Republic of Yemen
Ministry of Higher Education
and Scientific Research
21 September University of
Medical and Applied Sciences

# Prevalence of Low Back Pain and Its Associated Risk Factors among Neurosurgeons and Residents Neurosurgeons in Sana'a City., Yemen

**Prepared by:**

**Ali Saleh Abdullah Al-Nadhy**
**Ayah Abbas Ahmed Al-Haj**
**Mohammed Naji Ahmed Al-Musakhan**
**Emad Ali Mohammed Al-Zandani**
**Bahar Ali Mohammed Al-Shawki**
**Ali Bughbughi Qaid Al-Bughbughi**
**Sami Nagi Abdullah Al-Shawki**
**Ammar Khalid Ali Awad**
**Ghadeer Abdulkarem Monsar Al-Dafari**
**Somia Mohammed Abdullah Al-Samai**
**Omar Abdulwassa Abdo Al-Salwi**
**Rawdah Ahmed Mohammed Naji**
**Ahmed Saleh Naji Al-Bareai**
**Ali Abdullah Ahmed Al-Lassani**

## Supervisors:

**Dr. Mojahed Measar**
**Professor of Neurosurgery**

**Dr. Esmail Al-Hoothi**
**Ass. Prof. of Neurosurgery**

**Dr. Basheer Al-Nabahee**
**Ass. Prof. Community Medicine**

**1444هـ-2023م**

# Acknowledgements

Praise be to Allah who helps us to finish the degree of B.Sc. from Faculty of Medicine, 21 September University of Medical and Applied Sciences, 2023-2024.

We like to express our deepest gratitude to our supervisors, **Professor. Mojahed Measar,** the rector of 21 September University for Medical and Applied Sciences, **Assistant. Professor. Esmail Al-Hoothi** and **Assistant. Professor. Basheer Al-Nabahee** for their invaluable guidance, support and expertise throughout the research process. Their insightful feedback and constructive criticism greatly contributed to the success of this project.

We would like to thank the deanship of the college of medicine represented by **Assistant. Professor. Salwa Al-Ghomeri** the dean of the faculty of medicine, and **Assistant. Professor. Muneera Shaher Abdul jabber** the head of public health and community medicine, we also thank **Dr. Eman AL-Dawa'a** the director of academic affairs, and **Samah Al-Baidhani** the director of the college dean's office, for the academic and administrative coordination, which played an important role in the success of the project.

We would also like to thank the arbitrators of the study questionnaire **Dr. Abdulsalam Al-Aqal ,Dr.Anwer Al-Arhabi, and Dr.Fekri Al-Naib** for their collaboration in adjusting and modifying the questionnaire.

We would also like to acknowledge to **Teacher Saleh Al-Baadani**, faculty member at Exceed Language Center for his cooperation in amending the rules and wording of writing the research, also for our colleague from the first batch **Ezadeen Al-Selwi** who generously volunteered his time and shared his experiences for this study, also to our colleague from the fifth batch **Amr Al-humaiqani** for his assistance in data collection.

Finally, we would like to thank our families and friends for their unwavering support and encouragement throughout this journey. Their love and understanding have been our constant motivation.

Once again, we extend our heartfelt appreciation to everyone who played a part in this research endeavor.

Thank you."

# Dedication

First of all, we dedicate this work to our Almighty Allah who gives us the strength and knowledge in our everyday life.

We also dedicate this research to our loving families for their unwavering support and encouragement. Their belief in us has been a constant source of strength throughout our academic journey.

We also dedicate this work to our mentor, **Professor. Mojahed Measar**, **Assistant. Professor. Esmail Al- Hoothi** and **Assistant. Professor. Basheer Al- Nabahee**, whose guidance and expertise have shaped us into the researcher we are today. Thank you for your invaluable mentorship and belief in our abilities.

Lastly, we dedicate this research to all the participants who generously contributed their time. Their involvement was essential in obtaining meaningful results and advancing our understanding in this field.

This work is dedicated to all those who have supported and inspired us.

# Table Of Contents

# List of Figure

# List of Table

## List of Abbreviations:

| Abbreviations | Definition |
|---|---|
| **21UMAS** | 21 September university of medical and applied sciences |
| **BMI** | Body mass index |
| **CI** | Confidence interval |
| **CT** | Computed Tomography |
| **IBM** | International Business Machines |
| **IL** | Interleukin |
| **IVD** | Intervertebral disk |
| **LBP** | Low back pain |
| **MMPs** | Matrix metalloproteinases |
| **MRI** | Magnetic Resonance Imaging |
| **MSK** | Musculoskeletal |
| **NO** | Nitric oxide |
| **NSAIDS** | Nonsteroidal anti-inflammatory drugs |
| **Obs & Gyne** | Obstetrics and Gynecology |
| **OR** | Odds ratio |
| **PG-E** | Prostaglandin E |
| **PL-A** | Phospholipase A |
| **PLL** | Posterior longitudinal ligament |
| **PR** | Prevalence ratio |
| **SIJ** | Sacroiliac joint |
| **SPSS** | Statistical Package for the Social Sciences |
| **TB** | Tuberculosis |
| **TIMP-2** | Tissue inhibitor of metallopr-oteinase-2 |
| **TNF-A** | Tumor necrosis factor – A |
| **USA** | United States of America |
| **VAS** | Visual Analog Scale |

# Abstract

**Background:** Low back pain (LBP) is a prevalent issue among neurosurgeons and resident neurosurgeons. It is considered one of the most common work-related health problems in this profession. In order to gain a better understanding of this issue, this study was conducted to determine the prevalence of LBP and identify its associated risk factors among neurosurgeons and resident neurosurgeons in Sana'a.

