Characteristics of Pain among Patients with Failed Back Surgery Syndrome in a Tertiary Care Hospital in Western Saudi Arabia

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Abstract

Background: This study aims to determine the characteristics and the disability level of patients with failed back surgery syndrome in a tertiary care hospital in Saudi Arabia. Failed back surgery syndrome is a growing medical challenge, particularly with the increase in the number of surgical interventions and the aging of patients.

Methods: A retrospective database review was conducted to identify patients who underwent spine surgery in the form of laminectomy or discectomy with or without fusion, microdiscectomy, or surgical repair for scoliosis from January 2008 through December 2018. Trauma victims requiring urgent spine stabilization and patients with spinal tumors were excluded. Demographic and surgical data were collected, including postsurgical outcomes and Oswestry Low Back Pain Disability Questionnaire responses. A telephone interview was conducted with all patients to complete any missing data prior to statistical analysis.

Results: A total of 231 spinal surgery patients were included. The incidence of severe disability, household, and bed-bound Oswestry Disability Index scores was 14.7%, 6.9%, and 1.7%, respectively. There was a significant association between disability and pain grades ($p < 0.05$). Disability was also related to age, gender, and specialty of the surgeon. Although various methods were prescribed to treat pain, only oral medications were associated with satisfactory feedback ($p < 0.0001$). Adequate pain treatment was significantly related to physiotherapy, medication use, and pain specialist consultation.

Conclusions: Failed back surgery syndrome has led to a significant degree of disability, and protective measures such as enhanced patient selection, recruiting well-experienced surgeons, and providing adjuvant treatments should be adopted to reduce the incidence of poor outcomes.

Key words: low back pain, failed back surgery syndrome, persistent post-operative back pain, back pain treatment

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Introduction

Low back pain (LBP) is one of the most common patient complaints worldwide. Surgical intervention is one of the treatment options for persistent low back pain. Failed back surgery syndrome (FBSS) is one of the potential consequences of surgical treatment. In 1993, Follet and Dirks[1] introduced the term FBSS to describe "the persistent low back pain with or without radicular pain, after one or more surgeries on the lumbar spine, which were performed to relieve that low back pain".[2,3] Besides pain, FBSS results in various social, psychological, and financial consequences for patients and creates an economic burden on the health service.[4,5] Various epidemiological studies conducted in the United Kingdom, Japan, and Switzerland of patients who underwent lumbar surgeries revealed that 20% to 46% of patients were diagnosed with persistent postoperative low back pain.[6,7] Despite great medical advancements in Saudi Arabia, the number of surgical interventions is continuously increasing, including spine surgeries. This study assesses the characteristics of FBSS patients in a tertiary care hospital in the Western region of Saudi Arabia, to identify any contributing factors that might lead to FBSS, and to assess any pain-related disability among FBSS patients, using the Oswestry Disability Index (ODI).[8,9]

Materials and methods

Study Design

Following the approval of the ethics and research committee at King Abdulaziz University Hospital (Reference no. 249-19 on March 31, 2019), the hospital information system was searched for patients who underwent spine surgery from January 2008 to December 2018. Data related to FBSS were recorded, and a research assistant conducted phone interviews with patients to complete any missing data. The patients were informed of the nature of the study and gave verbal consent to participate in the study.

Study Population

All patients between 18 and 80 years of age who underwent discectomy or laminectomy with or without fusion, microdiscectomy, or surgical repair of scoliosis and complained of pain in the postoperative period were included in the study. Patients with vertebral fractures who required urgent spine stabilization and those with spine tumors treated by surgical interventions were excluded from the study.

Study Procedures

A total of 824 patient medical records were identified and reviewed through the hospital information system. Demographic, social, pain, and disability characteristics were recorded. Patient-related factors (level of education, smoking, comorbidities, exercise performance), and surgery-related factors (with or without fusion, surgeon's years of experience, and postoperative complications) were recorded as well. The ODI was used to assess low back functional disability in the postsurgical period, and its details were recorded. The ODI, or Oswestry Low Back Pain Disability Questionnaire, is an index that quantifies the level of disability in the period following surgery. It covers 10 daily activities that represent the patient's level of function.

