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Research Paper:

Demographic Characteristics and Family History of Lumbar Problems in Patients with Lumbar Disc Degenerative Diseases Candidate for Surgery

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ABSTRACT

Background and Aim: Previous studies have reported the important effect of age, sex, heredity, and occupational status on intervertebral degenerative disc diseases, which are among the most important causes of low back pain. However, their results are not always so conclusive. This study was performed to investigate the demographic characteristics and family history of lumbar problems in patients with lumbar degenerative disc diseases due to causes other than acute trauma.

Methods and Materials/Patients: This cross-sectional descriptive study included patients without acute trauma who were candidates for surgery of lumbar degenerative disc diseases from 2017 to 2018 in the only state hospital admitting these patients in Rasht, Iran. The data related to the disease were obtained from the patients' medical records. Their demographic characteristics and family history of lumbar vertebrae diseases in their relatives were collected using a researcher-made questionnaire through face-to-face interview by the researcher. The data were analyzed using SPSS V. 16 software. Descriptive statistics and the chi-square test were conducted at a significance level of 0.05.

Results: More than half of the patients were in their 4th to 6th decades of life, and the number of men was 1.8 times as women. The frequency of herniated discs was more than that of both spinal canal stenosis and spondylolisthesis, and most people had no history of low back trauma. The duration of disease in 73% of the patients was more than 1 year and the mean duration was about 4.5 years. More than half of the patients reported problems with the lumbar vertebrae in at least 1 of their first-degree relatives. About one-third of the patients reported a history of vertebrae surgery in their first-degree relatives and the maximum number of reported surgeries in 1 family was 5. Most of the patients were low-literate and illiterate, and about one-third of the patients were workers/farmers. More than one-third of them were housewives and the number of patients working in administrative and driving jobs was very low. There was no significant relationship between study variables and the type of degenerative problems of the lumbar vertebrae.

Conclusion: These findings showed similarities with previous studies in terms of age groups, occupational status, and a history of family lumbar problems in patients with lumbar degenerative disc diseases.

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Highlights

- More than half of the patients were in their 4th to 6th decades of life.
- The number of men was 1.8 times as women.
- More than half of the patients and about one-third of them respectively reported lumbar problems, and lumbar problems leading to surgery in at least 1 of their first-degree relatives.
- About one-third of the patients were workers/farmers and more than one-third were housewives.
- The number of patients working in administrative and driving jobs was very low.
- There was no significant relationship between study variables and the type of lumbar degenerative problems.

Plain Language Summary

The effects of age, sex, heredity, and occupational status on disc diseases which are among the most important causes of low back pain are demonstrated in several studies. This study was performed to investigate the above characteristics in patients who were candidate for surgery of lumbar degenerative disc diseases without acute trauma in Poursina state hospital in Rasht, Iran. Regarding the results, more than half of the patients were in their 4th to 6th decades of life and the number of men was almost 2 times than women. Most patients suffered symptoms more than 1 year and more than half of them reported problems with the lumbar vertebrae in at least 1 of their first-degree relatives even vertebrae problems leading to surgery. About one-third of the patients were workers/farmers and one-third were housewives. Most of the patients were low-literate and illiterate. The findings of this study showed similarities with previous ones.

1. Introduction

Low back pain is the first leading cause of disability in people under the age of 45, the second most common cause for visiting a doctor and job absence, the 5th most frequent cause of hospitalization, and the 3rd most common cause of surgery. The medical costs of low back pain have been reported higher than related costs of cancer [1, 2]. About 60%-80% of people experience low back pain at least once in their lifetime [1-4]. Spinal cord disorders including Lumbar Disc Degeneration (LDD) as the main one are among the most common causes of low back pain [5-8]. LDD includes herniated or protruding disc, spinal canal stenosis, and spondylolisthesis (slip and displacement of the vertebrae) [9].