**Methods:** Cross-sectional study among neurosurgeons and resident neurosurgeons in Sana'a was conducted; their names and workplaces were obtained from the Yemeni Medical Council and from the Yemeni Neurosurgical Society. Then we went to meet them at their place of work, either in private or public hospitals or in their private clinics. A self-administered questionnaire was utilized that consisted of 30 items divided into three parts, including demographic data, individual and occupational characteristics, and prevalence data with pain characteristics.

**Results**: The study included a total of 114 participants, with 93% (106) being male and 7% (8) being female. The prevalence of LBP among respondents was found to be 81.6%. Several individual and occupational characteristics were associated with the prevalence of LBP with a statistically significant ($P < 0.05$) value, such as body mass index ($p = 0.0105$), daily standing hours ($p = 0.0367$), weekly number of performed operations ($p = 0.01$), and daily sitting hours at work ($p = 0.0079$). Others might be associated, but with no statistically significant ($P>0.05$), such as age, gender, years of practice, stress, smoking, daily sleep hours, and job satisfaction. The most commonly reported options for relieving the pain among affected neurosurgeons were medication and rest.

**Conclusion:** A high prevalence of LBP was observed among neurosurgeons and resident neurosurgeons. Several identified risk factors highlight the need for their avoidance, and primary prevention strategies should be considered to minimize the occurrence of LBP in this population.



**Keywords: Low Back Pain, Neurosurgeons, Sana'a City., Yemen**

# Chapter 1: Introduction

## 1.1 Background:

Low back pain (LBP) is described as multifactorial biopsychological problem. It is defined as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain, which can be acute, subacute, or chronic. It affects children to the elderly and is a very common reason for medical consultations. **(Béatrice,2004)** The prevalence of LBP disorder has increased markedly during the past decades. **(Battié, Bigos, Fisher, 1989)** It's estimated that LBP approximately affects 80% of people. **(Chiodo, 2003)** In the USA, the incidence of LBP is 10-30% every year in the adult population and the prevalence of life is as high as 65-80% in adults. **(Hartvigsen et al., 2018), (Urits et al., 2019)** It's one of the major types of occupational injury mainly in the healthcare field as it is found to be almost twice more than other occupations, and different specialties were found to be at high risk as orthopedic, Obs and Gyn, physical therapist, nursing, and operation theater staff. **(Alzidani et al., 2019)** In Italy, it was discovered that among healthcare workers, LBP prevalence varied from 33% to 86%. **(Aslam et al.,2022)** It has found that LBP has a great impact on daily lifestyle, job performance, and may even reach disability and absence from work. **(Alzidani et al., 2019)** It also causes a considerable economic burden presenting a major cause of medical expenses, absenteeism, and disability. **(Tulder, Koes, Bouter, 1995)** In Australia, for example, there were 3.6 million medical consultations and 2.9 million prescriptions for back pain during 1993/1994, **(Mathers, Penm,1999)** while in the United States, expenditures incurred by individuals with back pain reached 90.7 billion U.S. dollars in 1998. **(Luo et al.,2004)** The direct costs of LBP in the UK, USA, and Australia represent between 0.19 and 0.42 of Gross Domestic Product, which is between 1.65% and 3.22% of the total health expenditure. **(Kent, Keating ,2005)** LBP can be due to numerous risks factors including gender, age, lifestyle, psychosocial profile, physical demands of the workplace, long operating room hours, social support, pain perception, prolong static postures, and repetitive movement of neurosurgeon-ns. **(Schneider, Randoll, Buchner,2006), (Lucasti et al.,2022)** It actually can have many causes, but most people (>85%) have nonspecific LBP, which could mean that the pain is not associated with any specific disease or abnormality in the spine. **(Aldawsary et al.,2018)** But sometimes it occurs as a result of a variety of other causes and pathological conditions such as trauma, inflammation, tumors, or degenerative disease; it may arise from diseases of intra-abdominal organs, including the liver, gallbladder, and pancreas. Also, referred pain is also seen among the diseases that give rise to LBP. Pain also arises from posterior abdominal organs,

including the uterus, ovaries, and urine bladder. The existence of psychogenic pain associated with hysteria and depression must also not be forgotten. **(HAYASHI,2004)** Diagnosis of LBP based on history and examination then investigated by X-ray ، CT or MRI according to the disease for confirmation the diagnosis. Because of the diverse etiology of LBP, there are various methods of treating it, and the principles of treatment:

- Curing the LBP by treating the underlying disease.
- LBP can be cured by surgery.
- Treatment without indications for surgery includes (rest- physical therapy- exercise therapy- orthosis-drug therapy-psychotherapy -guidance for everyday living). **(HAYASHI,2004)**

While many studies on LBP have primarily focused on nurses or other healthcare workers, neurosurgeons who are also affected by it were ignored. Additionally, a comparative study on different healthcare workers to investigate which type of healthcare work is at higher risk of LBP seems to be lacking.

In Sana'a City there was a study that focused on female nurses which was done in 2013, but no study has been conducted on the prevalence of LBP and its associated risk factors among neurosurgeons or even surgeons in general. Hence, this study was conducted to determine the prevalence of LBP and its associated risk factors among neurosurgeons and residents neurosurgeons in Sana'a, Yemen, in order to identify the risk factors associated with LBP, so that preventive interventions could be adopted for the aim of reducing MSK complaints.

## 1.2 Problem Statement:

Occupational health hazards are very common. Higher prevalence rates occur in the occupational settings. With promotion of industrial life, the prevalence of musculoskeletal disorders has increased markedly. The most common complaint in workers is LBP. As job nature of neurosurgeons included doing surgery on patients, awkward posture and may have to stand and/or sit for prolong period of time for examining and/or treating the patients. It's formed to be almost twice more common in neurosurgery than other occupations.

The problem to be addressed through this study is to determine the prevalence of LBP in neurosurgeons and residents neurosurgeons in Sana'a and its associated risk factors.