One activity involves pain, and the remaining 9 activities involve daily living functions (personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and travelling). Each activity is followed by 6 scenarios describing the patient's current situation. Each statement is scored from 0 to 5, where 0 indicates the least amount of disability and 5 reflects the highest. The ODI score ranges from zero (no disability) to 100 (maximum disability), and a score of 0–20 is considered mild disability, 20–40 indicates moderate disability, 40–60 indicates severe disability, 60–80 indicates household disability, and 80–100 indicates bed-bound disability.[8]

Statistical Analysis

Data were analyzed using IBM SPSS Advanced Statistics version 21 (SPSS Inc., Chicago, IL). Numerical data are expressed as mean and standard deviation or median and range, as appropriate. Pearson Chi-square tests were used to compare the incidence of postoperative complications. A P value of $\leq .05$ was considered statistically significant.

Results

From January 2008 through December 2018, records for 824 patients with spine surgeries were identified and reviewed. Thirty-two patients were older than 80 years, 15 patients were younger than 18 years, 20 patients were diagnosed with spine tumors, and 757 patients were contacted to participate in the study. Among these, 10 patients were deceased at the time of the study, 219 patients refused to participate in the study, while another 297 patients could not be contacted. Finally, 231 patients were included in the study.

Table 1 presents the patient demographic data. Patients aged 50–70 years most commonly complained of FBSS. A slight female predominance was noted (52.4%). More than 50% of patients were non-Saudis. A majority of the patients (87%) were overweight, while 20% were diabetic.

Table 2 presents the patients' Oswestry Low Back Pain Disability Questionnaire responses. One fifth of the patients complained of at least a fairly severe degree of pain or more (21.6%), and 32 patients (13.9%) required some level of assistance with personal care.

Over 80% of the patients had difficulty lifting without pain, 49.8% of patients had limitations in walking, and sitting and standing were limited in 46.5% and 64.6% of the patients, respectively. Sleep was not disturbed in 68.4% of patients, and sexual life was normal among the majority of patients (82.7%). Social life was limited in 26% of patients, but pain did not prevent 61.9% of the patients from travelling.

The distribution of ODI scores as minimal, moderate, severe, household, and bed-bound is presented in Figure 1. More than 50% of patients had a considerable degree of disability (moderateto bed-ridden disability).

Surgeries were performed by neurosurgeons in 220 patients (95.2%), and by orthopedic surgeons in the remaining 11 patients (4.8%).

The number of back surgeries ranged from one to more than 3 surgeries per patient. A total of 157 patients underwent one single surgery, 35 patients underwent surgery twice, 6 patients underwent 3 surgeries, and 3 patients underwent more than 3 surgeries.

Table 1. Patient Demographic Data

Demographic Characteristics		Number	%
Age (years)	<30	13	5.6
	30–50	58	25.1
	50–70	124	53.7
	>70	36	15.6
Gender	Female	121	52.4
	Male	110	47.6
Body Mass Index (BMI)	Underweight (<18.5)	4	2.4
	Normal (18.5–24.9)	17	10.1
	Overweight (25.0–29.9)	69	40.8
	Obese (>30)	79	46.7
Marital Status	Married	183	79.2
	Single	26	11.3
	Divorced	6	2.6
	Widowed	16	6.9
Existence of Children	Yes	190	92.7
	No	15	7.3
Household Chores	Self	58	25.1
	Family help	100	43.3
	House maid	73	31.6
Educational Level	Illiterate	58	25.1
	Elementary	40	17.3
	High school	54	23.4
	College	41	17.7
	Post grad	38	16.5
Employment Status	Student	3	1.3
	Employee	70	30.3
	Unemployed	113	48.9
	Retired	42	18.2
	Other	3	1.3
Smoking	Yes	43	18.6
	No	188	81.4
Sports Participation	No	131	56.7
	Aerobic exercise	18	7.8
	Swimming	25	10.8
	Walking	32	13.9
	Others	25	10.8
Concomitant Chronic Diseases	No	107	46.3
	Yes	124	53.7
	Diabetes	47	20.3
	Hypertension	46	19.9
	Other cardiac diseases	12	5.2
	Dyslipidemia	4	1.7
	Renal diseases	1	0.4
	Psychiatric diseases	1	0.4
	Other	18	5.8