Each disc consists of 2 main parts: 1. The central part or nucleus (nucleus pulposus), which is a soft, pasty substance composed of glycoprotein and water; and 2. The peripheral part (annulus fibrosus), which surrounds the nucleus, and is made up of collagen tissue [9, 10].

The discs absorb pressure that enters the spinal column and neutralizes shocks to the spine like a shock absorber, thus they play a crucial role in reducing pressure as well as facilitating its movements [10, 11].

The intervertebral degenerative diseases are commonly seen with increasing age [12-14], and recent studies emphasize the effect of several factors on its development including heredity [6, 8, 13, 15-17], sex [18-21], and various environmental factors such as occupational factors [12, 22, 23], although the relevant events are not well known [12].

Occupational low back pain has been considered as the most common debilitating musculoskeletal injury worldwide that causes job compensation. Many studies have been conducted to achieve a comprehensive approach to prevent and treat low back pain [24].

2. Methods and Materials/Patients

Heredity and family history

Many of the recent studies have shown the importance of genetic factors and strong familial backgrounds in low back pain and disc degeneration [6, 8, 10, 17].

The findings from two separate studies on twins in the recent decade have suggested that the effect of heredity can be more than 60%. MRI findings of identical twins which were completely contradictory in terms of risk factors such as smoking and heavy physical work were reported to be very similar in terms of spinal condition and disc degeneration patterns [10].

Battié et al. found that the effect of genetic on disc degeneration ranged from 29%-54% depending on the condition and location of the lesion, and have considered the equal effect of genetics and environmental factors on Disc Degeneration (DD) [25]. It is almost certain that the presence of specific polymorphisms increases the risk of herniated discs, so the identification of the genes involved can improve diagnostic indicators; although pure genetic studies are unlikely to be performed due to the interaction of genes and environmental factors [10].

Genetic studies have shown that mutations in different groups of genes can lead to changes in morphology, biochemistry, function, and overall destruction of the disc [10]. In this regard, the diversity of alleles observed in the vitamin D and estrogen receptors [13, 15] and extracellular matrix genes [10] have been mentioned. A study by Jones et al. on 272 patients over the age of 60 found a relationship between the severity of osteophyte, the narrowing of the disc, and to a lesser extent, the osteophyte development with the allelic difference in the vitamin D receptor gene in these individuals [13].

This genetic relationship with polymorphism of COL11A2 (collagen) and CHRNA5/CHRNA3 genes (encoding the subunit receptors of nicotinic acetylcholine receptors) has been investigated in patients suffering LDD in two case-control studies performed by Yang et al. [8, 17]. Moreover, the family history of a herniated disc in LDD patients sheds light on the effect of genetic factors on DD [16]. However, the family history of a herniated disc in the first-degree relatives in the study of Shokouhi et al. has been observed in only 4 of 50 patients [26].

Age

Low back pain usually begins in people with a mean age of 30 years and is most common in people between the ages of 45 and 60 [3]. Based on the results of several studies, the most common age for disc degenerative changes (which is the most leading cause of low back pain) is between the 4th and 6th decades of life, which occurs in men about 1 decade earlier than women [27]. Sinaei in his study indicated the significant relationship between increasing age and listhesis until the 6th decade of life but decreasing after that. The study also reported a similar relationship between increasing age and stenosis until the 17th decade of life [28]. Most patients with a herniated disc in the study by Saicheua et al. were between 26 to 35 years old [29]. Other studies suggested a higher prevalence of herniated disc mainly in the 4th decade of life [30] and spinal canal stenosis in the 5th decade of life [5].

Degeneration in discs usually occurs much earlier than that in other musculoskeletal tissues. The first certain findings from lumbar disc degeneration have been observed in the 11- to 16-year-old age group and about 20% of adolescents had mild signs of disc degeneration [10]. A part of a cohort study on 558 participants demonstrated that at least 1 degenerated disc was seen on MRI in the lumbar vertebrae of approximately half of Finnish youth with a mean age of 21 years [31].

