

## Managing Low Back Pain in Primary Care

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**ABSTRACT:** Low back pain (LBP) is one of the most common pathologies for which patients present for consultation in primary medical practice. The objective of the study was to determine the number of patients with LBP who presented to the general practitioner's (GP) office between October 2019 and March 2020, to determine risk factors, favoring factors and their correlation with clinical data obtained after performing the clinical examination, with paraclinical data obtained by imaging investigation. 347 patients, aged between 17 and 82 years, were included in the study, presenting a sex ratio of men: women of approximately 2: 1. The main pain symptoms of the patients were: localized pain in the lumbar spine, radicular pain, referred to the lower limbs, subjective sensitivity disorders felt in the lower limbs, distal motor deficit in the lower limbs, paravertebral muscle contractions and the feeling of instability in the low back. The main risk factors were smoking, the existence of a trauma to the lumbar spine, sedentary lifestyle, maintaining a prolonged fixed position and intense physical exercise, either occasionally or daily. Among the patients included in the study, a number of 93 patients required the granting of medical leave both by the attending GP and by other specialists. Regardless of the etiology and pathophysiological mechanisms involved in the occurrence of LBP, therapeutic management should aim to stop pain symptoms and prevent recurrences.

**KEYWORDS:** Low back pain, primary care.

### Introduction

Low back pain (LBP) is one of the most common musculoskeletal pathologies found worldwide and one of the main causes of disability worldwide [1].

This type of pain pathology can occur in people of all ages, from children to the elderly, and is one of the pathologies with a very high addressability in primary health care [2-4].

Although many risk factors are incriminated, such as age, sex, physical exercises, changes in posture, obesity, sedentary lifestyle, the cause is not always certain, and the diagnosis can sometimes be difficult to formulate. Although it presents a multitude of symptoms, the etiology of LBP is not fully elucidated [5,6].

Images captured by classical imaging techniques, such as plane x-rays, capture changes in vertebral statics, but can only provide indirect signs of intervertebral disc damage or musculoskeletal damage [7].

High-performance imaging techniques, nuclear magnetic resonance (MRI) and computed tomography (CT) are the most conclusive imaging diagnostic modalities for

disc or musculoskeletal pathology in the lumbar spine [8].

Conservative treatment of LBP involves lifestyle changes like quitting smoking, limiting or avoiding intense physical exercise and other predisposing factors, and the use of orthoses for the lumbar spine [9].

Pharmacological treatment consists in the administration of analgesics, steroidal anti-inflammatory drugs and most commonly non-steroids, muscle relaxants, nerve trophic [10,11].

The physical methods used in the treatment of pain symptoms in the lumbar spine can be thermotherapy, electrotherapy, massage.

Physical therapy also plays an important role in reducing pain symptoms as well as in reducing recurrences [12,13].

The aim of this retrospective study was to make a correlation between clinical data and risk factors in patients presenting with pain symptoms in the lumbar spine at the general practitioner's (GP) office, between October 2019 and March 2020.

The main objectives of the study were to determine the number of patients presenting with LBP symptoms at the GP's office, between October 2019 and March 2020, to determine risk

factors, as well as favoring factors and correlate them with the clinical data obtained after performing the clinical examination, as well as with the data obtained through imaging investigation.

The clinical study we conducted was designed to provide a series of data, that after statistical processing, will bring new information on the incidence, distribution of age groups, sex, area of residence and professional activity of the studied population.

We also aimed to perform this retrospective study in order to detect risk factors and correlate them with symptoms and imaging changes highlighted in these patients.

## Material and Methods

The study included a number of 347 patients who presented with symptoms of LBP at the GP's office, between October 2019 and March 2020.

All patients included in our study signed an informed consent prior to inclusion in the study, after being provided with all information about the protocols. Moreover, the study was approved by the Ethics Committee of the University of Medicine and Pharmacy of Craiova.