Various modalities were used to control the low back pain among patients with FBSS (Table 3). Physiotherapy was reported in 60% of the cases. Medications were prescribed to 50.2% of patients, and nonsteroidal anti-inflammatory drugs (NSAIDs) were the most commonly prescribed medications (75.8%). The primary treating surgeon was involved in the management of postoperative pain in 40% of cases. Adjuvant treatment modalities were offered to 14.4% of the patients. More than 70% of patients indicated that they were satisfied with the control of their pain (Figure 2).

Demographic data and pain management modalities were correlated to ODI scores (Table 4). Statistically significant correlations were found between the ODI score and age, gender, surgeon specialty, pain score in the last 3 months, the use of interventional procedures (epidurolysis and epidural steroid injection) to treat pain, and the specialty of the doctor managing the pain. Adequate treatment of FBSS pain was significantly related to the use of physiotherapy, pain service consultation, and prescription of medications ($P < .05$) (Table 5).

Table 2. Oswestry Low Back Pain Disability Questionnaire Responses

	N	%
Section 1 – Pain intensity at the moment		
No pain	94	40.7
Pain is very mild	47	20.3
Pain is moderate	40	17.3
Pain is fairly severe	24	10.4
Pain is very severe	19	8.2
Pain is the worst imaginable	7	3.0
Section 2 – Personal care (washing, dressing, etc.)		
Looking after myself normally without causing extra pain	161	69.7
Looking after myself normally, but it causes extra pain	36	15.6
Painful to look after myself and I'm slow and careful	2	0.9
Needs some help but manage most of my personal care	15	6.5
Needs help every day in most aspects of self-care	14	6.1
Cannot get dressed, wash with difficulty and stay in bed	3	1.3
Section 3 – Lifting		
Lift heavy weights without extra pain	44	19.0
Lift heavy weights, but it causes extra pain	17	7.4
Cannot lift heavy weights, but I can manage light to medium weight	29	12.6
Can lift very light weights	102	44.2
Cannot lift or carry anything	39	16.9
Section 4 – Walking		
Pain doesn't prevent me from walking any distance	116	50.2
Pain prevents me from walking more than 1.5 kilometer	23	10.0
Pain prevents me from walking more than 750 meters	26	11.3
Pain prevents me from walking more than 90 meters	22	9.5
Walk using a stick or crutches	38	16.5
Staying in bed most of the time	6	2.6

Continuation of Table 2

Section 5 – Sitting		
Sitting in any chair as long as I like	124	53.7
Sit in my favorite chair as long as I like	27	11.7
Pain prevents me from sitting more than one hour	32	13.9
Pain prevents me from sitting more than 30 minutes	17	7.4
Pain prevents me from sitting more than 10 minutes	20	8.7
Pain prevents me from sitting	11	4.8
Section 6 – Standing		
Standing as long as I want without extra pain	82	35.5
Standing as long as I want but it gives me extra pain	32	13.9
Pain prevents me from standing for more than one hour	23	10.0
Pain prevents me from standing for more than 30 minutes	29	12.6
Pain prevents me from standing for more than 10 minutes	43	18.6
Pain prevents me from standing	22	9.5
Section 7 – Sleeping		
Sleep without disturbance by pain	158	68.4
Sleep is occasionally disturbed by pain	51	22.1
Pain reduces my sleep to less than 6 hours	2	0.9
Pain reduces my sleep to less than 4 hours	5	2.2
Pain reduces my sleep to less than 2 hours	10	4.3
Pain prevents me from sleep	5	2.2
Section 8 – Sex life (if applicable)		
Sex life is normal and causes no pain	67	82.7
Sex life is normal but causes some pain	7	8.6
Sex life is nearly normal but is very painful	1	1.2
Sex life is severely restricted by pain	2	2.5
Sex life is nearly absent because of pain	3	3.7
Pain prevents any sex life	1	1.2
Section 9 – Social life		
Social life is normal and gives no extra pain	171	74.0
Social life is normal but increases the degree of pain	26	11.3
Pain has no significant effect on my social life apart from limiting my energetic interests e.g., sports	5	2.2
Pain has restricted my social life and I do not go out as often	1	0.4
Pain has restricted my social life to my home	19	8.2
I have no social life because of pain	9	3.9
Section 10 – Travelling		
Travels anywhere without pain	143	61.9
Travels anywhere but it gives me extra pain	32	13.9
Pain is bad but I manage journeys over two hours	19	8.2
Pain restricts me to journeys in the last year	12	5.2
Pain restricts me to short necessary journeys under 30 minutes	2	0.9
Pain prevents me from traveling except to receive treatment	23	10.0