Disc degeneration prevalence, especially in men, dramatically increases with age, and about 10% of discs of men at the age of 50 and 60% of those at the age of 70 are severely degenerated [10].

A study by Kim et al. reported that the prevalence of symbolic herniated disc was associated with increasing age [21]. According to a study by Hadizadeh and Saedi on 110 patients, there was an increase in the changes associated with degeneration in the lumbar vertebrae with increasing age [27]. A study conducted by Jones et al. on 110 men and 172 women older than 60 found that the development and severity of vertebral degenerative diseases increased in all its forms, with increasing age [13].

MRI findings in a study by Shobeiri et al. on 242 patients in Kermanshah revealed that the prevalence of spinal canal stenosis, herniation, and degeneration of the disc rose with increasing age [18]. A Swedish cohort study suggested that workers in the age range of 30-39 years were subject to more risk of hospitalization than workers aged in the range of 20-29 years, while men aged 60-65 years were less at risk of hospitalization in this study [23]. The results of a 5-year study conducted by Schistad et al. on 144 patients with a radiculopathy or low back pain at the beginning of the study revealed that aging was more effective than heredity on the progression of disc degeneration [32].

Sex

Shobeiri et al. realized that the abnormal findings of MRI in females were significantly higher than those in males [18]. The prevalence of herniated disc in the study of Kim et al. was higher in women than that in

men [21]. Some researchers have proposed the likelihood of listhesis in women is 4 times more in men [9]. However, 63% of men and 48% of women had LDD in the study by Takatalo et al. [20]. A cohort study in China reported that the risk of lumbar degenerative diseases in men was higher than that in women [19], and 78.4% of patients with a herniated disc in the study of Saicheua et al. were men [29]. Kaiser et al. reported that despite the observed difference in the bone distribution of lumbar vertebrae across age—which is associated with disc degeneration—there was no difference in the bone distribution of lumbar vertebrae in both sexes [33].

The mechanical pressure and occupational factors

Abnormal mechanical loads are known as the risk factors for disc destruction [10, 26]. Mechanical loads co-occurring with asymmetric postures and weakness of trunk muscles during work and activity can cause back pain [24]. For many decades, structural damage to the spine, often associated with occupational factors, has been a major cause of low back pain and clinical signs due to disc degeneration, as evidenced by animal studies whereas intensive physical activities do not seem to have the same effects on the disc, but long-term mechanical loads can be a more contributing factor [10].

As it is mentioned in Daneshjoo's article, a study on the nursing staff at 2 hospitals in Shiraz, Iran revealed 78.3% prevalence of occupational back pain [24]. Two percent of the American workforce consider occupational injuries as the cause of their low back pain. A study conducted in Sweden showed that 12.5% of the frequent job absences are due to lumbar pain, and 3.5 million working days were often lost due to low back pain in England in 2008-2009 [24].

Women working as nurses, practical nurses, maids, and hairdressers, and men working as construction workers, carpenters, automobile mechanics, truck drivers, and farmers are subject to the highest risk of low back pain [10, 30]. A study conducted in Iran reported the prevalence of lumbar pain in 62% of nurses, 84% of pregnant women, and 84.8% of surgeons [3].

The cohort study by Wahlström et al. on 263000 Swedish construction workers in the National Occupational Health Surveillance Program indicated that the factors that increase the workload on lumbar vertebrae cause people more likely to be hospitalized due to lumbar disc diseases (for example in workers more than employees or foremen) [23].