Data regarding: age, sex, area of residence, the intensity of the daily physical effort, body weight-body mass index, frequency and nature of pain symptoms, risk factors such as smoking, trauma, sedentary lifestyle, clinical examination, including information on changes in lumbar vertebral statics, paraclinical examinations, respectively radiological images, data on specialist consultations, the results obtained in these patients who required high-performance imaging investigations (MRI or CT), the type of treatment and the number of days of sick leave required were obtained by performing the anamnesis, the clinical examination, and respectively by the results of imaging investigations, performed and recommended by the attending physician.

The inclusion criterion of the patients in the study was the presence of LBP symptoms. The data thus obtained was statistically processed in order to achieve the correlation between the anamnestic, clinical and paraclinical data of the patients included in the study. The Microsoft Excel program (Microsoft Corp., Redmond, WA, USA) was used for data processing, together with the XLSTAT suite for MS Excel (Addinsoft SARL, Paris, France). The parameters investigated for the subjects included in this study were stored in Excel files.

## Results

The results of the distribution of the number of patients by age groups was as follows: 2.02% of patients were under 30 years of age, 6.05% of patients were aged between 20-29 years, 17% of the patients were between 30 and 39 years old, 21.19% of the patients were between 40-49 years old, 20.75% of the patients were between 50-59 years old, 21.33% of the patients were aged 60-69 years, while 10.66% of patients were over 70 years of age (Figure 1).

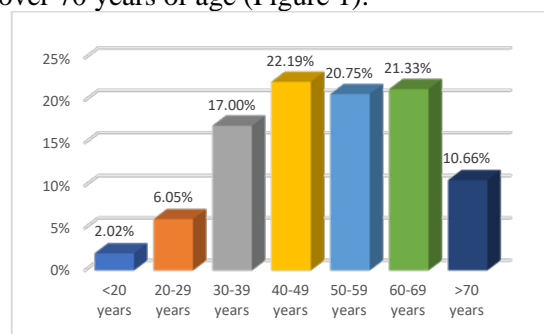
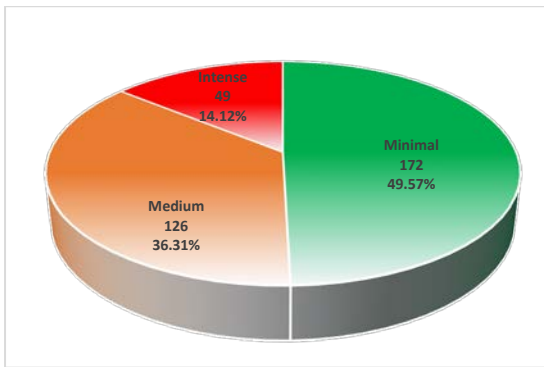


Figure 1. Age distribution of the study group.

The results of the study according to the sex of the patients were the following: the study group consisted of 215 men and 132 women and presented a sex ratio for men: women of about 2:1. In the studied group the percentage of men was 61.96%, and the percentage of women was 38.04%.

The results of the study according to the patients' area of residence were as follows-66 patients (19.02%) had a rural area of residence, while 281 (80.98%) patients had as a place of residence the urban area. Taking into account the fact that the population in Dolj county lives in a proportion of 46.87% in rural areas and 53.13% in urban areas, we found that there is a highly significant difference between these proportions and the proportions calculated for the total number of the patients included in our study. During the study, the value of p calculated by the Z test for proportions was <0.0001. In conclusion, the percentage of patients in urban areas is significantly higher than their share in the county population.

Regarding the level of daily physical activity, a number of 172 patients, representing almost half of the patients included in our study, stated that they have a minimum level of physical effort, they either work in the office or are retired. 126 of the patients, representing a percentage of 36.31% perform an average physical effort, and only 49 patients claimed that they perform an intense physical effort in their daily activity (Figure 2).



