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الجمهورية اليمنية
جامعة العلوم والتكنولوجيا – صنعاء
كلية الطب والعلوم الصحية
قسم طب المجتمع والأسرة

# Prevalence of Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023

**This Final Report is Submitted as a Partial Fulfillment of the Requirement for the Graduation Project in Community Medicine**

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# Lists of Content

**Page**


**Chapter 1: Introduction ..... - 1 -**

*1.1 Background ..... - 1 -*

*1.2 Justification ..... - 7 -*

*1.3 Research questions: .....* ***خطأ! الإشارة المرجعية غير معرّفة.***

**Chapter 2: Literature Review ..... - 8 -**

*2.1 Reviewed literature ..... - 8 -*

*2.2 Conceptual framework : ..... - 16 -*

**Chapter 3: Research Objectives ..... - 16 -**

*3.1 General objective : ..... - 17 -*

*3.2 Specific objectives : ..... - 17 -*

**Chapter 4: Method ..... - 18 -**

*4.1 Study area: ..... - 18 -*

*4.2 Study design: ..... - 18 -*

*4.3 Study population: ..... - 18 -*

*4.4 Sample size : ..... - 18 -*

*4.5 Sampling method: ..... - 18 -*

*4.6 Study Tools: ..... - 18 -*

*4.7 Operational variables(Dependent and independent ) ..... - 19 -*

*4.8 Inclusion criteria: ..... - 19 -*

*4.9 Exclusion criteria: ..... - 19 -*

*4.10 Data processing analysis: ..... - 19 -*

*4.11 Ethical consideration: ..... - 19 -*

*4.12 Limitation of the study: ..... - 19 -*

*4.13 Timetable (Action plan): ..... - 20 -*

**Chapter 5: Results ..... - 21 -**

**Chapter 6: Discussions ..... - 27 -**

**Chapter 7: Conclusions ..... - 30 -**

**Chapter 8: Recommendation ..... - 31 -**

**References ..... - 32 -**

# List of tables


| Name of tables | Page |
|---|---|
| **Table (1)** The action plane of study about lumber disc prolapse surgery in University of Science and Technology Hospital, Sana'a Yemen,2020-2023**.** | **20** |
| Table (5.1): Patient's socio-demographic of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | **21** |
| Table (5.2): Chronic diseases of lumber disc prolapse surgery patients in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | **25** |
| Table (5.3): Type of surgery of lumber disc prolapse surgery patients in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | **25** |
| Table (5.4): Type of disc prolapse in patients lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | **26** |
| Table (5.5): Onset of symptoms in patients with lumber disc prolapse surgery at the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | **26** |
| Table (5.): Type of images in patients lumber disc prolapse surgery at the University of Science and Technology Hospital from April 2020 to December 2023(n=330 | **26** |

# List of figures


| Name of figure | Page |
|---|---|
| Figure (1) lumber disc prolapse framework | 16 |
| Figure (2) Patient gender of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023 (n=330). | 21 |
| Figure (3) Patient marital status of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 22 |
| Figure (4) Patient geographical area of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 22 |
| Figure (5) Patient level of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 23 |
| Figure (6) Distribution date of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 23 |
| Figure (7) Patient age group –gender distribution of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 24 |
| Figure (8) Type of diagnosis image of Patients lumber disc prolapse surgery in University of Science and Technology Hospital from April 2020 to December 2023(n=330). | 24 |

# Lists of Abbreviation

| The Abbreviations | The Words |
|---|---|
| LDH | lumber disc herniation |
| LBP | low back pain |
| DD | Disc degeneration |
| BMI | body mass index |
| NSAIDs | Nonsteroidal anti-inflammatory drugs NSAIDs |
| HLD | Herniated Lumbar Disc |
| OD | open discectomy |
| LDS | Lumbar disc surgery |
| PAF | Population attributable fraction |
| DRS | Disc-related sciatica |

# Abstract

**Background:** Lumber disc prolapse is localized or focal displacement of disc material beyond the limits of the intervertebral disc space, despite all types and forms of complaints and the differences in the severity of disease, surgeries (in all their forms and types) still the last solution and final treatment for the cure of cases and prevent the possible complications, the surgeries vary according to the case and patient need.

**Objective:** To estimate of Prevalence of Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023**.**

**Methods:** Descriptive cross sectional nonprobability convenient study was done for 330 files of lumbar disc prolapse surgery out of 1932 different neurosurgery were done in three consecutive years from(10/4/ 2020- 26/12/2023 ) and data collected by a self-designed checklist that contains demographic information and surgery information, admitted and analysis by SPSS version 24 and excel 2016.

**Results:** the prevalence of lumbar disc prolapse surgery was 17% in 330 case file surgery. the females 180(55%) males 150(45%) most of them are married 228 (69.1%). The most age group affected was 31- 45y (123 cases) and the least age group affected was 76-90 (9 cases). The most geographical area was Alamanah 30% (99 cases) and the least geographical area was Marib and Raimah 0.3% (1 case).The most level affected was L4-L5 23%(77 case) ,most of patients have no chronic diseases 246(74.5%) but there are group of patients have HTN 38(11.5%),DM 20(6.1%)or combined (HTN and DM) 38(11.5%).

**Conclusions:** Female patients undergoing surgery for lumbar disc prolapse were more common than males, the surgery was done mostly in ages of 31-45, the most geographical area was in Alamanah and the most level affected was L4-L5 And most of the patients have no chronic diseases.

# Chapter 1: Introduction

## 1.1 Background

**Back pain:**

Between 60 and 80% of people will experience back pain at some point in their lives. Some of these people will have back pain , lower back pain, and leg pain caused by a disc prolapse.

Lumbar intervertebral discs are complex structures that undergo significant axial loading as well as flexion/ extension, lateral bending, and rotational forces. Because of the biomechanical demands placed upon these structures, as well as their inability to remodel due to their avascular nature, lumbar disc herniations are common. Lumbar disc herniations can lead to substantial radicular symptoms, which if persistent, may require surgical intervention.

**Defining a lumbar disc herniation**: according to the combined task forces of the North American Spine Society, the American Society of Spine Radiology, and the American Society of Neuroradiology, these pathologies are not the same; they define a disc herniation as "localized or focal displacement of disc material beyond the limits of the intervertebral disc space. [1]

Also, A Lumber disc prolapse in the spine is a condition during which a nucleus pulposus is displaced from intervertebral space. It is a common cause of back pain. The patients who experience pain related to a herniated disc often remember an inciting event that caused their pain. Unlike mechanical back pain, herniated disc pain is often burning or stinging, and may radiate into the lower extremity. [2]

### ▪Types :

- Disc protrusion: protrusion of the vertebral disc nucleus pulposus towered the annulus fibrosus
- Disc herniation (disc extrusion or disc prolapse): extrusion of the nucleus pulposus through a tear in the annulus fibrosus

- Disc sequestration: extrusion of a part of the nucleus pulposus and separation of this fragment for the disc material.
- Lumbar Spinal disc prolapse with migration.
- Spondylosis: a broad term used to describe degenerative changes of the spine that may result in irritation and/or damage of the adjacent nerve roots or spinal cord. [3]

## Epidemiology

Reported that the average age of patients with a herniated disc was 41 years, and the diagnosis was slightly more common in males than females (57% versus 43%, respectively Over 90% of lumbar disc prolapses occur at the L4/5 or L5/S1 levels. [4]

An elevated body mass index (BMI) is a risk factor for lumbar disc prolapse, and it is thought to be due to the increased axial load on the lumbar spine. In a Finnish study, Bostman reported 27% of the patients undergoing surgery for a lumbar disc prolapse were obese,

Other medical comorbidities such as diabetes, hyperlipidemia, and smoking have also been reported as possible risk factors for lumbar disc prolapse. Sakellaridis compared a case series of 102 patients requiring surgical intervention for a lumbar disc prolapse to 98 patients undergoing elective surgery for another reason and found a statically significant increase in the rate of diabetes in patients undergoing a lumbar microdiscectomy (32% versus 19%, p ¼ 0.001). [5]

## Epidemiology

- **Worldwide**:

The incidence of lumbar disc prolapse is about 5 to 20 cases per 1000 adults annually and is most common in people in their third to the fifth decade of life, with a male-to-female ratio of 2:1 [6]

- **Regionally**:

The prevalence of disc-related sciatica in Monastir is 2.2%. We identified several patient- and occupation-related risk factors. The high socioeconomic cost should encourage preventive measures. [7]

## Pathophysiology:

If the pressure continues, the jelly-like nucleus may push through the disc's outer ring or cause the ring to bulge. This puts pressure on the spinal cord and nearby nerve roots. Not only is this a mechanical compression (squeezing) of the nerves, but the disc material also releases chemical irritants that contribute to nerve inflammation. When a nerve root is irritated, there may be pain, numbness, and weakness in one or both of your legs, a condition called sciatica.