Therefore, by this study we'll provide neurosurgeons with how individual and occupational characteristics contribute to the risk of LPB.

## 1.3 Justifications:

- LBP is a very common medical issue which approximately affects 80% of people, and considered as one of the most occupational injury mainly in the healthcare field as it is found to be almost twice more than other occupations.
- Researches related to this type of disorder in Yemen are very rare and the data is very scanty.
- There are no studies that focus in prevalence of LBP among neurosurgeons or even surgeons in general in Yemen, therefore our goal in this study is to establish a database about the prevalence of LBP and its risk factors among this group of workers.
- To provide the neurosurgeons with the necessary awareness about the cases of LBP among neurosurgeons as well as the various risk factors such as, postures, long standing, workload and other related factors that would contribute to LBP in the course of their profession.

## 1.4 Hypothesis:

It's hypothesized that (LBP) has a high prevalence rate among neurosurgeons and residents neurosurgeons due to their exposure to a range of work-related risk factors, with a great impact on their daily lifestyle.

## 1.5 Research Question:

1) What is the number of neurosurgeons that have experienced LPB?
2) What is the relationship between LBP and a set of work and psychosocial related risk factors?
3) What is the characteristics of LBP?
4) What are the best treatment options for LBP?

## 1.6 Objectives:

### 1.6.1 General Study Objective:

The aim of this study is to assess the prevalence of LBP and its associated risk factors among neurosurgeons and residents neurosurgeons in Sana'a City.

### 1.6.2 Specific Study Objectives:

- To identify the number of neurosurgeons and residents neurosurgeons with LBP in different demographic groups.
- To explore the associations between LBP and a set of work- and job-related risk factors.
- To explore the associations between LBP and a set of emerging workplace psychosocial risk factors.
- To identify the characteristics of LBP among neurosurgeons and residents neurosurgeons.
- To identify what the best treatment options that were used for most affected neurosurgeons are.
- To provide the neurosurgeons with the necessary awareness about the cases of LBP among neurosurgeons as well as the various postures, workload and other related factors that would contribute to LBP in the course of their profession.

# Chapter 2: Literature Review

## 2.1 Review of Low Back Pain:

LBP is an extremely common health problem that can range from mild to severe and can be acute (short-term), subacute or chronic (long-term). It causes more global disability than any other condition. **(Andersson,1998), (Deyo et al.,1991)** It affects the lifestyle, work and physical activity of individuals. **(Abebe et al., 2015)**

## 2.2 Epidemiology of Low Back Pain:

LBP is the most common MSK condition that is frequently causing disability in both developing and developed countries. It was reported that about 70% to 85% of the population worldwide experience LBP at some time in their life **(Al-Ruwaili, Khalil, 2019)**

Locally, there is a study which was done in 2013, conducted by Sana'a University, reported that, out of 696 female nurses selected, 687 (98.7%) responded. The lifetime, the 12 month and one-week prevalence rates of LBP among female nurses were 512 (74.5%; 95% CI: 71.1–77.7%), 411 (59.8%; 95% CI: 56.0–63.5%) and 249 (36.2%; 95% CI: 32.6 39.9%), respectively. The prevalence was significantly lower in Indian nurses compared to other nurses. Three out of every 10 nurses with LBP had sick leave because of LBP in the last 12 months. Factors that showed significant association with LBP among nursing staff in the multivariate analysis were age, nationality, menstrual disorders and stress level at work. **(Ghilan et al.,2013)** But, there is no study has been conducted on the prevalence of LBP and its associated risk factors among neurosurgeons or even surgeons in general.

Globally, we found no study specifically done to neurosurgeons, however there are various studies that focused on physicians and surgeons in various specialties.

In 2018, a study was done in Taif to determine the prevalence and risk factors of LBP among surgeons. The prevalence data of LBP were pointing prevalence of 28 (20.3%), last month prevalence of 67 (48.6%), last year prevalence of 91 (65.9%), and a lifetime prevalence of 101 (73.2%). Some of the investigated individual and occupational characteristics associated with the prevalence of LBP with a statistically significant ($P < 0.05$) such as smoking, specialty, overall standing time, perceived level of stress, and using preventive strategies. Others might be associated but with no statistically significant ($P > 0.05$) such as age, gender, body mass index, and job satisfaction. Rest and painkillers are the best option for most of the affected surgeons to relieve the pain. **(Bin Homaid et al., 2016)**

In 2019, a study of occupational LBP among surgeons working at Ministry of Health hospitals in Jeddah, Saudi Arabia. It was done in two hundred and sixteen surgeons (69.9% males, mean age 39.03 years, median work: 5 years) responded. The prevalence of occupational LBP was 55.8% (95% CI: 49.0%, 62.3%); high rates of inadequate management and self-treatment had a notable impact on all 4 domains. Multivariate regression showed two independent protective factors (regular physical exercise [OR = 0.27, P = 0.002] and back health education [OR = 0.41, P = 0.031] and two independent risk factors (high exposure to risky activities [OR = 1.06, P = 0.048] and presence of chronic pain other than back pain [OR = 2.59, P = 0.012]). More than one in two surgeons are likely to suffer from occupational LBP. **(Aseri et al., 2019)**

In 2011, a study was done in Iran to determine the prevalence and risk factors associated with LBP among surgeons, the result of this study was point, last month, last six months, last year and lifetime prevalence of LBP was 39.9%, 50.2%, 62.3%, 71.7% and 84.8%, respectively. The highest point prevalence was related to the gynecologists with 44.9%, and the lowest for general surgeons (31.7%). Age, body mass index, smoking, general health, having an assistant, job satisfaction, using preventive strategies and years of practice was found to be correlated with the prevalence of LBP (P <.05 in all instances except for age and job satisfaction). Prolonged standing, repeated movements and awkward postures were the most prevalent aggravating factors (85.2%, 50.2% and 48.4%, respectively). Rest was found to be the most relieving factor (89.5%). **(Bandpei et al., 2011)**