Modified from Fairbank, et al. 2000.[8]

Table 3. Modalities Used to Treat Failed Back Surgery Syndrome Pain

Items		N	%
Postoperative physiotherapy	Yes	145	62.8
	No	86	37.2
Specialist providing pain treatment	None	97	42.0
	Family medicine	22	9.5
	Primary surgeon	84	36.4
	Pain specialist	20	8.7
	Others	8	3.5
Pain relief in relation to treatment	Yes	141	61.0
	No	90	39.0
Postoperative interventional procedures for pain treatment	Yes	45	19.5
	No	186	80.5
Medications prescribed to relieve pain	Opioids	127	55.0
	NSAIDs	175	75.8
	Anti-Depressants	89	38.5
	Anti-Convulsants	92	39.8
	Combined medications	2	0.9
Other modalities used to relieve pain	Acupuncture	3	1.3
	Exercises	2	0.9
	Swimming	8	3.5
	Massage	9	3.9
	Hot and Cold	3	1.3
	Others	8	3.5
	Medications	116	50.2

Discussion

FBSS is a relatively new term that encompasses a wide range of meanings.[10] It describes the failure of spine surgery to achieve its goal secondary to poor selection of the right patient for surgery. In this study, 23.3% of spinal surgery patients had a severe disability based on the ODI Index, and over 50% had at least moderate disability. While a majority of patients were satisfied with their pain management, adequate pain therapy was related to the use of a multimodal treatment plan.

The failure rate of spine surgeries to relieve low back pain is estimated to be 10% to 46%, and despite marked advancement in surgical techniques, FBSS rates continue to increase.[11,12] FBSS patients suffer more pain, and have poorer quality of life and decreased physical functions compared to those with osteoarthritis, rheumatoid arthritis, complex regional pain syndrome, or fibromyalgia.[13] The significant impairment of function related to pain disability in FBSS is a major finding of our study. Disability after surgery requires medical and surgical attention. Ikeda et al. reported disability in 70% of their

Table 4. Oswestry Disability Index Score versus Demographic Details and Pain Management Protocols