## Cause :

**- Old age:** age-related wear and tear on the spine. This process is called disc degeneration.

**- Children & Young adults:**

Discs have high water content. As people age, the water content in the discs decreases and the discs become less flexible. The discs begin to shrink and the spaces between the vertebrae get narrower. This normal aging process makes the discs more prone to herniation.

**- A traumatic event**, such as a fall, can also cause a disc prolapse.

## -Risk Factors:

**1- Gender.** Men between the ages of 20 and 50 are most likely to have a disc prolapse.

**2- Improper lifting:** Using your back muscles instead of your legs to lift heavy objects can cause a disc prolapse. Twisting while you lift can also make your back vulnerable. Lifting with your legs, not your back, may protect your spine.

**3- Occupation:** Staying seated for long periods as in Driver, medical student, or office work, can put pressure on your spine and discs.

**4 - Repetitive activities that strain your spine.** Many jobs are physically demanding. Some require constant lifting, pulling, bending, or twisting. Using safe lifting and movement techniques can help protect your back. as in builder

**5- Smoking.** It is believed that smoking lessens the oxygen supply to the disc and causes more rapid degeneration.

## Clinical feature:

In most cases, lower back pain is the first symptom of a herniated disc. This pain may last for a few days, and then improve. Other symptoms may include:

- Sciatica. This is a sharp, often shooting pain that extends from the buttock down the back of one leg. It is caused by pressure on the spinal nerve.
- Numbness or a tingling sensation in the leg and/or foot.
- Weakness in the leg and/or foot.
- Loss of bladder or bowel control. This is extremely rare and may indicate a more serious problem called cauda equina syndrome :
    - Low back pain
    - Uni- or bilateral sciatica
    - Saddle anesthesia
    - Motor weakness in the lower extremities Variable rectal and urinary symptoms [8]
- . This condition is caused by the spinal nerve roots being compressed. It requires immediate medical attention. [9]

## Diagnosis:

Over 85 to 90% of patients with an acute herniated disc experience relief of symptoms within 6 to 12 weeks without any treatments. [10]

*Medical History and Physical Examination :*

- Neurological examination :
- Provocative maneuvers
- Leg raising maneuvers are used to screen for lumbosacral radiculopathy
- Straight leg raise test (Lasegue sign)
- Bragard sign
- Crossed straight leg raise test

**Imaging :**

- X-rays: Lumbar X-ray films are the first-line imaging test performed in low back pain settings.

- MRI: This is the gold standard study for confirming a suspected Lumbar Disc prolapse With a diagnostic accuracy of 97%, it is the most sensitive study to visualize a herniated disc due to its significant ability in soft tissue visualization. MRI also has higher inter-observer reliability than other imaging modalities. [11]
- CT: This is the most sensitive imaging modality to examine the bony structures of the spine. CT imaging allows for the evaluation of calcified herniated discs or any pathological process that may result in bone loss or destruction.[12]

## Treatment :

❖ **Nonsurgical Treatment**

Initial treatment for a Lumbar disc prolapse is usually nonsurgical.

**Nonsurgical treatment may include:**

- **Rest.** One to 2 days of bed rest will usually help relieve back and leg pain. Do not stay on your feet for a long time, however. When the patients resume activity, try to do the following:
  - Take rest breaks throughout the day, but avoid sitting for long periods.
  - Make all The physical activity slow and controlled especially bending forward and lifting.
  - Change The daily activities to avoid movements that can cause further pain.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs).** Anti-inflammatory drugs such as ibuprofen or naproxen can help to relieve the pain.
- **Physical therapy.** Specific exercises will help strengthen the lower back and abdominal muscles.
- **Epidural steroid injection.** An injection of a cortisone-like medicine into the space around the nerve may provide short-term pain relief by reducing inflammation.

There is good evidence that epidural injections can successfully relieve pain in many patients who have not been helped by 6 weeks or more of other nonsurgical care.

There is some data to suggest that epidural steroid injection within 3 months of surgery can slightly increase the risk of infection. It is important to note that these nonsurgical treatments do not heal the disc prolapse. Rather, they can help relieve your symptoms while the body works to heal the disc. In many cases, disc prolapse naturally symptoms to

improve over time and is Resolved by reduction of the associated edema and inflammatory processes.

❖ **Surgical Treatment:**

Only a small percentage of patients with lumbar disc prolapse require surgery. Spine surgery is typically recommended only after a period of nonsurgical treatment has not relieved painful symptoms, or for patients who are experiencing the following symptoms:

- ✓ Muscle weakness
- ✓ Difficulty walking
- ✓ Loss of bladder or bowel control

- **Microdiscectomy.** it is common technical to treat a single disc prolapse. The procedure is done through a small incision at the level of the disc prolapse and often involves the use of a microscope.

  The prolapsed part of the disc is removed along with any additional fragments that are putting pressure on the spinal nerve.

- **Endoscopic discectomy.** A newer surgical option for treating a single disc prolapse is endoscopic discectomy. This minimally invasive procedure involves the use of an endoscope, a thin tube with a camera, which allows the surgeon to visualize and access the affected area.

Potential benefits of endoscopic discectomy include:

- o Smaller incisions
- o Reduced scarring
- o A shorter recovery time

- **Percutaneous endoscopic lumbar discectomy** showed better results than open lumbar microdiscectomy in some items, open lumbar microdiscectomy still showed good clinical results, [13 ]
- **An open surgical procedure** with a larger incision, indicates re's Multiple disc prolapse.

**Rehabilitation:**

Dynamic lumbar stabilization exercises may be recommended to patients following spinal surgery due to their benefits in reducing pain, increasing spinal mobility, and ensuring faster return to work periods.

- Simple walking program (such as 30 minutes each day), along with specific exercises to help restore strength and flexibility to back and legs.
- To reduce the risk of repeat prolapse, the patient is prohibited from bending, lifting, and twisting for the first few weeks after surgery. [14]

❖ **Surgical complications:**

- Dural tear
- Hematoma
- Infection
- Nerve root lesions
- Cauda equina
- Reoperations. [15]

## Considerations

With both surgical and nonsurgical treatment, there is up to a 20 to 25% chance that the disc will prolapse again in the lifetime.

The risk of nonsurgical treatment is that symptoms may take a long time to go away. Patients who try nonsurgical treatment for too long before electing to have surgery may experience less improvement in pain and function than those who elect to have surgery earlier. Studies suggest that at around 9 to 12 months, the surgical outcomes (results) are not as beneficial as if you have surgery before 9 months.

### 1.2 Justification

- ✓ Because there is lack study or research about disc prolapse in Yemen.
- ✓ To improve people's awareness about disc prolapse because they think that any back pain is disc prolapse.
- ✓ Increase of knowledge of Yemeni Doctors and medical students about the prevalence of Disc prolapse in Yemen.
- ✓ Through our work in the Neurosurgery Department we Noted increasing in cases of disc prolapse.
- ✓ Because we want to accomplish our Graduation Project.
- ✓ It is one of the suggestions of our Research supervisor Dr.Majed Amer.

# Chapter 2: Literature Review

## 2.1 Reviewed literature

**Abstract (1):**

**Title:** Decreasing Incidence of Lumbar Discectomy Surgery in Finland in 1997–2018[16]

**Done by:** Ponkilainen, Ville T. MD, PhDa; Mäntymäki, Heikki MD, PhDa; Huttunen, Tuomas T. MD, PhDb,c; Mattila, Ville M. MD, PhDa,c,d

**Place(source):** SPINE

**Time:** March 15, 2021

**Aims:** To assess the incidence and trends of lumbar disc surgeries in Finland from 1997 through 2018.

**Results:**: A total of 65,912 lumbar discectomy operations were performed in Finland from 1997 through 2018. The annual population-based incidence of lumbar discectomy decreased 29% during the 22-year period, from 83 per 100,000 person-years in 1997 to 58 per 100,000 person-years in 2018. In addition, the incidence of microdiscectomy increased by 12%, from 41 per 100,000 person-years in 1997 to 47 per 100,000 person-years in 2018, whereas the incidence of open discectomy decreased by 71%, from 41 per 100,000 person-years in 1997 to 12 per 100,000 person-years in 2018. The total reoperation rate for microendoscopic, microscopic, and open discectomy surgeries was 16.3%, 15.3%, and 14.9%, respectively.