In 2022, a study was done in western New York to determine the Prevalence of back and neck pain in orthopedic surgeons, the result of this study was: Seventy-seven percent of respondents reported back pain, whereas74% reported neck pain, both of which are greater than those seen previously. Sixteen surgeons reported receiving medical treatment currently or in the past for their MSK pain. Fourteen surgeons said that their pain has caused them to adapt their practice and/or operating room setup. **(Lucasti et al., 2022)**

In 2022, a study was done to estimate the prevalence of LBP among physicians in Erbil city and to detect its related risk factors. The result has been found that the mean BMI difference between the two groups, with and without LBP, was (27.84 ± 1.18Vs 25.46 ± 1.28) with a significant p= 0.003. The proportion with irregular sleep was (83.07% Vs 22.53%) among both groups respectively with a statistically significant p=0.032. The overall prevalence rate of LBP among physicians was 78.6%; 71.4% were males and only 28.6% were females with a significant p=0.0-01. The result of logistic regression for the overweight, obese, regular sleeping, and lifting heavy objects, OR with 95% confidence

intervals, were; 3.40 (0.37-30.6), 2.36(0.5-10.3), 1.57 (0.99-2.48), and 2.63(1.63-4.25) respectively. **(2022, Mala, Aram, Media)**

In 2023, a study was done to deduce the prevalence of LBP among medical doctors in the teaching hospitals of Karachi, Pakistan, along with its associated variables and the functional disability accompanying it. The result was: seventy percent of medical doctors included in this study suffered from the problem of LBP, with 68% experiencing it over the last 3 months to 1 year. Furthermore, 89% and 11% suffered from minimal and moderate disability, respectively, affecting day-to-day and work life. Moreover, this study also found a significantly positive association (p value $< 0.05$*) of LBP with age and work-related characteristics and was more common in those with work experience between 1 and 10 years, >8 working hours, >4 standing hours, and belonging to the surgery and medicine specialties. The association was significantly positive according to the chi-square/Fischer exact test. **(Javed et al., 2023)**

In 2017, a study was done to determine the prevalence, perception and correlates of LBP among healthcare workers in tertiary health institutions in Sokoto, Nigeria. The mean age of the study participants was 36.99 ± 8.23 years. The lifetime, annual, and point prevalence of LBP among the participants were 56.2%, 39.1% and 17.2% respectively.151 (83.9%) of the 180 participants that have ever experienced LBP reported that it commenced after starting work, and they perceived it to be due to standing for long hours (57.2%), awkward postures (22.2%) and carrying heavy objects / patients at work (20.6%). Older age, female sex, longer duration of practice, overweight/obesity, and lifting heavy objects/patients at work were significantly associated with LBP among the participants. **(Awosan et al., 2017)**

In 2008, a study in a Kuwait hospital was done to determine the prevalence and risk associated with LBP among health professionals working, the response rate to the survey was 60% (n= 344). Lifetime prevalence of LBP in the sample was 70.9%, and point prevalence of LBP was 21.5%. Factors associated with acute LBP included direct patient contact (P = 0.015), performing patient lifts and/or transfers (P = 0.016), low job satisfaction (P = 0.039), and poor self-reported health status (P = 0.019). The prevalence ratio of reporting acute LBP was also found to increase as a function of the number of daily lifts/transfers performed (PR: 1.4; 95% CI:1.27 to 1.70). Other factors generally associated with LBP, such as age, sex, professional experience, smoking and exercise, were not found to be significantly associated with LBP in this study. **(Landry et al., 2008)**

In 2017, a study was done in Slovenian hospitals among nurses. Results revealed a prevalence of LBP among 85.9% of respondents. Relevant risk factors included female gender, age, length of employment, years in current position, shift work and the number of nurses per shift. **(Savič, Pesjak, Touzery, 2017)**

In 2001, a study was done in Hong Kong to measure the magnitude of LBP among Hong Kong nurses and its association with the work-related psychological strain and patients handling activities. The result of the 377 nurses interviewed, 153 (40.6%) reported having LBP within the last 12 months. With symptoms of LBP as the outcome, risks were increased where nurses self-reported that they only occasionally or never enjoyed their work [adjusted odds ratio (OR) 2.07], where frequent manual repositioning of patients on the bed was required (adjusted OR 1.84) and where they were required to assist patients while walking (adjusted OR 2.11) after adjustment for other potential confounders. **(Yip,2001)**

In 2022, a study LBP Among Nurses in a Tertiary Care Teaching Hospital at Malappuram Kerala was done, and the result of this study was: among 220 nurses, 89 (40.4%) complained of mild LBP, 86 (39.09%) complained of moderate pain, and seven (0.03%) of them had severe LBP. Due to LBP, among the 182 (82.7%) nurses who have LBP, 46 of them had to take one or more days' leave from work. Thirty-six nurses have had LBP for more than four years. As a mode of treatment, 43 nurses have taken either medicine or injection, 25 of them have taken rest, four are on Ayurvedic (Natural) treatment, and 110 nurses haven't taken any treatment. **(Kanakkarthodi et al., 2022)**

## 2.3 Risk Factors of Low Back Pain:

Back pain is a complex and multifactorial condition that likely develops as result of the interaction between several risk factors. **(Diatchenko et al., 2013)**, many individuals will experience an episode of acute LBP at least once in their lifetime. However, some risk factors are associated with a higher occurrence of LBP. Systematic reviews of risk factors for LBP have suggested that physical risk factors (such as prolonged standing and lifting the heavy weights), an unhealthy lifestyle (such as smoking and obesity) and psychological factors (such as distress and expectations that pain indicates bodily harm or injury) increase the risk of a back pain episode. **(Vlaeyen et al., 2018)** Other risk factors that developed LBP as sociodemographic factors as (age, it is one of the most common risk factors of LBP. Some studies have found incidence is highest in the third decade **(Kopec, Sayre, Esdaile, 2004), (Waxman, Tennant, Helliwell, 2000), (Reigo, Timpka, Tropp,1999)**, gender: a study in

United States in 2013 reported that LBP is found more frequently among females than males, with females representing 55% of healthcare resource visits.