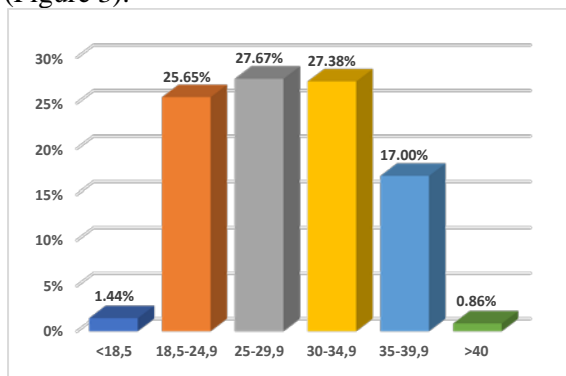
**Figure 2. Distribution of the study group according to the level of daily activity.**

There is a highly significant relationship between the gender of the patient and the effort intensity, the result of the Chi square test,  $p=0.00066$ , showing male patients are prone to more intense physical effort (Table 1).

**Table 1. Relationship between the daily physical activity and patients gender.**

			Female patients	Male patients
Daily physical activity level	Number	Percentages	132	215
Minimal	172	49.57%	79	93
Medium	126	36.31%	45	81
Intense	49	14.12%	8	41

To evaluate the implications of body weight on the occurrence of LBP symptoms, we took into account the body mass index of the patients in the study group. A number of 5 patients, representing 1.44% of the patients were underweight, 89 patients, respectively 25.65% of the patients had normal weight, 96 of the patients: 25.67% were overweight, and the rest of 157 patients, representing almost half of the patients: 45.24% had a certain degree of obesity (Figure 3).



**Figure 3. Distribution according to the value of the body mass index of the study group.**

Analyzing the relationship between BMI and lumbar pain we concluded there is a highly significant increase in this symptom in overweight patients ( $p$  Chi square test=0.00000035) (Table 2).

**Table 2. Correlation between BMI and lumbar pain.**

BMI	Lumbar pain		Total
	Present	Absent	
<18,5	2	3	5
18,5-24,9	70	19	89
25-29,9	86	10	96
30-34,9	92	3	95
35-39,9	59	0	59
>40	3	0	3
Cases	312	35	347

Because it is difficult to pinpoint the exact time of onset of pain symptoms in the lumbar spine, because the perception of pain shows significant individual variations, we took into account the time elapsed between the appearance of subjective sensation in patients and the time of presentation to the GP's office for an objective evaluation by the attending physician.

Most patients, respectively 56.48% presented to the GP's office with lower back pain with recent onset, in 19.31% of patients it was less than 3 months between the onset of pain symptoms and presentation at the office. For 12.39% of patients, it took between 3 and 6 months to request a medical opinion, and for 6.92% of patients and 4.90% of patients, respectively, a longer period of time was required, an interval between 6-12 months, respectively over 1 year to determine them to be investigated properly.

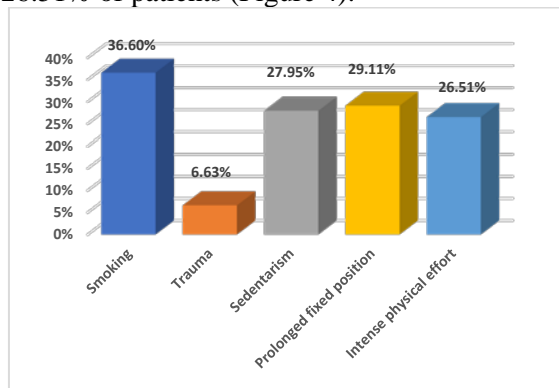
There is a statistically significant relationship between the gender of the patient and the time elapsed between the symptoms onset to the first presentation to the GP's office, male patients presenting themselves later in regard to the first symptoms, the Chi square test  $p$ -value being  $0.046 < 0,05$  (Table 3).