**Conclusion:** The nationwide incidence of lumbar discectomy decreased in Finland from 1997 through 2018. Additionally, the incidence of open discectomy is decreasing rapidly, whereas the incidence of microsurgical techniques is increasing.

**Abstract (2):**

**Title:** Trends in Incidence and Treatment of Herniated Lumbar Disc in the Republic of Korea: A Nationwide Database Study [17]

**Done by:** Jong-Myung Jung et al. J Korean Neurosurg Soc.
**Place(source):** Republic of Korea
**Time:** 2020 Jan.

**Aims**: To determine the incidence and analyze trends of the herniated lumbar disc (HLD) based on a national database in the Republic of Korea (ROK) from January 2008 to December 2016.

**Results**: The number of patients diagnosed with HLD was 472245 in 2008 and increased to 537577 in 2012; however, it decreased to 478697 in 2016. The pattern of crude incidence and the standardized incidence were also similar. Overall, the incidence of HLD increased annually for the 30s, 40s, 50s, and 70s until 2012 and then decreased. However, the incidence of HLD in the 80s continued to increase. The crude incidence of HLD in female patients exceeded that of male patients in their middle age (30s or 40s) and was 1.5-1.6 times higher than in male patients in their 60s. The total number of open discectomies (OD) increased from 71598 in 2008 to 93942 in 2012 and then decreased to 85846 in 2016. The rate of younger patients (in the 20s, 30s, and 40s) who underwent OD was decreased, and the rate of younger patients who underwent percutaneous endoscopic lumbar discectomy was increased. However, the rate of older patients (in the 70s and 80s) who underwent OD continuously increased.

**Conclusion:** This nationwide data on HLD from 2008 to 2016 in the ROK demonstrated that the crude incidence and the standardized incidence increased until 2012 and then decreased. The annual crude incidence was different according to age and sex. These findings may be considered when deciding on future health policy, especially in countries with a similar national health insurance system (or with plans to adopt).

**Abstract (3):**

**Title:** Gender differences in patients scheduled for lumbar disc herniation surgery[18]

**Done by:** Fredrik Stro¨mqvist1 • Bjo¨rn Stro¨mqvist1 • Bo Jo¨nsson1 • Magnus K. Karlsson1

**Place(source):** University Hospital, Lund University, Malmo, Sweden

**Time:** In 2015

**Aims:** To show gender differences in preoperative status and outcome of spine surgery.

**Results:** 44 % of the patients were women (mean age 45 ± 13) and 56 % were men (mean age 44 ± 13). More women than men were smokers (26 versus 21 %, p\0.001). Women also reported inferior walking ability (less than 100-metre walking ability 37 vs 30 %; p\0.001), consumed more analgesics (92 versus 84 %; p\0.001), reported higher level of pain (mean difference VAS leg 6 (95 % CI 5–7)), had inferior health-related quality of life (mean difference EQ 5D 0.07 (95 % CI 0.05–0.08)) and had higher disability (mean difference ODI 6 (95 % CI 5–6)).

**Conclusion:** Women scheduled for LDH surgery report inferior clinical status than men scheduled for the same operation. We have in the literature found no evidence-based data that support such a difference, and the reason for the discrepancy is unclear.

**Abstract (4):**

**Title:** Frequency of Lumbar Intervertebral Disc Calcification and Angiogenesis, and Their Correlation With Clinical, Surgical, and Magnetic Resonance Imaging Findings [19]

**Done by:** Karamouzian, Saeid MD*†; Eskandary, Hossein MD*‡; Faramarzee, Mohcen MD§; Saba, Mohammad MD¶; Safizade, Hossein MD, MPH‖; Ghadipasha, Masoud MD**; Malekpoor, Afshar Reza MD*; Ohadi, Amin MD**

**Place(source):** Neuroscience Research Center, Kerman, Iran; †Department of Neurosurgery; Kerman University of Medical Sciences, Kerman, Iran

**Time:** April 15, 2010.

**Aims:** This study measured the frequency of lumbar intervertebral disc nucleus pulposus microscopic calcification and angiogenesis in adult patients undergoing discectomy compared to normal cadavers.

**Result:** Frequency of microscopic calcification was significantly higher in degenerated disc than normal cadaveric (54.4% vs. 6.7%) and was higher in Modic type III than type I (III: 95.0%, II: 57.4%, I: 13.0%), also prevalence of angiogenesis was significantly higher in patients than cadaveric discs (41.0% vs. 6.7%) and in calcified than noncalcified discs (59.2% vs. 19.5%) ($P < 0.001$). There was no relationship between disc calcification and patients' gender and level of discectomy.

**Conclusion:** Disc nucleus pulposus microscopic calcification is a common event occurring in adult patients suffering from lumbar disc herniation. Mechanisms that link disc degeneration, angiogenesis, and calcification remain a focus for further research that may be useful in future medical treatments before surgical treatment of lumbar disc herniation.

**Abstract (5):**

**Title:** Microdiscectomy for Lumbosacral Disc Herniation and Frequency of Failed Disc Surgery [20]

**Done by:** Muhammad Shahzad Shamim 1, Maria Adnan Parekh 2, Muhammad Ehsan Bari 1, Syed Ather Enam 1 2, Faraz Khursheed 1

**Place(source):** Department of Neurosurgery, Aga Khan University Hospital, Karachi, Pakistan

**Time:** December 2010,

**Aims:** To review the demographics of the patient population presenting for surgical treatment of lumbosacral disc herniations and to review our results of lumbosacral microdiscectomy at a university hospital in Pakistan.

**Results:** Five hundred-one patients were studied, based on inclusion criteria. The mean age was 41.2 years; 347 (69%) patients were male and 154 (31%) female. The mean body mass index of the population was 26 and was higher in females. All patients primarily presented with radiculopathy, and the mean duration of these symptoms was 438 days. The mean duration of nonoperative management was 53 weeks. Fifty-one patients (10.2%) had previously undergone spine surgery. A total of 442 (88%) patients were operated at single disc level, and the rest at two levels. Sixty-six (13%) patients were operated for upper lumbar disc herniations. The mean operative time was 94 minutes, and the most common complication was a dural tear. The mean length of hospital stay was 5 days (2–12 days). The mean follow-up was 48.3 weeks (4 weeks to 14 years). Complete resolution of symptoms was seen in 360 (71.9%) patients and failed disc surgery was diagnosed in 42 (8.4%) patients. Twenty-six patients (5.2%) were reoperated upon, with gradual improvement. The authors report an overall failed back surgery rate of 8.38%.

**Conclusion:** Overall our results were comparable to published international literature. However, the authors observed significant differences in demographics, especially in terms of age, gender distribution, and mean BMI of the patient population as well as frequency of involvement of upper lumbar discs.

**Abstract (6):**

**Title:** Epidemiological surveillance of lumbar disc surgery in the general population: a pilot study in a French [21]

**Done by:** Yves Roquelaure, Natacha Fouquet, Catherine Ha, Éric Bord, Nathalie Surer,Audrey Petit, Annette Leclerc, Pierre Lombrail, Marcel Goldberg, Ellen Imbernon.

**Place(source):** Angers cedex, France.

**Time:** 2010

**Aims:** To assess the feasibility of a surveillance system for DRS using hospital databases for lumbar disc surgery (LDS).

**Results:** Employment information was available for the 75 women and 71 men. The risk of LDS varied according to occupations and industries. PAFs ranged between 30% (12–48) for male blue-collar workers and 22% (4–40) for female lower white-collar workers. PAFs ranged between 7 and 17% in the economic sectors at high risk.

**Conclusion:** The surveillance of LDS can identify occupations and industries at risk.

**Abstract (7):**

**Study:** Dural lesions in lumbar disc herniation surgery: incidence, risk factors, and outcome. [22]

**Done by:** Fredrik Stro¨mqvist • Bo Jo¨nsson • Bjo¨rn Stro¨mqvist •

**Place(source):** Lund, Sweden.

**Time:** 2010.

**Aims:** To know the incidence, risk factors, and effect on the outcome of an incidental dural lesion in lumbar disc herniation surgery.