Hangai et al. reported a relationship between occupational workload and DD [12]. Shokouhi et al. found an association between the mean workload and DD [26]. Moreover, Seidler et al. suggested a relationship between the imposed workload rate on lumbar discs or its duration and DD [34]. In a prospective study, Liuke et al. examined 129 middle-aged working men, reporting that the prevalence of DD was the highest and lowest in carpenters and employees, respectively [22]. The prevalence of herniated disc in the study of Luoma et al. was found to be higher in wood industry workers and drivers than in the general population [35]. The study by Shobeiri et al. discovered that abnormal MRI findings were significantly higher in workers, farmers, and housewives than those in other occupations, and higher in residents living in rural than in urban areas [18]. In their prospective study, Elfering et al. proposed that night shift work along with a lack of physical activity was a risk factor for LDD development and progression [36].

The employment profession is one of the most common jobs with all of the disadvantages of sedentary life in Iran. Using convenience sampling, a study on 709 employees in Payam-e-Noor University of Fars Province, Iran reported a high prevalence of low back pain (86.3%) among them [24]. In this regard, based on a comprehensive review, ergonomic interventions in the work environment are suggested [10].

The results of the meta-analysis by Macedo et al. on 17 selected cross-sectional, case-control and cohort articles showed moderate evidence of the relationship between occupation-related workload and disc degeneration [37].

Types of mechanical pressures known to increase the risk of damage to intervertebral discs are vibration, torsion, and compression. Helicopter pilots, drivers of trucks, buses, and tractors whose whole bodies are exposed to intermittent vibrations, are more likely to have low back pain, which has been confirmed by epidemiological studies. However, the results of MRI in identical twins who had different driving patterns and some epidemiological studies on tractor drivers, race cars, and users of earth drilling machines have not shown this relationship. The lumbar pain in these cases may depend on other factors [38].

This cross-sectional descriptive study was performed on 130 patients with 1 of the lumbar disc degenerative diseases due to non-acute trauma who were admitted to the neurosurgery ward of Poursina Hospital, the only state center admitting these patients in Rasht, Iran during the autumn and winter of 2017-2018. The patients

with a documented diagnosis confirmed by neurosurgeons based on the MRI results and other diagnostic methods were included in the study.

Accordingly, the patients were divided into 3 groups: 1. Herniated disc; 2. Spondylosis and spondylolisthesis, and 3) spinal stenosis. The patients with 2 criteria for inclusion in more than 1 group were prioritized based on the severity of the complication and the primary cause of the disease according to the specialist's views.

After obtaining written consent from patients, data on current disease, age, and sex of patients were extracted from their medical records. Marital and educational status, job information, history of lumbar trauma as well as a family history of lumbar vertebrae diseases were collected in a researcher-made questionnaire and face-to-face interview by the researcher.

To perform the pre-test, the questionnaire was first completed for 10 patients on a trial basis and then used with very small changes for other patients. Because of few changes in the format and questions of the initial questionnaire, which mostly included changes in the description and number of questions, the information of the first 10 questionnaires could be used in the main study and their results were used.

The results were analyzed using SPSS V. 16 software. Descriptive statistics were used to describe the data and the chi-square test to examine the relationship between qualitative and ranked variables at a significance level of 0.05.

3. Results

According to the descriptive findings of the present study, 61.5% of patients were in the herniated disc group, 31.5% in the listhesis group, and only 6.9% in the spinal canal stenosis group. However, spinal stenosis

Table 1. The frequency of lumbar vertebrae diseases leading to surgery and disease duration

Variables		No. (%)
Type of disease	Hernia	80 (61.5)
	Listhesis	41 (31.5)
	Canal stenosis	9 (6.9)
	Total	130 (100)
Disease period (y)	<1	35 (26.9)
	>1	95 (73.1)
	Total	130 (100)

Table 2. The patients' sex, age, and marital status

Variables	Status	Mean±SD	No. (%)
Sex	Male	46.82±12.57	84 (64.6)
	Female	48.94±12.07	46 (35.4)
Age (y)	20-40	48.17±12.28	38 (29.2)
	41-60		68 (52.3)
	>60		24 (18.5)
Marital status	Single	-	9 (6.9)
	Married		121 (93.1)