**Table 3. Correlation between patients gender and the time between the symptoms onset and first presentation to the GP's office.**

Symptoms onset	Number of patients	Percentages	Female patients	Male patients
<1 week	87	25.07%	36	51
1-4 weeks	109	31.41%	52	57
<3months	67	19.31%	21	46
3-6 months	43	12.39%	14	29
6-12 months	24	6.92%	6	18
>12 months	17	4.90%	3	14

The main pain symptoms of the patients included in the study were localized lower back pain for a significant percentage of patients-89.91%, radicular pain, referred to the lower limbs in the case of 25.07% of patients, subjective sensory disturbances felt in the lower limbs for 11.82% of patients, distal motor deficit in the lower limbs for 1.73% of patients, lumbar paravertebral muscle contracture found in 55.33% of patients and also the occurrence a feeling of instability in the lumbar spine in 38.62% of patients.

The main risk factors detected in the patients in the study group who presented to the GP office was represented by smoking: in almost a quarter of patients: 36.6%, the existence of a trauma to the lumbar spine in 6,63% of patients, sedentary lifestyle at 27.95% of patients, maintaining a prolonged fixed position for 29.11% of patients and intense physical exercise, either occasionally or daily, for 26.51% of patients (Figure 4).



**Figure 4. Distribution of the study group according to risk factors.**

Analyzing the link between past spinal trauma and spinal instability we found a strong statistical relationship (Chi square  $p=0.00033<0.001$ ) (Table 4).

**Table 4. Correlation between spinal trauma and spinal instability.**

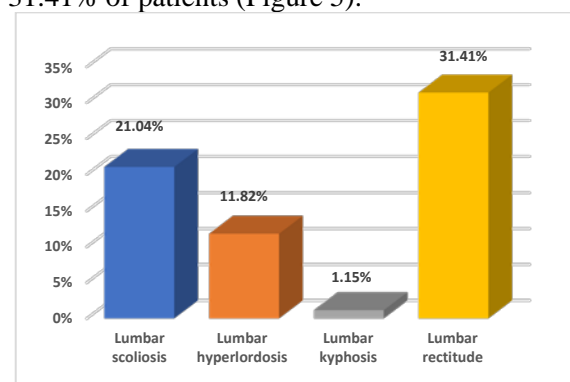
		Spinal instability	
		Present	Absent
Spinal trauma	Present	17	6
	Absent	118	208

We also found a statistically significant relationship between sedentary lifestyle or maintaining a prolonged fixed position and changes that disturb the statics of the spine. Sedentary patients being more prone to develop vertebral static disorders ( $p=0.0298<0.05$ ) (Table 5).

**Table 5. Relationship between sedentary lifestyle or maintaining a prolonged fixed position and the appearance of vertebral static disorders.**

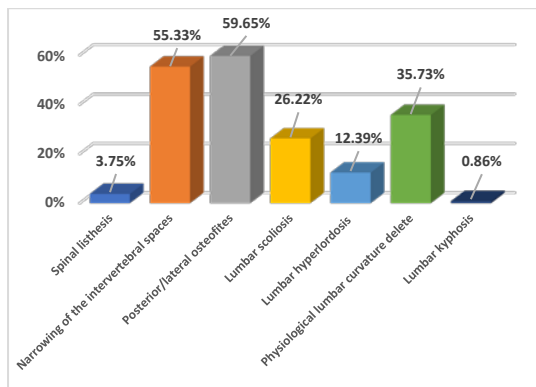
	Number	Vertebral static disorders	
		227	120
Sedentary lifestyle/ Prolonged fixed position	198	120	78
	149	107	42

The main changes in vertebral statics highlighted in the patients included in the study were lumbar scoliosis found in 21.04% of patients, lumbar hyperlordosis in 11.82% of patients, reversal of physiological curvature in the lumbar spine, and the appearance of kyphosis lumbar spine in 1.15% of patients and the appearance of lumbar spine straightness in 31.41% of patients (Figure 5).