**Results**: In a prospective study within the framework of the Swedish Spine Register, 4,173 patients operated on for lumbar disc herniation were evaluated using pre- and 1-year postoperative protocols and complication registration. The mean patient age was 41 (18–81) years and 53% of the patients were male. 93% of the operations were performed on the two lowermost lumbar levels. The incidence of dural lesions in the material was 2.7%. In patients with previous disc surgery, the incidence was doubled, 5%, a significant increase ($P = 0.02$).

**Conclusion:** The dural lesion is a technical complication that must be solved at the time of surgery but does not bear any negative implications on the long-term outcome for the patient.

**Abstract (8):**

**Study:** Surgical treatment of lumbar disc herniation in different ages-evaluation of 11,237 patients [23]

**Done by:** Fredrik Strömqvist 1, Björn Strömqvist 2, Bo Jönsson 2, Magnus K Karlsson 2

**Place(source):** Lund University, Skåne University Hospital, Malmö Sweden.

**Time:** 2017.

**Aims:** To evaluate referral patterns and outcomes in patients of different ages surgically treated because of lumbar disc herniation.

**Results**: Patients of all ages referred to surgery had inferior PROM data compared with published normative age-matched PROM data. Referral to LDH surgery demanded of each 10-year strata statistically significantly more pain, lower quality of life, and more disability (all $p<.001$). Surgery markedly improved quality of life and reduced disability in all age groups (all $p<.001$), but with statistically significantly less PROM improvement with each older 10-year strata (all $p<.001$). This resulted in statistically significantly inferior PROM values for pain, quality of life, and disability postoperatively for each 10-year strata (all $p<.001$). There were also more complications ($p<.001$) with each 10-year older strata.

**Conclusion:** In general, older patients referred to lumbar disc herniation surgery have statistically significantly inferior Patient's Patient-reported outcome measures, improve less, and reach inferior Patient Reported Outcome Measures scores postoperatively. The clinical relevance must however be questioned because most patients reach, independent of age group, the defined level for a successful outcome, and the patient satisfaction rate is high.

## 2.2 Conceptual framework :

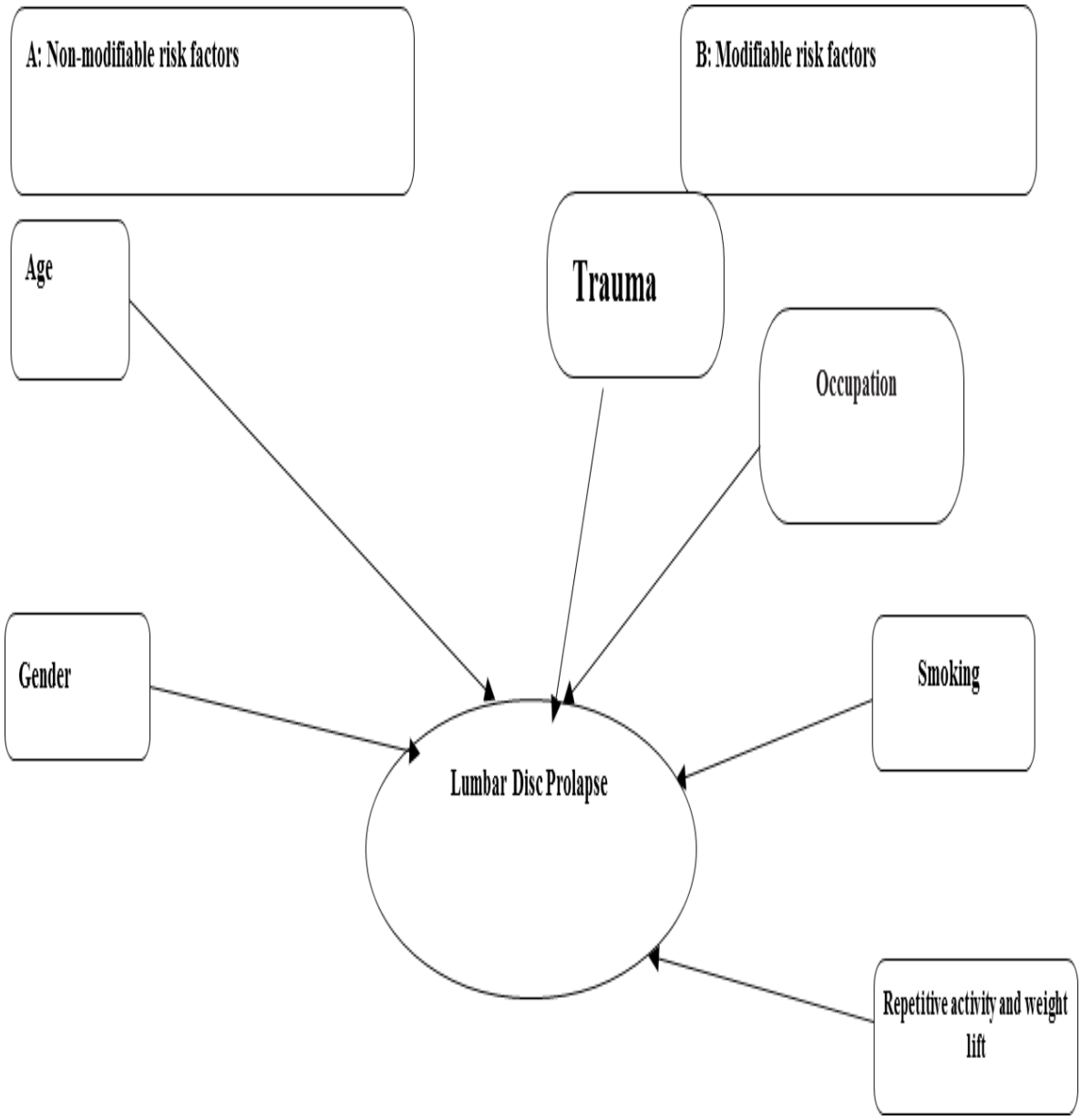


**Figure (1)** lumber disc prolapse framework

# Chapter 3: Research Objectives

## 3.1 General objective :

To estimate of Prevalence of Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023**.**

## 3.2 Specific objectives :

1) To determine the Frequency of Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023.

2) To determine the Distribution of Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023.

3) To determine the most common gender that has undergone Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023.

4) To describe the geographic locations of patients who Undergo Lumbar Disc Prolapse Surgery Among Admitted Patients in University of Science and Technology Hospital, Sana'a , Yemen, 2020-2023.

# Chapter 4: Method

## 4.1 Study area:

University of Science and Technology Hospital Neurosurgical Department, Sana'a city area of Mathbah which is located in the northwest, the population is characterized by a moderate socioeconomic level and crowded area.

## 4.2 Study design:

Descriptive cross-section study to survey lumber disc prolapse among all patients who has surgery in USTH.

## 4.3 Study population:

All patients that have lumbar disc prolapse surgery ( 10/4/ 2020- 26/12/2023 ) that were diagnosed as lumber disc prolapse whatever the degree out of 1932 different neurosurgery in the department .

## 4.4 Sample size :

Include all Lumber disc prolapse surgery that is 330 case field in three consecutive years.

## 4.5 Sampling method:

Non-probability convenient for patients in lumber disc prolapse surgery of USTH that a neurosurgeon diagnoses and decides to do surgery.

## 4.6 Study Tools:

All information taken from patient fields in the hospital by our self-design check-list to collect data that contain the following :

1-**Demographic information**

a) Contains the file-number,
b) Age: we divided the age into five groups (15-30), (31-45), (46-60), (61-75), (76-90).
c) Gender: either male or female
d) Marital status: single, married, divorced, or widow.
e) Risdency: Sanaa, Alamanh, Thamar, Adan, Taiz, Ibb, Alhodeda, Mareb, Albedha, Shaboa, Haja, Raema, Algof, Aldhala, Amran, Sadaa, Almahwet.
f) Any Chronic Disease

**2- surgery information**

a) Onset of symptom: sudden, Gradual, or intermittent
b) Level of disc prolapse :
c) Date of surgery: 2020, 2021, 2022, or 2023.
d) Type of surgery: discectomy, open, TPSF, lamiotomy&foraminotomy, laminectomy, laminotomy&discectomy, fenestration&discectomy, or foraminotomy
e) Type of confirming images: CT or MRI
f) Main findings in images (types of disc prolapse ): disc protrusion, disc herniation, disc sequestration, or spondylosis

### 4.7 Operational variables(Dependent and independent variables ):

**Dependent**: lumbar disc prolapse.

**Independent**: age, gender, occupation, chronic disease, bad habits.

### 4.8 Inclusion criteria:

Patients who have disc prolapse surgery with complete records.