Table 3. The education and occupation of patients

Variables	Status	No. (%)
Education	Illiterate/Low-literate	101 (77.7)
	Without university degree/ Associate's degree	28 (21.5)
	Bachelor's degree and higher	1 (0.8)
Job status in disease period	Housewife/ Unemployed	53 (40.8)
	Official job	4 (3.1)
	Labor job	15 (11.5)
	Farming job	27 (20.8)
	Driving job	8 (6.2)
	Others	23 (17.7)
Current job status	Housewife/Unemployed	67 (51.5)
	Official job	9 (6.9)
	Labor job	11 (8.5)
	Farming job	16 (12.3)
	Driving job	7 (5.4)
	Others	20 (15.4)

was seen as one of the main complications of herniated disc and listhesis in 2 other groups in many patients.

The Mean±SD duration of the disease leading to surgery was 4.48±3.7 years, while the lowest duration of disease was 2 months and the highest 15 years. Seventy-three percent of patients suffered chronically at least for 1 year (Table 1).

The number of men in this study was 1.8 times more than women (64.6% versus 35.4%), and more than half of the patients were in the 41-60 age group. The Mean±SD of the patients was 48.17±12.28 years. The mean age of men was 2.1 years, less than that of women but this difference was not significant. The majority of the patients (93.1%) were married (Table 2).

Most of the patients (77.8%) were low-literate and illiterate. About one-third of patients were workers and farmers, and more than one-third were housewives. Most of the job changes after involvement in the disease were observed among farmers at a decreasing rate (after disease: 12.3% versus before disease: 20.8% (Table 3).

Table 6. The frequency of first-degree relatives with lumbar problems with and without surgery

Family Relationship	No. (%)	
	Leading to Surgery	No Surgery
Father, mother, sister, brother, grandfather, grandmother, child	37 (28.5)	31 (23.8)
Uncle, aunt	8 (6.1)	0
Total	43 (34.6)	31 (23.8)

Table 4. Frequency of history of lumbar diseases and trauma

Variables	Status	No. (%)
Lumbar diseases history	Yes	16 (12.3)
	No	114 (87.7)
Lumbar trauma history	Yes	21 (16.2)
	No	109 (83.8)

Table 5. The frequency of family history related to lumbar problems in first-degree relatives

Lumbar Problems in the First-Degree Relatives	No. (%)
Yes	76 (58.4)
No	54 (41.6)
Total	130 (100)

There was no history of other cases of lumbar vertebral diseases in 87.7% of the patients, and 83.8% of them did not report a history of trauma to the lower back (Table 4). More than half of the individuals (58.4%) reported diagnosed problems in lumbar vertebrae at least in 1 of their first-degree relatives. This figure was 34.6% for lumbar problems leading to surgery.

The total number of cases suffering from low back pain leading to surgery was 80 in the relatives of these 130 people, and the highest number of lumbar pain leading to surgery in the first-degree relatives of 1 person was 5 (Tables 5 and 6).

The inferential findings of the present study using the chi-square test determined no statistically significant relationship between family history of intervertebral disc diseases and the type of lumbar vertebrae degenerative problems (P=0.383) (Figure 1). Similarly, this association was not seen between occupational status (P=0.25) and the type of lumbar vertebrae degenerative problems (Figure 2).

4. Discussion

Age

In this study, the Mean±SD age of the patients was 48.17±12.28 years. The mean age of men was 2.1 years less than that of women, and 52.3% of people were in the 4th to 6th decade of life. Previous studies have reported the highest rates of low back pain in people aged 45-60 years [3]. The most common period for disc degenerative changes was reported between the 4th and 6th decade of life [27], the highest prevalence of herniated disc in the 4th decade of life [30], and the spinal stenosis in the 5th decade of life [5]. The results of these