**Figure 5. Distribution of the study group according to changes in vertebral statics.**

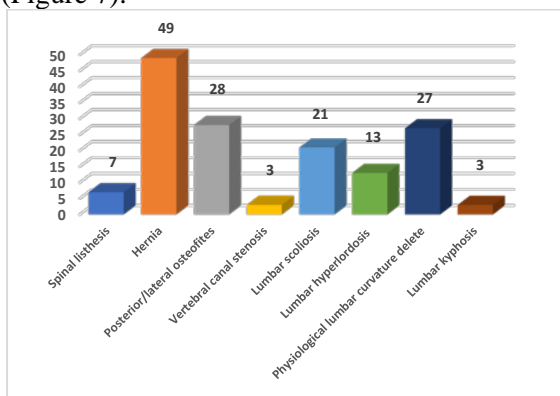
Of the 347 patients included in our study, 253 were advised by the GP to perform a classic imaging investigation, mainly an x-ray of the lumbar spine, in two incidences, antero-posterior and profile. In more than half of the patients that underwent radiological investigations, respectively in 192 (55.33%) of patients, the decrease in lumbar intervertebral spaces was highlighted. In 207 (59.65%) of patients the presence of posterior and lateral osteophytes in the lumbar vertebral bodies was noticed. In most patients, respectively in 75.2% of patients there were changes in vertebral statics in the frontal plane, but also in sagittal incidence. In 91 of the patients (26.22%) lumbar scoliosis was noticed, in 43 patients (13.39%) lumbar hyperlordosis was observed, in 124 of the patients (35.73%) the erasure of the lumbar physiological curve was highlighted and in a number of 3 patients (0.86%) reversal of lumbar curvature was highlighted-the appearance of lumbar kyphosis (Figure 6).



**Figure 6. Results obtained by using classical imaging techniques.**

In 136 of the patients, a specialist consult was recommended by the GP according to the pain symptoms, the results obtained after performing the anamnesis, the clinical examination and the classic paraclinical laboratory and imaging examinations. A number of 41 patients (22.82%) were referred to the physical and rehabilitation medicine specialists, 23 of the patients (6.63%) to rheumatologists, 29 of the patients (8.36%) to specialists in orthopedics and traumatology, 35 patients (10.09%) required a neurology consultation, and in 9 of the patients, representing a percentage of 2.31% of the total, a neurosurgery consultation was considered necessary.

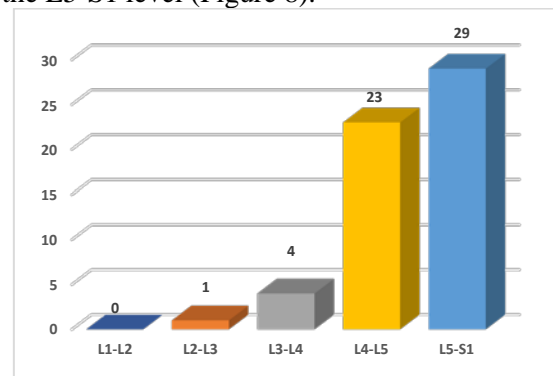
Of the 136 patients who benefited from a specialist consultation, a number of 57 patients were evaluated with high-performance imaging techniques, mainly MRI and CT. In 7 of the patients who underwent MRI or CT, spinal listhesis was highlighted at the level of one or more lumbar vertebral bodies. In 49 of the patients a disc herniation was observed, in 28 patients posterior and/or lateral osteophytes were noticed in the vertebral bodies, in 3 of the patients lumbar vertebral stenosis was observed (Figure 7).



**Figure 7. Results obtained by using high-performance imaging techniques.**

Most of the patients who underwent MRI or CT presented disorders of the vertebral static, both in frontal plane, scoliosis in 21 of the patients, and in sagittal plane, lumbar hyperlordosis in 13 patients, clearance of lumbar physiological curvature in 27 of the patients and occurrence of lumbar kyphosis in 3 patients.