Back disorders, particular, are more common in females, while disc disorders and back injuries are recorded similarly between sexes. Over 8 in 10 (84.4%) female healthcare visits in 2013 for LBP were classified as back disorders, compared to 80.4% for males. This is probably a reflection of the prevalence of spinal stenosis and degenerative spondylolisthesis in both sexes, as show in figure (2.1). **(Andersson, Gunnar, 2008)** While other studies have found no significant gender differences in the prevalence of LBP**,** race and marital status). **(Maher, Underwood, Buchbinder ,2017), (Linton, Hellsing, Halldén,1998) (Toroptsova et al., 1995)**

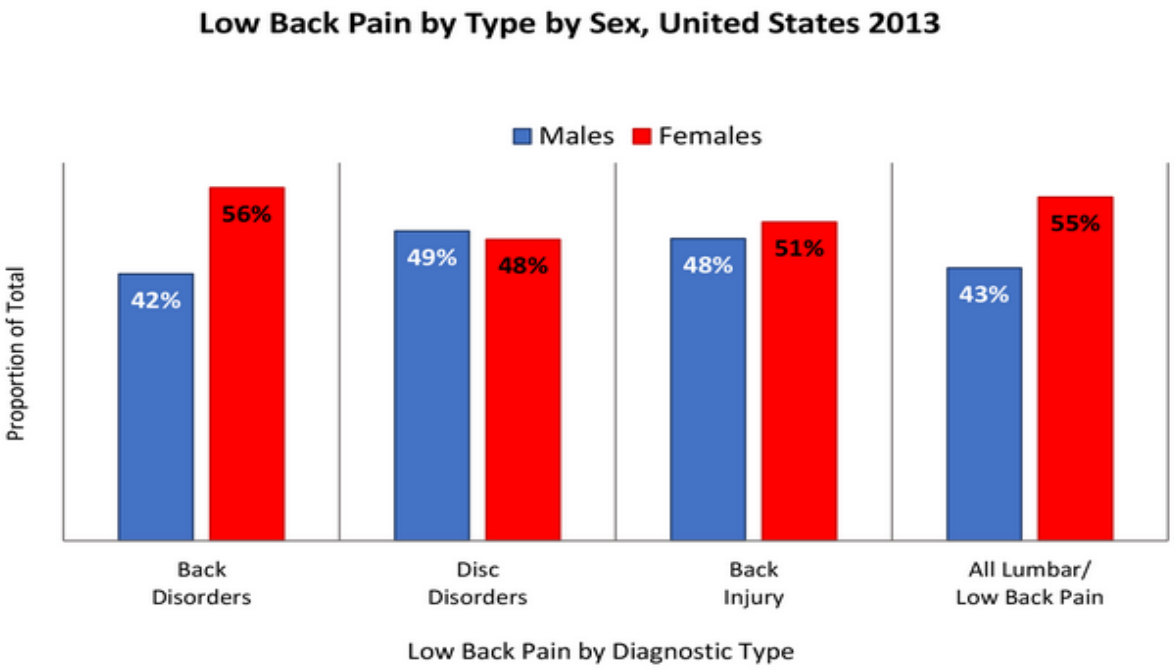



**Fig. 2.1 Low Back Pain by Diagnostic Type by Sex, United States 2013**

## 2.4 Etiology of Low Back Pain:

LBP is clearly an important health problem whose etiology is largely indefinable. **(Lee et al., 2014)** Studies suggest that LBP may arise from any one of a number of anatomical structures, including bones, intervertebral discs, joints, ligaments, muscles, neural structures and blood vessels. **(Galukande, Muwazi, Mugisa ,2005)**

The most common etiologies:

**Infective:** Spinal infections include spondylodiscitis, vertebral osteomyelitis, epidural abscess, and rarely facet joint infection. Bacterial infections are divided into pyogenic (e.g., *Staphylococcus* aureus and *S. epidermidis*) and granulomatous diseases (e.g., tuberculosis, brucellosis). Although rare, these disorders are associated with a substantial mortality; up to 3% for epidural abscesses, 6% for spinal osteomyelitis, and possibly as high as 11% for pyogenic spondylodiscitis. **(Galukande, Muwazi, Mugisa ,2005)**

**Tumors:** Spinal tumors usually manifest themselves initially with nonspecific pain, and later with general functional deficits. An actual swelling is seen in only 16% of cases. The vast majority of spinal tumors (96%) are metastases. The remaining 4% consist of primary benign and malignant tumors and so-called tumor-like lesions. **(Hoy et al.,2010)**

**Traumatic:** The spine can be injured in a traumatic event involving massive force, with resulting LBP, but spinal fractures often arise spontaneously or after relatively mild trauma, generally because of osteoporosis. The incidence of radiologically detectable fractures in 55- to 79-year-old women is 1% per year; in men in the same age group, it is 0.6% per year. A woman over age 50 has a more than 60% chance of sustaining an osteoporotic fracture. **(Kehrer et al., 2014)**

**Inflammatory and degenerative lesions**: are also important.

Other causes in addition to diseases that arise in the structures that compose the lower back, which is the pivot of the body, pain arising from diseases of intra-abdominal organs, including the liver, gallbladder, and pancreas, and referred pain are also seen among the diseases that give rise to LBP. Pain also arises from posterior abdominal organs, including the uterus, ovaries, and urine bladder. The existence of psychogenic pain associate with hysteria and depression must also not be forgotten. **(Casser, Seddigh, Rauschmann,2016)**