### 4.9 Exclusion criteria:

- Patients 1-14 years old.
- Missing data of risk fasctors in sociaodemographic ( occupation , smoking, income )

### 4.10 Data processing analysis:

Data were cleared, coded, and interred to SPSS software version (24) and described by tables and figures.

### 4.11 Ethical consideration:

Written approvals have been taken from UST hospital and from UST faculty of medicine deanship and community and family medicine department to implement the study.

All information that taken kept confidential.

### 4.12 Limitation of the study:

- Difficulty in collecting data due to multiple patient medical records.
- Some of the data in the field is missed

## 4.13 Timetable (Action plan):

**Table (1)** The action plane of study about lumber disc prolapse surgery in University of Science and Technology Hospital, Sana'a Yemen,2020-2023**.**

| Activities | Nov | | | | Dec | | | | Jan | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1st W | 2nd W | 3rd W | 4th W | 1st W | 2nd W | 3rd W | 4th W | 1st W | 2nd W | 3rd W | 4th W |
| First meeting | | | | | | | | | | | | |
| Proposal writing | | | | | | | | | | | | |
| Data collection | | | | | | | | | | | | |
| Data analysis | | | | | | | | | | | | |
| Final report writing | | | | | | | | | | | | |
| Discussion | | | | | | | | | | | | |

## Chapter 5: Results

Three hundred and thirty cases were filed with surgery of lumber disc prolapse in the University of Science and Technology Hospital from April 2020 to December 2023, out of 1932 different neurosurgery in the same hospital and same period; **thus the prevalence of lumber disc prolapse was found to be 17%**. Of these 330 cases filed surgery ( 150- 45% ) are male and (180-55% ) are female with a main age of 48.3 .

**Table (5.1)**: Patients' socio-demographics of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *Gender* | | | |
| *[N (%)]* | *Male* | *150* | *45* |
| | *Female* | *180* | *55* |
| *Age (Year)* | | | |
| *[N (%)]* | *15-30* | *28* | *8.5* |
| | *31-45* | *123* | *37.3* |
| | *46-60* | *105* | *31.8* |
| | *61-75* | *63* | *19.1* |
| | *76-90* | *9* | *2.7* |
| *Marital State* | | | |
| *[N (%)]* | *Single* | *88* | *26.7* |
| | *Married* | *228* | *69.1* |
| | *Widow* | *14* | *4.2* |