Regarding the topographic distribution of lumbar disc hernias, depending on the affected level, highlighted in the 49 patients investigated by MRI and CT imaging, there were no changes at L1-L2, between L2-L3 the herniation of the intervertebral disc was noticed in 1 patient, and at the level of L3-L4 the appearance of the disc herniation was noticed in 4 patients. Most of the disc herniation were notice between L4-L5, in 23 patients, and most frequently-29 patients, at the L5-S1 level (Figure 8).

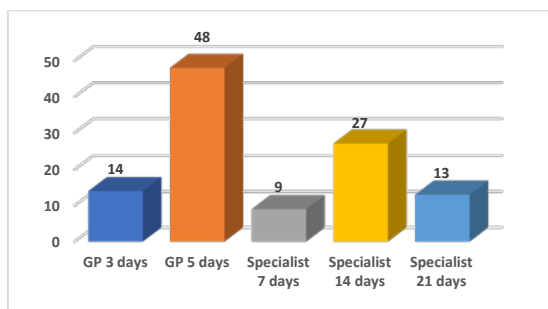


**Figure 8. Lumbar spine hernia distribution depending on the affected level.**

Regarding the therapeutic approach of patients with LBP who presented at the consultation in the GP's office, the majority, respectively 336 of the patients representing a percentage of 96.83% benefited from conservative treatment which led to the decrease or remission of pain symptoms in the lumbar spine. In 11 of the patients included in our study (3.17%) surgery was required, in addition to the means of conservative treatment instituted, to remit the pain symptoms in the lumbar spine.

Among the patients included in the study, a number of 93 patients required the granting of medical leave both by the attending the GP and by other specialists. 14 of the patients were granted a 3-day medical leave by the GP, who also considered it necessary to grant 5 days of medical leave in the case of 48 of the patients.

Of the patients who were referred to specialized consultations, 9 of them benefited from 7 days of medical leave from the specialist, 27 of the patients of a medical leave lasting 14 days, and 13 patients required a medical leave with a duration of 21 days (Figure 9).



**Figure 9. Duration of medical leave granted to patients.**

We analyzed the relationship between patients age and the length of the medical leave. Our data shows that there is a strong relationship between the patients' age and the length of the medical leave, the Chi square test having a significant value ( $p=0,0254 < 0,05$ ) (Table 6).

**Table 6. Relationship between patients age and the length of the medical leave.**

			Medical leave 3 days	Medical leave 5 days	Medical leave 7 days	Medical leave 14 days	Medical leave 21 days
Age	Number	Percentages	14	48	9	27	13
<20 years	7	2.02%	1	1	0	0	0
20-29 years	21	6.05%	2	2	0	0	0
30-39 years	59	17.00%	4	4	0	1	2
40-49 years	77	22.19%	4	21	1	9	5
50-59 years	72	20.75%	2	18	4	11	5
60-69 years	74	21.33%	1	2	4	6	1
>70 years	37	10.66%	0	0	0	0	0

**Discussions**

The incidence of LBP is higher in the adult population, active, during the productive work period. In our study the incidence is lower in patients under 20 years of age, which is consistent with other specialized studies. The high share in the 40-70 age groups can be explained by the appearance of degenerative pathology [1,14].

In our study, the ratio between men and women was about 2:1, this data corresponds to that in the literature [2,11,40].

There is a male prevalence due to the type of effort made at work and the fact that, most of the time, they have no patience in order to wait that the conservative drug treatment and rest have favorable evolution [15].

Other authors claim that male patients are more susceptible to the onset of LBP symptoms, because discal degeneration is more important than in women, in all age groups, due to a higher disc and musculoskeletal stress, because male patients have longer diffusion-nutrition pathways [16].

The higher prevalence in males can also be explained by the difference in height, which is an absolute value of 10.5cm, the female body being generally about 7% shorter than males. This difference in height has consequences for the posterior longitudinal ligament, especially in its lateral portion [14,16].