## 2.5 Pathophysiology of Low Back Pain:

The relationship between intervertebral disk degeneration and LBP is not clearly understood. It appears that alteration in biomechanical properties of the disk structure, sensitization of nerve endings by release of chemical mediators, and neurovascular ingrowth into the degenerated disks all may contribute to the development of pain. Degenerated disks may have notable ingrowth of nerve fibers and blood vessels within the inner anulus fibrosus and nucleus pulposus. The loss of disk structure also alters the loading response and alignment of the rest of the spinal column, including that of the facet joints, ligaments, and paraspinal muscles, which eventually may become additional pain generators. Back and radicular pain can be present even in the absence of distinct morphologic changes conversely

many patients report no pain, even in the presence of marked degeneration. Autologous nucleus pulposus has been shown to produce inflammatory and degenerative changes consistent with damage to the nerve root without mechanical compression.10-12 recently, the concept of local chemical mediation of pain by the injured tissue has gained favor. Several cytokines have been identified that may be responsible for chemical mediation of pain (2.2). Similarly, endogenous inhibitors of these cytokines have been isolated. The presence of NO has been detected in the granulation tissue around the extruded IVD by histochemical techniques and in situ hybridization.

Some investigators have implicated phospholipase A2, derived from the herniated nucleus pulposus, in the production of pain by irritating nerve roots, but others deny its role in causing pain. Allograft and autograft intervertebral disk tissues have been shown to produce hyperalgesia in the rat. From their animal experiments, Kawakami and colleagues concluded that autologous nucleus pulposus implanted on the lumbar nerve roots produce mechanical hyperalgesia, and anulus fibrosus provokes thermal hyperalgesia.

**Table. 2.1 Common Chemical Substances and Their Functions**

**Common Chemical Substances and Their Functions**

| Chemical Substance | Function |
|---|---|
| Phospholipase $A_2$ | Mediates mechanical hyperalgesia |
| Nitric oxide | Inhibits mechanical hyperalgesia and produces thermal hyperalgesia |
| MMP-2 (gelatinase A) and MMP-9 (gelatinase) | Degrade gelatin (denatured fibrillar collagens) and other matrix molecules<br>Act synergistically with MMP-1 |
| MMP-1 (collagenase-1)<br>MMP-3 (stromelysin-1) | MMP-1 degrades collagen<br>Both MMP-1 and MMP-2 may play a role in spontaneous regression of the herniated disk |
| IL-1, TNF-α, prostaglandin $E_2$ | Promote matrix degradation<br>Enhance production of MMPs |
| CGRP, glutamate, substance P (neurotransmitters) | Modulate dorsal root ganglion responses |
| IL-6 | Induces synthesis of TIMP-1 |
| TIMP-1 | Inhibits MMPs |
| TGF-β superfamily | Blocks synthesis of MMPs |
| IGF-1, PDGF | Have an antiapoptotic effect |

CGRP = calcitonin gene–related peptide; IGF = insulin-like growth factor; IL = interleukin; MMP = matrix metalloproteinase; PDGF = platelet-derived growth factor; TGF = transforming growth factor; TIMP = tissue inhibitor of metalloproteinase

Mechanical hyperalgesia is probably mediated by activation of phospholipase A2 because mepacrine, which is a relatively selective inhibitor of phospholipase A2, abolishes mechanical hyperalgesia produced by the nucleus pulposus. Thermal hyperalgesia produced by autologous anulus fibrosus may be induced by direct effects of NO at the level of the dorsal root ganglion. Kawakami et al speculated that NO paradoxically may inhibit mechanical hyperalgesia and produce thermal hyperalgesia, depending on the amount of nitric acid produced after the disk material is applied. Matrix metalloproteinase (MMPs) belong to a family of zinc-dependent enzymes capable of degrading extracellular and basement membrane components. MMPs are responsible for nor mal extracellular matrix remodeling in connective tissues. Active forms and inactive preforms of MMP-2 and MMP-9 have been found to be elevated in degenerated intervertebral disk specimens, and MMP-1 (collagenase-1) and MMP-3 (stromelysin-1) have been implicated in the pathogenesis of disk herniation.

MMP activity also is thought to be more prevalent in IVD herniation than in other intervertebral disk disorders. Kang et al noted increased in vivo production of MMP in herniated lumbar disks from patients undergoing diskectomy compared with diskectomy specimens from patients undergoing anterior surgery for scoliosis and traumatic burst fractures. Extrusion of nucleus pulposus into the epidural space evokes an autoimmune response and inflammatory cell infiltration. These inflammatory cells, in turn, secrete chemotactic cytokines, which further recruit the macrophages. Cytokines, such as interleukin-1 (IL-1) and tumor necrosis factor-α (TNF-α), are believed to enhance production of MMP. Takahashi et al performed a biochemical and in immunohistochemical analysis of disk tissues in 77 patients with herniated IVD and noted increased production of prostaglandin E2 as well as the presence of IL-1, IL-6, and TNF-α. MMP is produced by invading blood vessels, perivascular tissues, and locally present disk cells. The presence of capillary invasion and fibrous tissue has been well documented. In surgically Removed sequestered or extruded disk specimens. Expression of MMP-1 and MMP-3 has been noted to be higher in the granulation tissue, chondrocytes, macrophages, and fibroblasts from transligamentous extrusion and sequestered specimens than from protruded intervertebral disks. This finding suggests that inflammatory tissue rich in these proteinases causes degradation of the disk material and the collagen contained within the posterior longitudinal ligament (PLL), leading to weakening and eventual rupture of the PLL. An alternative scenario would be an increase in the production of MMP after the PLL has ruptured. A more likely explanation is a synergistic effect in which increased granulation tissue forms when the PLL is torn, and vice versa. It appears that preforms of MMPs, such as prostromelysin,

are secreted by intervertebral disk cells and that these preforms subsequently may become activated by cytokines. Sedowofia et al reported that a latent form of collagenase is 3.5 times more abundant than the active form in the nucleus pulposus. They also reported that the quantity of latent collagenase is 1.5 times greater than the active form in the anulus fibrosus.