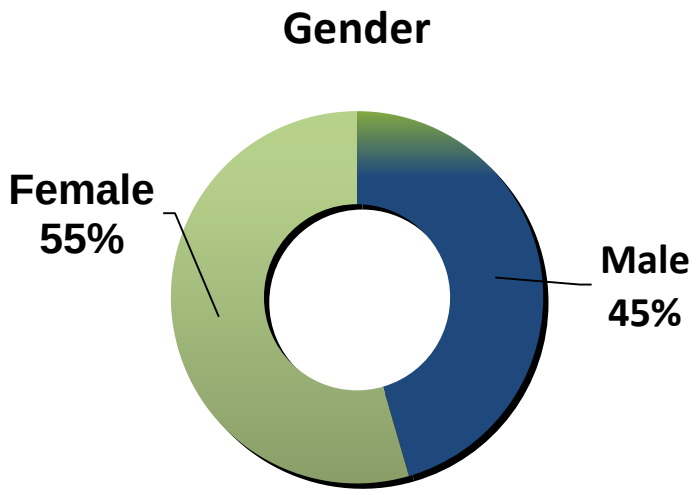


**Figure (2)** Patients gender of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023 (n=330).

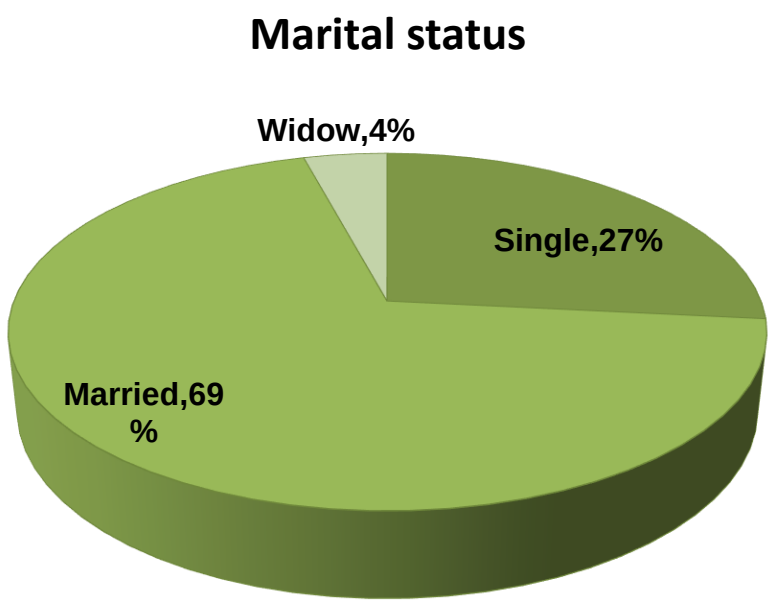


**Figure (3)** Patients marital status of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

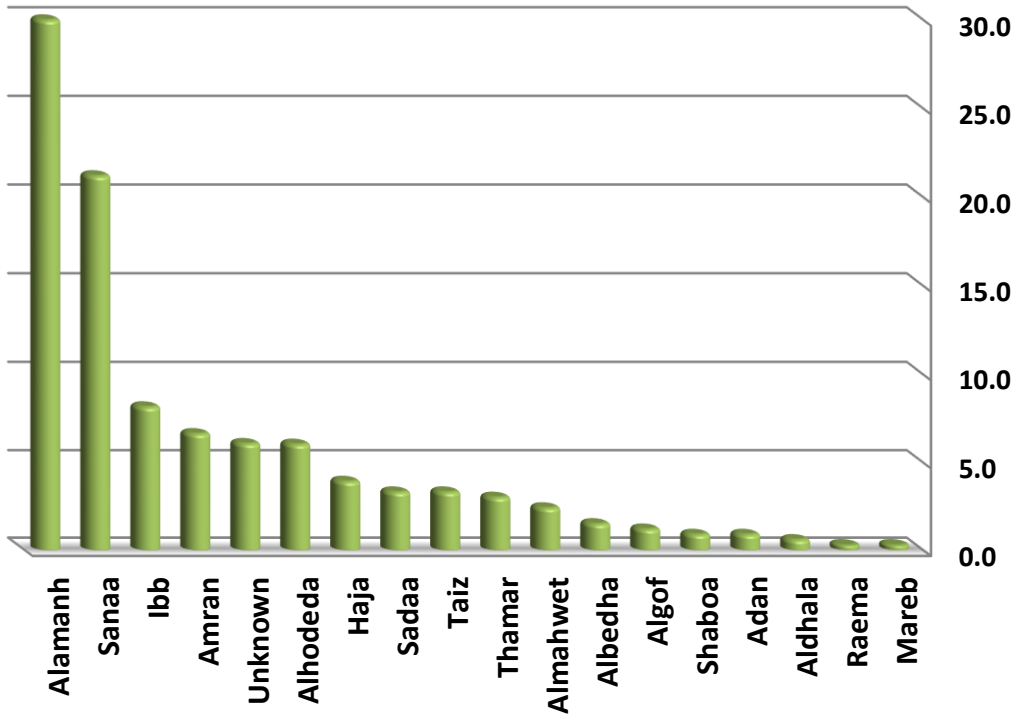


**Figure (4)** Patients geographical area of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

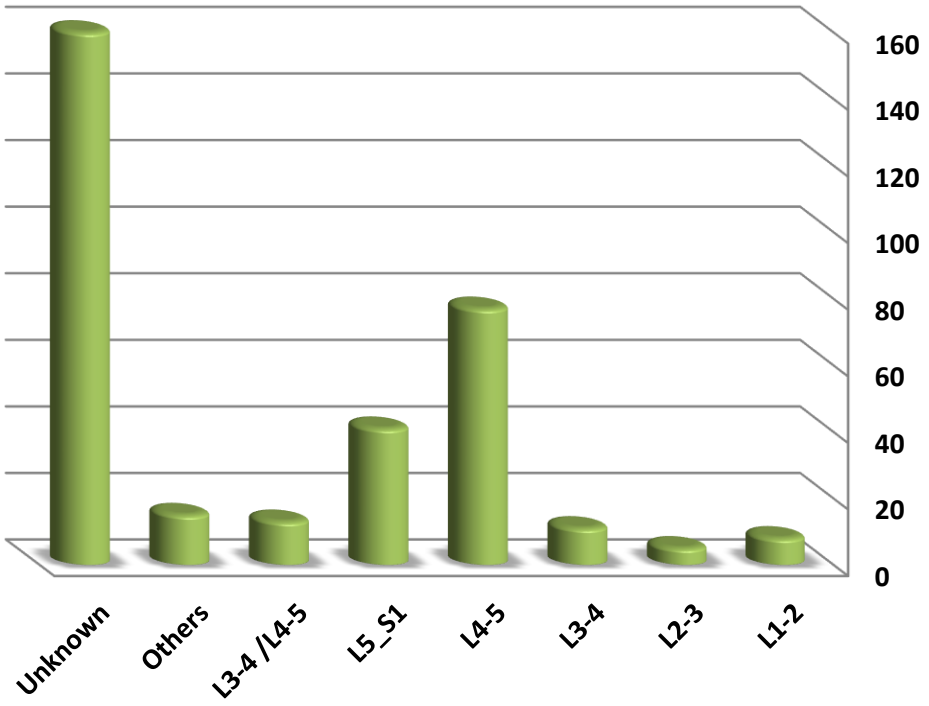


**Figure (5)** Patients level of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

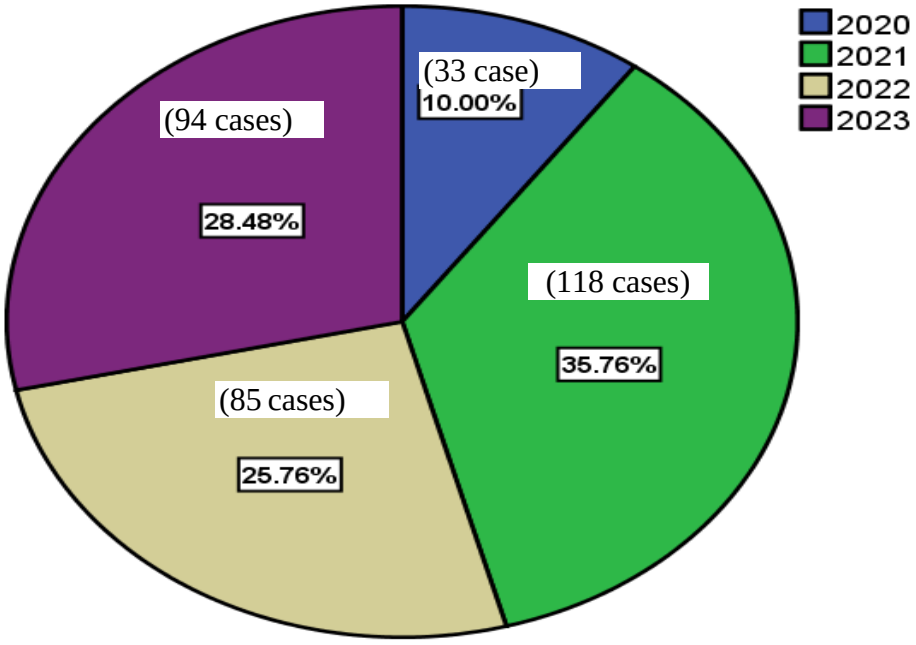


**Figure (6)** Distribution date of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

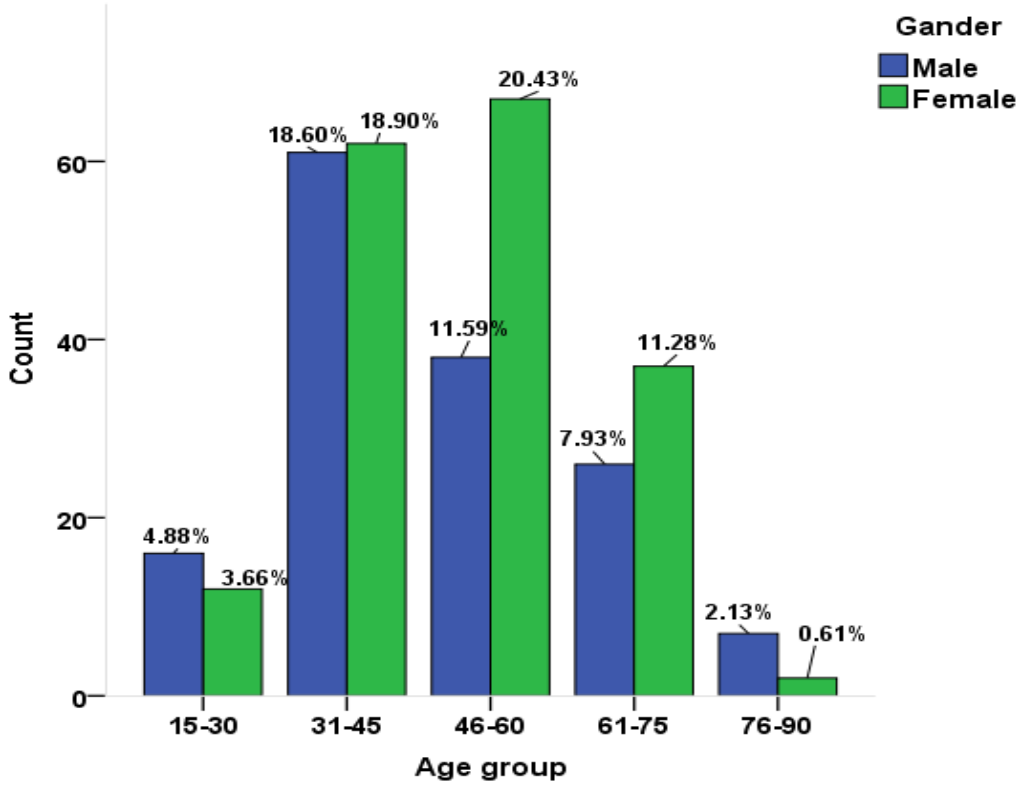


**Figure (7)** Patients age group –gender distribution of lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

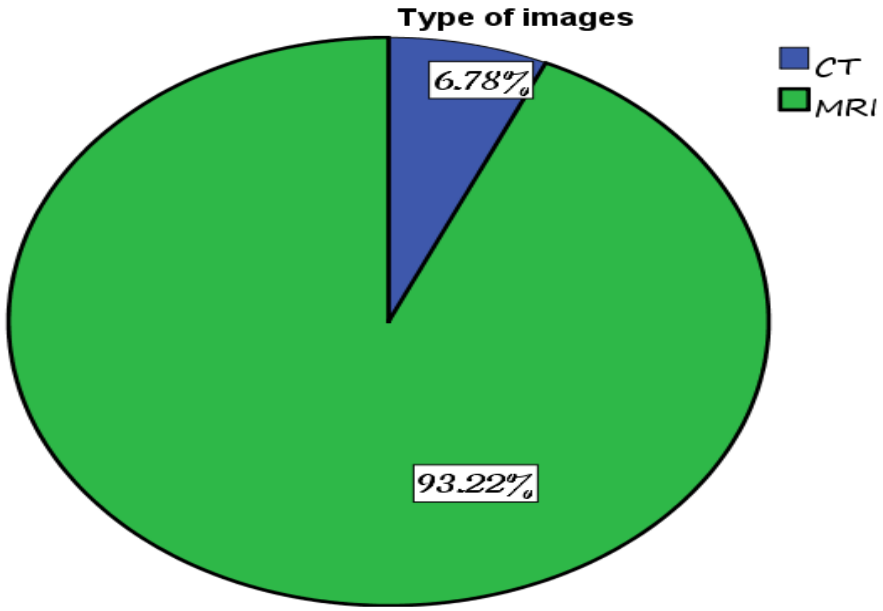


**Figure (8)** Type of diagnosis image of Patients lumber disc prolapse surgery in University of Science and Technology Hospital from April 2020 to December 2023(n=330).