A percentage of 19.02% of the patients included in the study came from rural areas, and 80.98% of patients had as an area of residence the urban area.

Taking into account the fact that the population in Dolj county lives in a proportion of 46.87% in rural areas and 53.13% in urban areas, the uneven distribution of patients, depending on the area of residence, was due to the fact that we included patients who are in the records of a GP who works in an urban area.

Only a relatively small number of the patients came from the suburbia adjacent to the municipality of Craiova, where the activity of ensuring the primary health care of the respective GP is carried out.

More than half of the patients in our study performed intense physical exercise, either occasionally or daily, causing the onset of LBP.

The intensity of physical exercise can have repercussions on the statics and dynamics of the spine, this type of activity accelerates the appearance of degenerative changes, which can be associated with both disc pathology and changes in muscle and ligament in the lumbar spine [14].

The paravertebral muscles have the role of maintaining a normal muscle tone through minimal contractions that ensure a vertical or horizontal position even when the patient does not engage in physical activity, giving body posture. In conditions of prolonged rest, minimal or absence of physical activity, the paravertebral

muscle tone begins to decrease. In this case it doesn't aid in maintaining the spine in physiological position and posture, which can lead lumbar discopathies or other pathologies of the lumbar vertebrae [5,15].

Vertebral trauma is a major risk factor for developing LBP, as they can later lead to pathologies that can endanger the patient's health. Equally, accidents represent a cause for concern and their detection is essential to avoiding the development of LBP, with a negative effect on the biomechanical integrity of the body [1,2].

Cigarettes are known to contain a large number of toxic substances that have a negative effect on the wellbeing of the body, of which nicotine plays an important role. This substance manages to decrease the blood flow to the intervertebral discs, which accelerates degenerative processes [2].

The increase in body mass index above the normal values and especially obesity leads to an increase in the incidence of low back pain [9].

Obesity increases the risk of pain symptoms in the lumbar spine through several mechanisms: excessive biomechanical loading of the spine by overload, increased serum lipidemia and atherosclerosis, common in these patients, decrease blood transport of nutrients to the intervertebral discs, thus promoting the process of degeneration, inflammation secondary to mediators released by adipocytes: adipocytokines (adiponectin, leptin and resistin) [2,9].

Because globally, the incidence of overweight and obese people is constantly increasing, at least theoretically the prevalence of LBP is also increasing. In the literature, the risk of LBP, as well as that of relapses is 12 times higher in obese patients, with a body mass index greater than or equal to 30 [17].

One of the most frequent symptoms patients present when consulting their GP is lower back pain. It can be unipolar in this case occurs only in the spine or bipolar and refers to the lower limbs. Another common manifestation in LBP is paralumbar muscle contracture that occurs as a result of irritation of nerve threads in the dura mater [3,9,18].

Patients may also have sensitivity disorders that may be a criterion of severity if their character persists, and the occurrence of motor deficit in the lower limbs is most often shows a long-lasting or extensive root conflict. The feeling of instability in the lumbar spine can occur in a variable number of patients without

having an important significance in assessing the degree of the injury [6,18].

The appearance of pain symptoms in the lumbar spine can be preceded by physical exercise, a movement performed in poor dynamic conditions such as recovery from flexion or twisting, prolonged exposure to cold, moisture, microtrauma. The paravertebral muscle contracture in the lower back is highlighted in patients, in orthostatic position, with the arms raised in the extension of the body or by performing the anteflexion movement of the spine [4,14].

Changes that disturb the statics of the spine in patients with lumbar pain symptoms may be both in frontal and sagittal planes. The change in the frontal plane, scoliosis, can be levo or dextroconvex, compensated or not at the level of the dorsal spine. There may also be a deletion of physiological lumbar lordosis: lumbar rectitude or even a reversal of this curvature leading to the appearance of lumbar kyphosis, which gives a reserved prognosis [14].