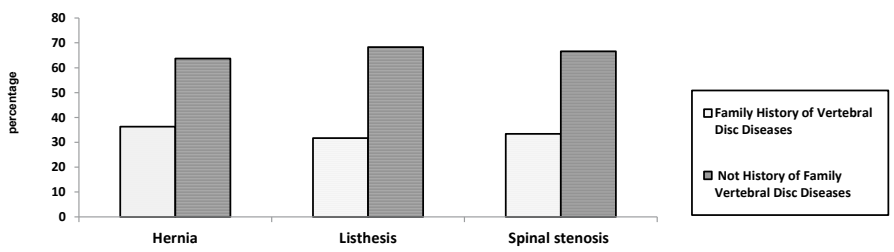

Figure 1. The frequency distribution of family history of vertebral disc diseases in three groups of patients with various types of lumbar disc degeneration diseases

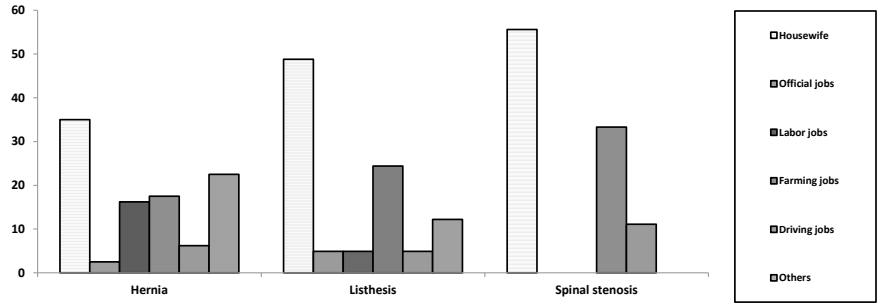

Figure 2. The frequency distribution of occupational status in three groups of patients with a variety of lumbar disc degeneration diseases

studies on the prevalence of disc degeneration are consistent with those of the present study.

Kim et al. reported an increase in the prevalence of herniated disc with aging [21]. Another study by Jones et al. suggested an increase in the development and severity of disc degenerative diseases with age [13]. Furthermore, Schistad et al. have shown that age is more effective on disc degeneration progression than genetics [32]. Sinaei's study also reported a significant relationship between increasing age and listhesis until the 6th decade of life but decreasing after that, also increasing age and spinal canal stenosis until the 17th decade of life [28]. The type of disease in different age groups reviewed in the present study needs further investigation.

Saicheua et al. reported that most patients with herniated discs were in the 2nd and 3rd decade of life [29], which is not consistent with the present study results.

With increasing age and bone growth and development, the jelly-like nature of the disc decreases, and the disc becomes fibrous and more dehydrated, and its morphology and structure change [10, 38].

A study conducted by Daneshjoo and colleagues showed no statistically significant relationship between age and amount of pain in the lumbar region, as well as sex and amount of pain (P>0.05) [24]. The inconsistency can be due to the lack of specific assessment of low back pain which is related to degenerative disc diseases.

Sex

The number of men in the present study was 1.8 times more than that of women, and the mean age of men was 2.1 years less than that of women. A study by Takatalo et al. showed that the prevalence of DD in men was 1.3 times as much as that in women [20], which is consistent with our results. However, the higher and significant prevalence of degenerative disc findings in women in the study by Shobeiri et al. [18], the higher prevalence of herniated discs in women in the study by Kim et al. [21], no sex difference in the prevalence of disc degenerative changes [27, 33], as well as developing these kinds of diseases in men about a decade earlier than that in women in the study of Hadizadeh and Saedi [27] are not consistent with the results of the present study, although the mean age of men in the current study was 2.1 years less than that of women.

Generally, men do more heavy physical works than women due to their physical abilities and social and familial status. Mostly, masculine occupations involve lifting multiple weights during a day that can be one of the causes of the higher prevalence of intervertebral degenerative disc diseases in men [26]. Samartzis et al. accounted for the greater distribution of adipose tissue in the abdomen for a more increased risk of lumbar degenerative diseases in men than women [19]. More tobacco consumption in men could also be among the underlying causes of disc degenerative diseases in males [39].