**Table (5.2)**: Chronic diseases of lumber disc prolapse surgery patients in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *chronic diseases* | | | |
| *[N (%)]* | *DM* | *20* | *6.1* |
| | *HTN* | *38* | *11.5* |
| | *DM&HTN* | *23* | *7.0* |
| | *Asthma* | *1* | *0.3* |
| | *HBV* | *1* | *0.3* |
| | *HCV* | *1* | *0.3* |
| | *No chronic disease* | *246* | *74.5* |
| | *Total* | *330* | *100.0* |

**Table (5.3)**: Type of surgery of lumber disc prolapse surgery patients in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *Type Of Surgery* | | | |
| *[N (%)]* | *Discectomy* | *210* | *63.6* |
| | *Open* | *17* | *5.2* |
| | *TPSF* | *40* | *12.1* |
| | *Lamiotomy & Foraminotomy* | *14* | *4.2* |
| | *Laminectomy* | *4* | *1.2* |
| | *Laminotomy & Discectomy* | *8* | *2.4* |
| | *Fenestration & Discectomy* | *5* | *1.5* |
| | *Formaitomy* | *30* | *9.1* |

**Table (5.4)**: Type of disc prolapse in patients lumber disc prolapse surgery in the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *Type Of Disc Prolapse* | | | |
| *[N (%)]* | *Disc Protrusion* | *167* | *50.6* |
| | *Disc Herniation* | *118* | *35.8* |
| | *Disc Sequestration* | *4* | *1.2* |
| | *Spondylosis* | *13* | *8.5* |

**Table (5.5)**: Onset of symptoms in patients with lumber disc prolapse surgery at the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *Onset Of Symptom* | | | |
| *[N (%)]* | *Sudden* | *21* | *6.4* |
| | *Gradual* | *261* | *79.1* |
| | *Intermittent* | *1* | *0.3* |

**Table (5.)**: Type of images in patients lumber disc prolapse surgery at the University of Science and Technology Hospital from April 2020 to December 2023(n=330).

| *Variable* | | *Frequency=N* | *Percent=%* |
|---|---|---|---|
| *Type Of Images* | | | |
| *[N (%)]* | *MRI* | *165* | *50.0* |
| | *CT* | *12* | *3.6* |

## Chapter 6: Discussions

The results of this study will not only serve as important information but can also be used for local literature comparisons, which, in the absence of local literature, may be extrapolated to represent Yemen, at least until further reports are published.

Recent years have seen a notable significant prevalence of lumbar disc prolapse surgery (LDPS) at the University of Science and Technology Hospital (USTH) in Yemen, comprising 17% of all neurosurgical procedures. This figure not only indicates the presence of advanced medical facilities but also reflects the positive outcomes of such surgeries within the nation. Our study identified a 17% prevalence rate of disc prolapse surgery, aligning with previous research that reported a prevalence range of 7-17% for women and 8-16% for men, thereby corroborating our findings. [21]

Interestingly, our study revealed a higher incidence of LDS among females (n = 180/55%) compared to males (n = 150/45%). Females patients constituted a higher proportion of those undergoing lumbar disc prolapse surgery compared to males. This trend can be attributed to several factors. Females exhibit a wider range of spine motion, making them more susceptible to disc-related issues; their degenerative disc conditions are more pronounced than those in males. This divergence from the prior study, which showed a male majority (56%) and a female minority (44%), could be attributed to the more physically demanding lifestyle of Yemeni women, including frequent weight-lifting activities, as opposed to their Swedish counterparts. [18]

The age demographic most affected by LDS was found to be 31-45 years (n = 123/37.3%), which represents the most industrious segment of the population, often engaged in labor-intensive tasks. The heightened physical demands, particularly those involving lifting, may contribute to the increased incidence of lumbar disc prolapse, exacerbated by the ongoing conflict in Yemen. In contrast, the previous study reported average ages of onset at 55 for women and 62 for men, suggesting that the vigorous lifestyle of the younger Yemeni population and the higher quality of life enjoyed by young Swedes may influence the disparity in age-related prevalence. [21]

Marital status also appeared to influence the likelihood of undergoing LDS, with married individuals (n = 228/69.1%) representing the majority of cases, followed by singles

(n = 88/26.7%) and widows (4.2%). The financial responsibilities associated with marriage often lead to greater physical activity, including lifting heavy loads. Additionally, married females may experience pregnancy-related strain on the spine, further elevating the risk of disc prolapse .This distribution contrasts with the previous study, which reported higher percentages of married individuals (84.4%). The increased risk among single Yemenis, as opposed to their French counterparts, could be due to the heightened exposure to trauma amidst the war and the superior quality of life in France, which may mitigate risks among the young single French population. [20]

Magnetic Resonance Imaging (MRI) has become the diagnostic modality of choice for lumbar disc prolapse due to its most accurate in identifying disc anomalies , outperforming Computed Tomography (CT) scans. In our study, the patient were diagnosed using MRI (93.22%) with a small subset (12–3.6%) also undergoing CT scans. This diagnostic approach contrasts with previous studies where MRI was the sole imaging technique employed. The discrepancy in our findings can be attributed to significant data gaps encountered during the collection process at the University of Science and Technology Hospital (USTH). also some patients was came to the hospital with CT scans and they diagnosed by it in remote area because there is no MRI .[21] [24]

The predominant MRI finding was disc protrusion, which is typically the earliest form of disc compromise detectable on imaging. Our study's breakdown of disc prolapse types included disc protrusion (n = 167/50.6%), disc herniation (n=118/35.8%), disc sequestration (1.2%), and spondylosis (8.5%). These findings are consistent with prior reports, which documented protrusion as the most common herniation type (63.3%). However, our study uniquely contributes data on spondylosis, a condition not covered in earlier research. The L4-L5 intervertebral level was the most commonly affected site, likely due to the substantial body weight borne by this segment and the increased stress from heavy lifting. In our cohort, the L4-L5 level was implicated in 23.3% of cases, followed by L5-S1 at 12.4% so when we compered our results it turns out it matches with the previous reports.[24]

The onset of lumbar disc prolapse symptoms presented predominantly as gradual (79.1%), with a minority being acute (6.4%) and intermittent (0.3%). This may due to long standing pain for years and some patient go to traditional medicine and cauterisation not came early

he came as chronic case of pain . This distribution contrasts with previous research where acute onset was more prevalent (61%). The discrepancy may stem from the retrospective nature of the prior study, which allowed for more detailed historical data collection. [20]

Discectomy has been identified as the primary surgical intervention for lumbar disc prolapse due to its cost-effectiveness and positive patient outcomes. In our report , discectomy accounted for 63.65% of surgeries, followed by (TPSF) at 12.1%, and other less common procedures. This finding is consistent with global trends, although the use of TPSF is more prevalent in Yemeni neurosurgery compared to other regions where it is typically performed by orthopedic surgeons. Discectomy is the most popular surgical technique followed by Percutaneous endoscopic lumbar discectomy because they have more facilitates and highly specialized hospital. [13][18][17]

Comorbid chronic conditions were also evaluated, with hypertension (HTN) being the most common (11.5%), followed by concurrent HTN and diabetes mellitus (DM) (7%), and DM alone (6.1%). These conditions' prevalence may be more indicative of an aging population rather than a direct association with lumbar disc prolapse. Our study also identified other chronic diseases, albeit at much lower frequencies. [20]

Our study encountered significant challenges, primarily due to missing data and incomplete patient histories, which impeded a comprehensive analysis. To address these limitations and establish a more accurate prevalence , we propose the design of a retrospective cohort study that would enable a more precise determination of prevalence rates.

## Chapter 7: Conclusions

- In this study The prevalence of lumber disc prolapse was found to be 17%.
- The females were more than males.
- The more prevalent age group was 31-45 years old.
- Most of the patients were married.
- MRI was the most useful diagnostic scan in lumber disc prolapse.
- The more prevalent level was L4 _L5 followed by L5_ S1.
- Disc protrusion was the most common types of lumber disc prolapse.
- Most of their surgery was discectomy followed by open discectomy.