Images captured by classical imaging means such as plain x-rays do not provide any direct signs of intervertebral disc damage or musculoskeletal damage. Instead, they can be interpreted as indirect signs of the presence of a disease in the lumbar spine: removal of lumbar lordosis, the appearance of lumbar scoliosis and narrowing of the intervertebral spaces, also called the Barr triad [2,7-9].

High-performance imaging techniques, nuclear MRI and CT are the most conclusive imaging diagnostic modalities for disc or musculoskeletal pathology in the lumbar spine. MRI and CT techniques confirm the diagnosis, location, and severity of the herniated disc. MRI investigation provides detailed images of the soft tissues of the spine. And CT reveals detailed images of the bone structures of the lumbar spine [11,13].

In most patients in the study group, the site of the disc herniation was at L4-L5 and L5-S1, findings that agree with the data in the literature. The L4-L5 and L5-S1 motion segments have a distinctive anatomy and support a higher degree of mechanical stress and mechanical loads compared to the overlying segments. These characteristics may make L4-L5 and L5-S1 more susceptible to traumatic, degenerative or disc herniation at this level [5].

The movement segment of the lumbar spine, L5-S1, also called the lumbosacral joint, is a transition region between the lumbar spine and the sacral spine. In this region, the curvature of

the spine changes from lumbar lordosis to sacral kyphosis. L5-S1 helps to transfer mechanical loads from the spine to the pelvis and lower limbs [6,14].

Conservative treatment of LBP involves lifestyle changes, smoking cessation, limiting or avoiding intense physical exercise and other predisposing factors, and the use of orthoses for the lumbar spine. Pharmacological treatment consists in the administration of analgesics, steroidal anti-inflammatory drugs and most commonly non-steroids, muscle relaxants, nerve trophic [10].

The physical methods used in the treatment of pain symptoms in the lumbar spine can be thermotherapy, electrotherapy, massage.

Physical therapy also plays an important role in reducing the symptoms of pain, as well as in reducing relapses [5,12,13].

In the event that the use of conservative means of treatment fails, it is necessary to apply surgical treatment, individualized for each patient, with the benefits, risks and complications specific to each surgical technique used [6].

The total number of days of medical leave, granted both by the attending GP, but also by specialists, to the patients included in our study, was 1136 days. Painful symptoms in the lumbar spine are the main cause of limitation of daily activities and restriction of participation, respectively absenteeism from work worldwide, putting great pressure on the medical system and causing economic and social harm to both individual, family, and community level [1,19,20].

Several studies have been conducted in Europe to assess the social and economic impact of LBP. In the United Kingdom, LBP has been identified as the most common cause of disability in young adults, with over 100 million workdays lost per year [1,2,21].

In the United States, an estimated 149 million business days are lost each year due to LBP, which involves total costs estimated to be between \$ 100 billion and \$ 200 billion a year (two-thirds of which are due to lost wages and low productivity at work) [1,22,23].

## Conclusions

LBP is the main cause of limitation of daily activities and restriction of participation, respectively absenteeism from work worldwide, putting great pressure on the medical system and causing economic and social harm to the individual, family and community.

LBP occurs most frequently in patients in the age groups 40-70 years, so the incidence is highest in the adult population, active, during productive work. That is why presenting to the GP as soon as possible after the onset of LBP can reduce the functional, social and economic impact of this type of pathology.

The main risk factors detected in the patients in the study group were smoking, the existence of trauma to the lumbar spine, sedentary lifestyle, maintaining a prolonged fixed position and intense physical exercise, either occasionally or daily.

Regardless of the etiology and pathophysiological mechanisms involved in the occurrence of LBP, therapeutic management must aim to stop pain symptoms and prevent relapses.

## Acknowledgements

Kamal Constantin Kamal, Adina Maria Kamal and Mirela Radu share equal contributions to this work.

## Conflict of interests

None to declare.

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