Some studies have suggested that the likelihood of spine displacement in women is higher than that in men relating to the number of deliveries; if it is not clear how pregnancy predisposes a person to spine displacement. Ligament loosening, weight gain, and abdominal muscles' weakness have been identified as factors involved. However, the incidence of listhesis in women who have not given birth is twice as common as in men, indicating the involvement of other factors [9].

Heredity

More than half of the individuals (58.4%) reported a diagnosis of lumbar spine problems in at least one of their first-degree relatives. This variable was 34.6% for the problems leading to surgery. The total number of cases with low back pain leading to surgery in the first-

degree relatives of these 130 people was 80, and the highest number of surgeries in a family was 5.

Heredity's impact on developing intervertebral disc degeneration has been confirmed in many studies. Heredity and genetic bases have shown a 60% impact on disc degeneration patterns in MRI results in identical twins who were completely contradictory in terms of important LDD risk factors [10]. Battié et al. reported a 29%-54% effect of heredity on the disc degeneration depending on its situation and place [25]. The study of Jones et al. reported a relationship between the allelic difference in the vitamin D receptor gene and the symptoms of disc degeneration [13]. There is a genetic association with polymorphism of some genes in people with LDD found in two case-control studies of Yang and colleagues [8, 17].

Based on the findings of a cohort study by Livshits et al., a genetic background related to LBP was found [6]. A significant relationship was also observed between a family history of herniated disc surgery with degenerative lumbar vertebra diseases in the study by Matsui et al. [16]. These results are consistent with the findings of the present study. However, the family history of the lumbar herniated disc in the first-degree relatives in the study of Shokouhi et al. was observed in only 4 of 50 patients [26] which is not consistent with the results of the present study. Genetic studies suggest that changes in morphology, biochemistry, performance, and overall degeneration of the discs can be the result of mutations in different groups of genes [10, 13].

Occupational and Educational Status

Most patients (77.8%) were low-literate and illiterate. About one-third (32.3%) of them were workers, farmers, and more than one-third were housewives. A small number of people had administrative (3.1%) and driving (6.2%) jobs as risk factors mentioned in previous studies.

Shobeiri et al. stated that the abnormal MRI findings in workers, farmers, and housewives were significantly higher than those in other occupations. The study results are completely consistent with those of the present study. Besides, rural residents had more abnormal findings in MRI images compared with urban ones, probably due to more agricultural activities of the villagers [18]. It is necessary to pay attention to the study population and the social and economic level of referred patients because most patients admitted to this center are from rural and suburban areas, and their level of education and occupation (often agriculture and labor) can be directly affected by this issue. In addition, it is important to note that the present study was conducted in one of the hospitals in Guilan, where agriculture is one of the common occupations.

The results of the present study are consistent with those of the studies by Liuke et al. on the lower prevalence of DD in employees [22], Wahlström et al. on the increased risk of hospitalization due to lumbar disc diseases with more workload on lumbar vertebrae [23], Shokouhi et al. [26], and finally Seidler et al. [34]. Although the study by Elfering et al. on the night shift as a risk factor for developing LDD [36], and the study by Seidler et al. [34] on the period of bearing workload on the low back have not been reviewed in the current study.

Liuke et al. revealed that the prevalence of overweight at the age of 40-45 was also higher in carpenters and drivers than that in employees [22] which can be effective on the development and severity of the disease [39]. Even some studies have found that the effect of weight on DD is more than that of occupation [40].

In the study by Luoma et al., the prevalence of herniated disc in wood industry workers and drivers was higher than that of the general population [35]. The results related to workers are consistent with our results, but findings associated with driving are inconsistent with those of the present study.