Endogenous tissue inhibitors of MMPs also have been identified. The tissue inhibitor of metalloproteinase-2 (TIMP-2) is expressed at low levels in all tissues, whereas TIMP-1 expression is increased in diseased intervertebral disk material. An imbalance between MMPs and endogenous TIMP may play an important role in the degenerative process by inducing disk resorption. Doita et al demonstrated that, when stimulated by IL-1α, IL-1β, and TNF-α, cells isolated from extruded disk material produced greater amounts of MMP-1 and MMP-3 in vitro than did cells from protruded disk material. The MMP-3: TIMP ratio was higher in the extruded disk material than in the control group. IL-6 is believed to increase the production of TIMP-1. MMPs also may play a role in the natural history of IVD herniation. The spontaneous regression primarily of large herniated disks versus protruded disks over time is thought to be related to the increased synthesis of the MMPs.

Although the precise mechanism of intervertebral disk resorption remains unclear, neovascularization, macrophage infiltration, and inflammatory cytokines are believed to be integral to this resorptive process. Inflammatory cytokines such as IL- 1, IL-6, and TNF-α induce and enhance the expression of MMPs, leading to regression of a herniated intervertebral disk. Fibroblast growth factors also may regulate the proteolytic activity in herniated disk material. Brown et al speculated that there is proliferation of vascularity and sensory nerves containing calcitonin gene–related peptide in the endplate region and vertebral body adjacent to the degenerate disk. The increase in the density of sensory nerves and the presence of cartilage plate defects suggest a potential role of end plates and vertebral bodies as pain generators in patients with degenerated intervertebral disks. **(Casser, Seddigh, Rauschmann,2016)**

## 2.6 Clinical Picture of Low Back Pain:

An accurate history and physical examination are essential for evaluating LBP.

### 2.6.1 By History the Classical Presentation:

Often, patients awaken with morning pain or develop pain after minor forward bending, twisting, or lifting. Pain from spine structures, such as musculature, ligaments, facet joints, and disks, can refer to the thigh region, but rarely to areas below the knee. Pain related to the sacroiliac joint often refers to the thigh but can also radiate below the knee. Irritation,

impingement, or compression of the lumbar root often results in more leg pain than back pain. It is also important to note whether it is a first episode or a recurrent episode. Recurrent episodes usually are more painful with increased symptoms. **(Hayashi, Yasufumi,2005)**

### 2.6.2 By Neurological Examination:

When LBP has been determined to be of skeletal origin based on the history, proceed to inspection and palpation of the lower back.

The diagnostic methods are shown in Fig. 2.2. First, inspect for curvature of the spinal column anteriorly, posteriorly, and to the right or left. No curvature to the right or left is seen in normal persons, but when the spinal column is curved laterally and tilted in just one direction, interpret it as representing scoliosis in an effort to avoid pain, and consider lumbar intervertebral disc hernia or intervertebral disc degeneration. If the center of the scoliosis is in the thoracic spine and compensatory scoliosis in the opposite direction in the lumbar spine gives the spine as a whole the shape of the letter "S", consider idiopathic scoliosis. When the lower back protrudes posteriorly in a gentle manner, interpret it as representing kyphosis, and consider Scheuermann's disease (juvenile kyphosis) if the patient is young, and osteoporosis if the patient is an elderly woman. If the posterior protrusion of the lumbar portion of the back is steep, it often represents an old case of tuberculous spondylitis. A state in which the flexion and extension movements of the spinal column is as rigid as bamboo and exhibits stiffness in spondylosis deformans, ankylosing spinal hyperostosis, and ankylosing spondylitis.

Intense LBP and stiffness of the spinal column occur in the initial stage of tuberculous spondylitis and in purulent spondylitis. In diseases in which pain is elicited by tapping or palpating spinal processes at the center of the posterior of the spinal column, there is spinal metastasis by a malignant tumor or a vertebral body fracture in addition to the above-described spondylitis. When tenderness is elicited in the para-vertebral muscles immediately adjacent to the lumbar spine, consider acute muscular LBP (sprained back), caused by a sudden tear of muscle or fascia in the same area, or chronic muscular LBP.

In lumbar spinal stenosis, tenderness is observed along the ends of the gluteus major nerve in the superolateral area of the buttocks or along the center of the posterior aspect of the thigh. While touching the spinal processes of the lower 3 lumbar vertebrae, have the patient flex and extend the lumbar spine, and palpate the vertebral bodies for instability, in other words, to see whether they slide due to spondylolisthesis.

In addition to examining the lower back, other methods that are useful in making a definitive diagnosis of LBP are the stiffness test, in which the patient bends forward and the distance between the fingertips and the floor is measured, and the straight leg raising test, in which the legs are raised with the knees extended in the supine position. Testing sensation, muscle strength, and ten-don reflexes in the legs and determining whether paralysis is present in the area supplied by the sciatic nerves are also important from a diagnostic standpoint. **(Biyani, Ashok, Andersson,2004)**

