
Area of expertise	Musculoskeletal & Spine	4 (7.8)	17 (33.3)	30 (58.8)	3.127 0.210 ^a
	Others	1 (8.3)	1 (8.3)	10 (83.3)	
Experience in treating scoliosis patient	Yes	5 (8.3)	18 (30.0)	37 (61.7)	1.248 0.646 ^a
	No	0 (0.0)	0 (0.0)	3 (100.0)	

5.0 Discussion

5.1 Level of knowledge of registered physiotherapists in Malaysia

Practising physiotherapists must possess the necessary knowledge and clinical expertise to identify signs and symptoms suggestive of Idiopathic Scoliosis (IS) as a progressive disorder. Early detection is vital for improved patient outcomes, potentially allowing for better decision-making regarding conservative treatment and avoiding surgery (Negrini et al., 2018). Comprehensive conservative management can help improve patients' quality of life by reducing curve progression during puberty, addressing respiratory issues, and managing spinal pain syndromes.

Our findings showed that only 27% of physiotherapists were able to answer more than 70% of the questions correctly based on the 2016 SORSOT guidelines. This suggests that the overall knowledge of IS amongst physiotherapists in Malaysia is poor. Similarly, a recent study conducted in Turkey among physiotherapists and physiotherapy students showed a deficiency in fundamental knowledge of IS (AKGÜL et al., 2022). A study in the United States reported that only 8% of physiotherapy students could answer 70% of the questions according to the SOSORT guidelines (Drake et al., 2014). The lack of fundamental knowledge is possible because scoliosis education was not fully embedded in the physiotherapy core curriculum. Unfortunately, almost all previous findings assessed the knowledge of IS amongst physiotherapy students and only a handful of practising physiotherapists.

Generally, our findings demonstrated that physiotherapists in Malaysia have a good understanding of the cause of IS, the development of IS, and the use of bracing. Our results showed that physiotherapists (66.7%) in Malaysia were able to identify the cause of IS correctly, similar to findings conducted among physiotherapists in Turkey (52.7%) and South Africa (73.5%) (AKGÜL et al., 2022; Du Toit et al., 2020).

However, our findings showed a lack of knowledge about the definition, prevalence, diagnosis, and treatment of IS. Similarly, a study conducted in South Africa also demonstrated a lack of knowledge in these areas (Du Toit et al., 2020). More than half of practising physiotherapists in South Africa were unable to define IS correctly, only 15.7% were aware of the prevalence of IS, 66.4% incorrectly suggested or were not sure about the diagnosis of IS, and over half (58%) were unable to answer the treatment for IS correctly (Du Toit et al., 2020). On the contrary, a study conducted in Turkey found that most (57.2%) practising physiotherapists could define IS correctly (AKGÜL et al., 2022).

Our findings suggest that physiotherapists in Malaysia have poor knowledge of the diagnosis and treatment of IS. The ability of a physiotherapist to diagnose and treat patients with IS plays an integral part in patient management, leading to greater possibilities for slowing down the progression of the curve, hence improving patients' quality of life (Hresko et al., 2016).

The primary non-surgical approach for scoliosis is bracing, which proves to be an effective method in preventing the advancement of spinal curvature. Our findings suggest that 60.3% of physiotherapists in Malaysia are aware that bracing is required for IS patients with a Cobb angle of more than 20°. These findings were similar to a study conducted in Turkey, where 60% of physiotherapists know when a brace should be applied (AKGÜL et al., 2022). Meanwhile, only 42% of South African physiotherapists understand that bracing is recommended for IS patients with curves over 20° (Du Toit et al., 2020).

Our study reported that 44.4% and 27% of physiotherapists suggested pilates and swimming, respectively, was the most beneficial form of physical activity. These findings had similar views with the physiotherapist from Turkey (AKGÜL et al., 2022). Although previous studies have reported that swimming is a beneficial physical activity for treating scoliosis (Liljenqvist et al., 2006), studies are showing that swimming may increase trunk asymmetry (Aydın et al., 2020; Negrini et al., 2018). Our finding also showed that most of the physiotherapists (82.5%) believed that Physiotherapeutic Scoliosis Specific Exercise (PSSE) is the most effective conservative management for IS. The Malaysian physiotherapist's knowledge of the effectiveness of PSSE is in line with the SOSORT guidelines, aiming to auto-correct all aspects of deformity and limit the curve progression (Negrini et al., 2018).

5.2 Association between years of clinical experience and level of knowledge

This study showed an association between the years of clinical experience of physiotherapists and their level of knowledge. Most Malaysian physiotherapists in this study had clinical experience between one and five years. At this point, most Malaysian physiotherapists have poor level of knowledge. Moreover, a recent study's findings indicated that physical therapists with less than six years of clinical training lack understanding of best practice in treating patients with IS (Linhares et al., 2022). A good level of knowledge of IS was only seen among Malaysian physiotherapists with more than five years of clinical experience. Similarly, a study performed on Brazilian physical therapists who have experience for more than six years demonstrated greater knowledge of IS (Linhares et al., 2022). This could be attributed to attending more professional courses and training.

6.0 Conclusion & Recommendations

The registered practising physiotherapists in Malaysia have inadequate knowledge, particularly regarding IS prevalence, diagnosis, and treatment. A lack of knowledge of IS may prohibit the physiotherapist's ability to recognise early signs of IS and provide conservative treatment for the patients.

Considering the limited research available in this area and the apparent lack of global knowledge among physiotherapists, it is essential to investigate approaches to strengthen scoliosis education and training within the physiotherapy curriculum. These initiatives have the potential to result in enhanced patient outcomes. A larger sample size of practising physiotherapists should be recruited in the following study.

Acknowledgement

We want to thank all the physiotherapists who participated in this study.

Paper Contribution to Related Field of Study

This paper contributes to the importance of assessing the knowledge of IS among physiotherapists to detect IS early and provide conservative management to the patients.

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