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## Chapter 8: Recommendation

1) We recommend the University of Science and Technology Hospital to do regular health education program for the patients about the importance of regular check-up because most of the cases in our study were chronic in onset .

2) We recommend the University of Science and Technology Hospital to improve their Medical team skills and educate them how important to add patient's data that done outside the hospital because we found a deficiency in data collection.

3) We recommend researchers to do cohort study over a long period, to obtain more and complete information about lumber disc prolapse surgery.

4) We recommend researchers to concentrate in the causes of lumbar Disc prolapse surgery because it is a very important topic.

5) We recommend researchers to look for the entire spine and not just the lumber , because we found disc prolapse in levels other than the lumbar.

6) We recommend University of Science and Technology Hospital to do regular educate to married patients about the importance of reducing effort on themselves in hard work to avoid lumbar disc prolapse.

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Republic of Yemen
University of Science and Technology
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الجمهورية اليمنية
جامعة العلوم والتكنولوجيا – صنعاء
كلية الطب والعلوم الصحية
قسم طب المجتمع والاسرة

# Prevalence of Lumbar Disc Prolapse Surgery in University of Science and Technology Hospital, Sana'a , Yemen,2020-2023

## LIST OF DATA COLLECTION

**FILE NO:……**

**GENDER: MALE ( ) FEMALE ( )**

**AGE: ……**

**MARITAL STATUS: SINGLE ( ) MARRIED ( ) DIVORCED ( ) WIDOW ( )**

**RISDENCY:……...**

**ANY CHRONIC DISEASE:……..…..**

**ONSET OF SYMPTOM:…….**

**LEVEL OF DISC PROLAPSE:……. DATE OF SURGERY:…….**

**TYPE OF SURGERY:……**

**TYPE OF COFIRMING IMAGES: CT ( ) MRI ( )**

**MAIN FINDINGS IN IMAGE (TYPES OF DISC PROLPSE:…**

Republic of Yemen
**University of Science & Technology**
Faculty of Medicine & Health Sciences

الجمهورية اليمنية
**جامعة العلوم والتكنولوجيا**
**كلية الطب والعلوم الصحية**

التاريخ: 1445/06/08هـ

**الأخ الدكتور/ معتصم العماد المحترم**
**المدير الطبي لمستشفى جامعة العلوم والتكنولوجيا**

السلام عليكم ورحمة الله وبركاته

في البداية تهديكم كلية الطب والعلوم الصحية أطيب التحايا.. وتتمنى لكم التوفيق والنجاح في جميع أعمالكم.

**الموضوع/ التعاون مع الطلاب**

إشارة إلى الموضوع أعلاه، نرجو منكم التعاون مع طلاب مستوى سادس طب وجراحة، لغرض تنفيذ بحث التخرج والذي بعنوان:

(Prevalence of lumber disc prolapse surgery in university of science and technology hospital, Sana'a-Yemen, 2023)

وعليه نرجو احالتهم الى المعنيين للتعاون معهم.

شاكرين لكم جهودكم وتعاونكم،

نائب العميد للشؤون السريرية
د. مهدي القرواني

التاريخ :

## نموذج موافقة جمع بيانات بحث علمي

اسم الباحث: طلاب الطب البشري ج٢ التخصص: طب بشري الجامعة : جامعة العلوم

عنوان البحث

prevalence of lumbar disc prolapse surgery in university of science and technology hospital sana'a - yamen, 2023

موافقة الإدارة والقسم المعني بجمع البيانات:

القسم:..... الإدارة: الصادرات الطبية

تم الاطلاع على عنوان البحث وأداة جمع البيانات ونوافق على جمع البيانات

| رئيس القسم | مدير الإدارة |
|---|---|
| الاسم: د/ طارق | الاسم: محمد الحبشي |
| التوقيع: | التوقيع: |

موافقة إدارة الجودة

تم الاطلاع على عنوان البحث وأداة جمع البيانات ونوافق على جمع البيانات

الاسم

التوقيع

اعتماد المدير العام أو المدير الطبي

# الخلاصة


**المقدمة :**

الانزلاق الغضروفي هو انزياح موضعي أو بؤري للمواد والغضاريف الرابطة بين الفقرات العظمية في العمود الفقري خارج مكانها الطبيعي ،وعلى الرغم من اختلاف اشكال وانواع وشدة الشكاوى التي يأتوا بها المرضى، إلا أن العمليات الجراحية المختلفة هي الحل الأخير والأمثل والنهائي لعلاج الحالات ومنع المضاعفات المحتملة، وتختلف العمليات الجراحية حسب الحالة وحاجة المريض .

**الهدف**:

تقدير مدى انتشار العمليات الجراحة للانزلاق الغضروفي القطني بين المرضى المرقدين في مستشفى العلوم والتكنولوجيا، صنعاء، اليمن 2020-2023.

**المنهجية :**

تم إجراء دراسة وصفية مقطعية غير احتمالية مناسبة ل 330ملفًا لجراحة الإنزلاق الغضروفي القطني من أصل 1932 جراحة أعصاب مختلفة تم إجراؤها في ثلاث سنوات متتالية من 10\4\2020م إلى 26\12\2023م وتم جمع البيانات عن طريق قائمة المراجعة ، المصممة ذاتيا التي تحتوي على عدة نقاط مثل المعلومات الشخصية للمرضى والمعلومات الجراحية ...الخ

وتم معالجتها وتحليلها بواسطة الإصدار 24 من برنامج التحليل الاحصائي (SPSS) الإصدار 24 وبرنامج الأكسل 2016.

**النتائج :**

في دراستنا كان معدل انتشار عمليات الانزلاق الغضروفي القطني 17% في 330 حالة تم اجراء لها عملية جراحية. الإناث (55%) 180 والذكور ( 45%) 150 ، أغلبهم متزوجون 228 (69.1%) وكانت الفئة العمرية الأكثر تأثراً هي 31_45 سنة(123حالة) وأقل فئة عمرية تأثرا هي 76-90 (9 حالات). والمنطقة الجغرافية الأكثر تأثر هي الأمانة 30%(99 حالة)، والمنطقة الجغرافية الأقل تأثر هي مأرب وريمة 0.3% (حالة واحدة) ، وكان المستوى الأكثر تأثر هو الفقرات القطنية الرابعة والخامسة 23% (77 حالة).أغلب المرضى ليس لديهم أمراض مزمنة 246 (74.5%) ولكن هناك مجموعة من المرضى لديهم إرتفاع في ضغط الدم 38 (11.5%) أو مرض السكري 20(6.1%) أو لديهم المرضين معا (إرتفاع الضغط وسكري) 38 (11.5%).

**الخاتمة :**

النساء هم الأكثر شيوعا من الرجال للخضوع لعملية جراحية لعلاج عمليات الانزلاق الغضروفي القطني ، والمرحلة العمرية الأكثر شيوع للخضوع للعملية هي31_45 عام ، وكانت المنطقة الجغرافية الأكثر في الأمانة، وأكثر مستوى في العمود الفقري تأثرا هي الفقرات القطنية 4_5 ، وأغلب المرضى ليس لديهم أمراض مزمنة.

Republic of Yemen
University of Science & Technology-Sana'a
Faculty of Medicine & Medical Sciences
Family & Community Medicine Department

الجمهورية اليمنية
جامعة العلوم والتكنولوجيا – صنعاء
كلية الطب والعلوم الصحية
قسم طب المجتمع والأسرة

# معدل انتشار العمليات الجراحية للانزلاق الغضروفي القطني بين المرضى المرقدين في مستشفى جامعة العلوم والتكنولوجيا صنعاء ، اليمن ، 2020-2023

*هذا التقرير النهائي عبارة عن جزء من متطلبات بحث التخرج لنيل شهادة البكالوريوس طب عام وجراحة*

**فريق البحث :**

مازن فيصل قليل — عبدالكريم فايز البطلي

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**إشـــــــــــراف :**

البروفيسور/ عبدالله عبده المخلافي

**عميد كلية الطب والعلوم الصحية بجامعة العلوم والتكنولوجيا**

أستاذ مشارك / ماجد علي عامر

**رئيس قسم الجراحة العصبية بمستشفى جامعة العلوم والتكنولوجيا- إستشاري جراحة المخ والاعصاب**

**الجمهورية اليمنية**

**جامعة العلوم والتكنولوجيا – صنعاء**

**كلية الطب والعلوم الصحية**

**قسم طب المجتمع والأسرة**

**2024**