Items			Oswestry Disability Index Score					Chi-square	
			Minimal disabilit	Moderate disability	Severe disability	Crippled	Bed-bound	*P*-value	
Age	<30	N	7	3	3	0	0	.017	
		%	53.8%	23.1%	23.1%	0.0%	0.0%		
	30–50	N	37	15	3	3	0		
		%	63.8%	25.9%	5.2%	5.2%	0.0%		
	50–70	N	53	39	21	10	1		
		%	42.7%	31.5%	16.9%	8.1%	0.8%		
	>70	N	10	13	7	3	3		
		%	27.8%	36.1%	19.4%	8.3%	8.3%		
Gender	Female	N	46	40	23	11	1	.038	
		%	38.0%	33.1%	19.0%	9.1%	0.8%		
	Male	N	61	30	11	5	3		
		%	55.5%	27.3%	10.0%	4.5%	2.7%		
Surgeon's specialty	Neu-ro-sur-gery	N	98	70	33	15	4	.038	
		%	44.5%	31.8%	15.0%	6.8%	1.8%		
	Ortho	N	9	0	1	1	0		
		%	81.8%	0.0%	9.1%	9.1%	0.0%		
Low back pain	No	N	61	15	6	3	0	<.001	
		%	71.8%	17.6%	7.1%	3.5%	0.0%		
	Yes	N	46	55	28	13	4		
		%	31.5%	37.7%	19.2%	8.9%	2.7%		
Pain score in the last 3 months	None	N	57	9	3	1	0	<.001	
		%	81.4%	12.9%	4.3%	1.4%	0.0%		
	Mild	N	32	19	3	1	0		
		%	58.2%	34.5%	5.5%	1.8%	0.0%		
	Moderate	N	13	28	11	4	0		
		%	23.2%	50.0%	19.6%	7.1%	0.0%		
	Severe	N	5	13	16	7	0		
		%	12.2%	31.7%	39.0%	17.1%	0.0%		
	Worst	N	0	1	1	3	4		
		%	0.0%	11.1%	11.1%	33.3%	44.4%		
Postoperative physiotherapy	Yes	N	57	49	23	13	3	.065	
		%	39.3%	33.8%	15.9%	9.0%	2.1%		
	No	N	50	21	11	3	1		
		%	58.1%	24.4%	12.8%	3.5%	1.2%		
Postoperative consultation	None	N	68	21	5	3	0	56.551	<.001
		%	70.1%	21.6%	5.2%	3.1%	0.0%		
	Family medicine	N	7	9	4	1	1		
		%	31.8%	40.9%	18.2%	4.5%	4.5%		
	Primary surgeon	N	26	28	18	10	2		
		%	31.0%	33.3%	21.4%	11.9%	2.4%		
	Pain spe-cialist	N	6	8	3	2	1		
		%	30.0%	40.0%	15.0%	10.0%	5.0%		
	Other	N	0	4	4	0	0		
		%	0.0%	50.0%	50.0%	0.0%	0.0%		
Postoperative interventional procedures[a]	No	N	96	56	26	6	2	23.071	<.001
		%	51.6%	30.1%	14.0%	3.2%	1.1%		
	Yes	N	11	14	8	10	2		
		%	24.4%	31.1%	17.8%	22.2%	4.4%		

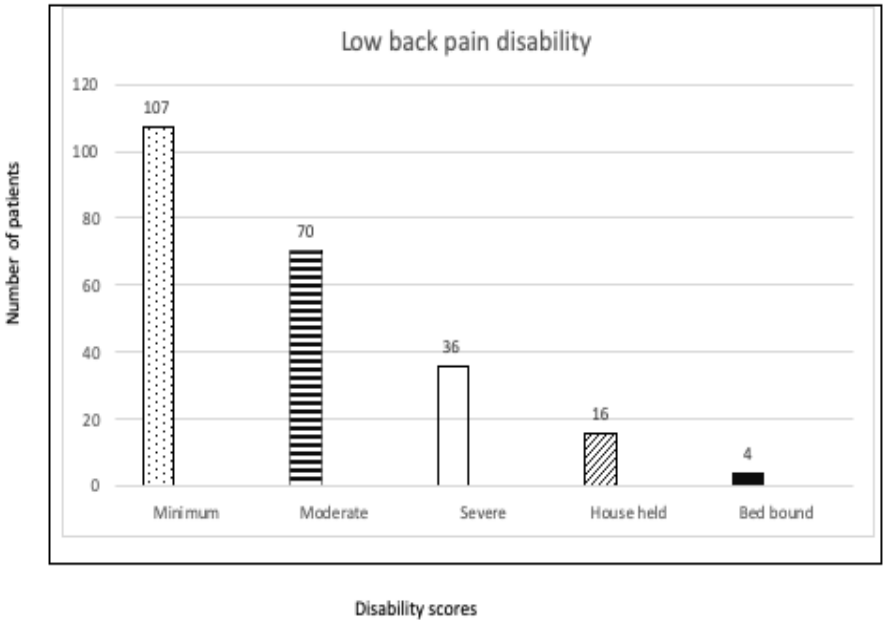
[a]Epidurolysis, epidural steroid injection