The results of the study of Daneshjoo et al. regarding the high prevalence of low back pain in the staff of Payam-e-Noor University [24] were inconsistent with those of the present study. Since their study examined low back pain regardless of the lumbar vertebrae degenerative diseases, the low back pain observed in the university staff could be due to other problems such as muscle cramps resulting from a sedentary lifestyle and incorrect ergonomic habits which caused inconsistency of their results with those of the present study. Also, the above study was performed on specific samples, all of whom were employees, while the present study was performed on patients with different occupations in which the number of employees was very low according to the study population. Therefore, the results of these two studies are not well comparable.

Jones et al. [13] in their study found no relationship between the severity of osteophyte and quadriceps muscle strength (as a result of physical activity) that is inconsistent with the present study. This could be due to their investigated subject (osteophytes instead of DD) and the age category of the people under study.

Occupational factors are considered as risk factors for low back pain, and heavy work, lifting objects, pushing, rotating, and sitting for long periods can be associated with lumbar pain [23, 30]. The occupational workload is also a risk factor for disc degeneration [10, 26, 37].

Although lumbar vertebrae discs are designed to resist the pressure required to rebuild their matrix, additional, sudden and severe pressures, or excessive fatigue can lead to fractures, especially on their endplates, resulting in blocked arteries—which are responsible for feeding the cells—and accelerate disc degeneration [38]. Results of animals and in vitro studies have suggested that intermittent and repetitive vibration movements on the lumbar vertebrae can have adverse effects on the disc's nutrition and metabolism. Cadaver, animal, and some clinical studies also noted that torsion injuries lead to cracks in the outer part of the disc, especially the lateral-posterior part, which, if repeated, spread slowly and radial to the center of the disc [38].

5. Conclusion

In this study, more than half of the patients—with insignificant difference between the mean age of men and women—were in their 4th to 6th decade of life and the number of men was 1.8 times more than women.

The mean duration of disease leading to surgery in these patients was about 4.5 years. Although the minimum duration of disease was reported to be 2 months, 73% of patients chronically suffered from the disease for at least one year. Herniated discs were more common than the other two groups and 61% of patients were hospitalized with a diagnosis of a herniated disc.

The majority of patients did not have a history of lumbar spinal diseases and lumbar trauma. More than half of them reported problems with lumbar vertebrae in at least one of their first-degree relatives, and about one-third reported lumbar spine problems leading to surgery in their first-degree relatives. The highest reported number of surgeries observed in a family was 5.

Most patients were low-literate or illiterate. About one-third of them were workers and farmers, and more than one-third were housewives. Few patients had administrative jobs and driving (known as risk factors for low back pain in previous studies), and the most common job changes after the disease were observed in farmers at a declining rate.

The inferential findings in the present study did not indicate a statistically significant relationship between the study variables and the types of degenerative problems of the lumbar vertebrae in patients.

Sampling from a state hospital in this study could have affected the level of education and occupation of the community. The negative response of the patients and their companions about the history of lumbar vertebrate diseases in relatives is not entirely reliable due to the people's different precision and memory, as well as not going to the doctor in many cases for definitive diagnosis of their disease.

It is recommended that middle-aged people, especially men with a history of lumbar vertebral diseases in their first-degree relatives, be more careful in performing tasks that place more workload on the lumbar vertebrae (such as farming and physical activities). Also, these individuals should be monitored regularly for lumbar spinal diseases, even without symptoms of low back pain.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Guilan University of Medical Sciences (IR.IAU.RASHT.REC.1395.50). Written informed consent was obtained from all of the patients before inclusion in this study.

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Authors' contributions

Conception and design: Shiva Mashinchi, Shahrokh Yousefzadeh-Chabok; Data collection: Shiva Mashinchi, Mesbah Dibavand; Data analysis and interpretation: Shiva Mashinchi; Drafting the article: Shiva Mashinchi; Critically revising the article, reviewing submitted version of manuscript, approving the final version of the manuscript: All authors.

Conflict of interest

The authors declared no conflicts of interest.

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