Table 5. Presence of Low Back Pain versus Management Protocols

Items		Low Back Pain						Chi-square	
		No		Yes		Total			
		N	%	N	%	N	%	X^2	*P*-value
Postoperative physiotherapy	Yes	40	47.1%	105	71.9%	145	62.8%	14.087	<.001
	No	45	52.9%	41	28.1%	86	37.2%		
Postoperative consultation	None	54	63.5%	43	29.5%	97	42.0%	27.177	<.001
	Family medicine	4	4.7%	18	12.3%	22	9.5%		
	Primary surgeon	20	23.5%	64	43.8%	84	36.4%		
	Pain specialist	6	7.1%	14	9.6%	20	8.7%		
	Other	1	1.2%	7	4.8%	8	3.5%		
Postoperative Interventional procedures	No	67	78.8%	119	81.5%	186	80.5%	0.245	.621
	Yes	18	21.2%	27	18.5%	45	19.5%		
Acupuncture		0	0.0%	3	2.1%	3	1.3%	2.776	.096
Some exercise		1	1.2%	1	0.7%	2	0.9%	0.146	.703
Swimming		2	2.4%	6	4.1%	8	3.5%	0.525	.469
Massage		4	4.7%	5	3.4%	9	3.9%	0.230	.631
Hot & cold		1	1.2%	2	1.4%	3	1.3%	0.016	.900
Medications		24	28.2%	92	63.0%	116	50.2%	26.658	<.001

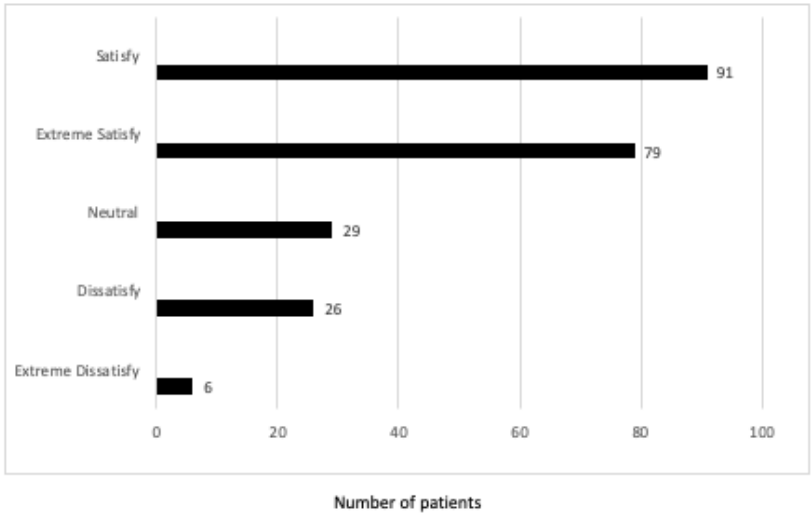
study sample of Japanese patients older than 65 years.[14] Disability and pain are not just co-existent, they are strongly related.[13-15] Patients with moderate, severe, and bed-bound pain scores constituted around 54% of our sample. The pain score was highly correlated with disability. DeVine et al. reported a significant correlation between pain intensity and both physical function (measured by the quality of life score) and disability (measured by ODI).[16] Weinstein and his group showed that the highest physical function recovery and pain reduction was reached 6 months after surgery.[17]

Figure 1. Low back pain disability scores based on the Oswestry Disability Index (ODI).



Several factors were correlat-

Figure 2. Patient satisfaction with treatment modalities.



ed with the incidence of FBBS in this study. The slight preponderance of females in our sample cannot be explained clinically. Siccoli et al. tried to correlate the gender difference in FBSS to the preliminary difference in degenerative spine disease between females and males.[13, 14] In his study among a sample of Saudis, Alshami revealed that low back pain was more prevalent in female patients than in male patients.[18]

More than 80% of our patients had a body mass index (BMI) of >30 kg/m^2. Obesity is a known risk factor for low back pain.[11,16] However, the high rate of FBSS among obese patients needs further explanation. Obesity has also been associated with a higher risk of infection and hemorrhage,[19,20] and the latter affects the outcome of surgery and could lead to FBSS. A previous study revealed that obese patients exhibited less improvement in quality of life after back surgery than slim and athletic patients.[21, 22]

In this study, FBSS was most prevalent in those aged 50–70 years (53%). Another study reported a higher occurrence of FBSS among patients >70 years of age, who were regarded as the most susceptible group of patients to complain of severe disability and pain. In Japan, Ikeda and colleagues found that FBSS was more common among elderly females for no obvious reason apart from their typically heavy physical duties.[14] The effect of various cultures on the incidence of FBSS requires further study.

Patient educational levels were evenly distributed in our study. In contrast, many studies have attributed the occurrence of FBSS to lower socioeconomic classes and educational levels, as these individuals are more involved in heavy duties.[9, 11, 14]

Smokers represented fewer than 20% of the cases in this study.

The effects of smoking on the incidence of FBSS are well documented as a result of a markedly increased risk for pseudoarthrosis in patients who underwent fusions. In addition, smoking increases the risk of other perioperative complications such as infection, dysphagia, and adjacent-segment pathology.[19, 24] Larger sample studies are needed to explore the effect of smoking on the incidence of FBSS among patients in the Western Saudi Arabia region.

The type of follow-up care received may have an impact on the incidence of FBBS. Primary surgeons were revisited by 36.4% of the patients in this study, while referral to a pain specialist was associated with reduced pain levels. Proper patient follow-up and appropriate referral should be considered in future guidelines for the management of FBSS.

Pain reduction was reported in 60% of patients after the operation. This percentage is regarded

as acceptable, considering that the type of surgery, patient age, BMI, and type of postoperative treatment might all affect the results.[23,24] Previous studies have considered prolonged neural compression as well as surgical manipulation close to the dorsal root ganglia, dura, and nerve root as potential risk factors for nerve root pathology and the occurrence of neuropathic pain syndromes.[11, 25] Unfortunately, nothing was mentioned about the occurrence of neuropathic pain among our patients.

Our patients sought methods other than analgesic medications to relieve pain in 14.4% of cases. NSAIDs were the most commonly used analgesics (74%). The most commonly used treatment options for the control of FBSS pain have included exercise, physical therapy, behavioral rehabilitation, medications, interventional procedures, neuromodulation and implantable technologies, and reoperation.[26] Spinal cord stimulation and implantable technologies were not included as treatment modalities in our sample, as the lack of governmental coverage of its expense limits its use in our center.

The complexity of FBSS requires a comprehensive, multi-disciplinary approach for the treatment of pain and optimal outcomes. Many studies have suggested treatment options for FBSS; however, to our knowledge, no studies have estimated the level of evidence for each treatment plan. An evidence-based management strategy for patients with complex FBSS may yield better outcomes and reduce the cost of treatment, as it avoids ineffective therapies and their associated risks.[26, 27]

In our study, the level of patient satisfaction was very high (73.6%). This might be related to the use of multimodal therapies to treat pain, the addition of complementary medical strategies to conservative treatment, or the culture of Saudi patients. Further studies are needed to clarify this finding. Satisfactory levels of pain management have been discussed in many studies.[28] Regardless of the approach, the best results came from multidisciplinary teams.[29]

Theoretically, surgeon experience might contribute to the occurrence of FBSS, but this is not the only factor. Surgeon experience is critical in patient's selection. It also has a heavy role inside the operating theater, where greater skill level enables prediction of possible complications and proper treatment.[29,30]

The retrospective design and small sample size are limitations of this study. In addition, the patients' records did not reveal any psychosocial assessments prior to the performance of surgeries. Carragee et al. reported a strong association between poor psychosocial wellbeing and poor outcome from low back surgeries.[31]

In conclusion, the disability associated with FBSS necessitates the development of protective measures governing patient selection for surgery. Even well-experienced surgeons must be familiar with the many poor prognostic indicators for spinal surgery, particularly psychosocial concerns.[32] Surgeons should be versed in multidisciplinary treatment options and seek collaborative treatment plans for the best outcomes.

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