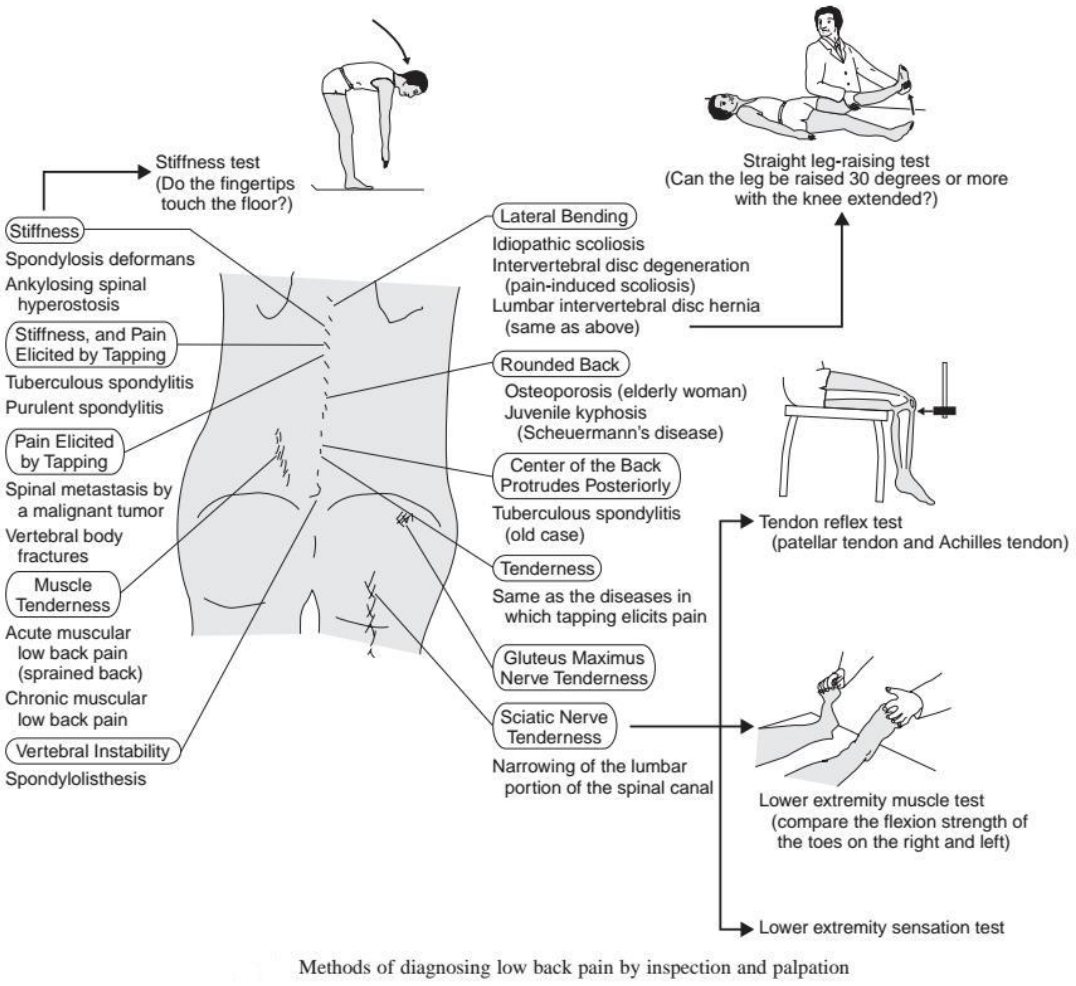



**Fig. 2.2 Methods of Diagnosing Low Back Pain by Inspection and Palpation**

## 2.7 Investigation and Evaluation of Low Back Pain:

Imaging is not warranted for most patients of LBP. Without signs and symptoms indicating a serious underlying condition, imaging does not improve clinical outcomes. **(Hayashi, Yasufumi,2005)** If the pain acutely worsens, or persists and remains intractable for six weeks or more, an imaging study is indicated. Magnetic resonance imaging (MRI) is usually most appropriate. Computed tomography (CT) is an alternative if MRI is contraindicated or unavailable.

Clinical correlation of MRI or computed tomography findings is essential because the likelihood of false-positive results increases with age. Radiography may be helpful to screen for serious conditions, but usually has little diagnostic value because of its low sensitivity and specificity. **(Casser, Seddigh, Rauschmann,2016)** Laboratory testing No laboratory tests should be obtained except to evaluate specific disease entities that are suspected on the basis of the history and physical examination.

Ancillary laboratory testing is needed if there is clinical evidence that the pain has a specific cause. **(Holt et al.,2011)**

## 2.8 Treatment and Outcomes:

Strategies for preventing and managing LBP include maintaining a healthy weight, regular exercise, adopting proper body mechanics and ergonomics, avoiding prolonged sitting or standing, using supportive mattresses and chairs, and managing stress. Treatment approaches may involve a combination of medication, physical therapy, exercise, heat or cold therapy, and in some cases, surgery, the principles of treatment are:

**Treatment of the causative disease:**

Treatment of the underlying disease causing the pain is given priority in patients complaining of LBP originating in abdominal or posterior abdominal organs. Similarly, treatment with anticancer drugs, radiation therapy, etc., must be considered in patients complaining of LBP who have spinal metastases of malignant tumors or bone lesions produced by multiple myeloma.

**Conservative therapy:**

Rest is usually advised as the first method of reducing LBP, without considering surgery. Rest can be approached in two ways, by restricting daily activity and by attempting to achieve local rest by fixing the lower back with a corset, etc. Among physical therapy modalities, in addition to thermotherapy with hot packs, disposable body warmers, and

bathing, pelvic traction by applying traction force to the lumbar spine is an effective means of physical therapy for lumbar intervertebral disc hernia.

**Thermotherapy:**

Is contraindicated for LBP caused by inflammation or tumors.

**Exercise therapy:**

Such as performing relaxation and stretching exercises to eliminate muscle tension, creating a "natural" corset by abdominal and low back muscle training, and attempting to strengthen bones by imposing mechanical loads on them are useful in treating LBP. Scoliosis and kyphosis cannot be completely corrected with orthoses, but they have the advantage of preventing progression and instilling a sense of security.

**Pharmacotherapy:**

Several systematic reviews have concluded that strong evidence supports the use of NSAIDS for non-neuropathic LBP, though the treatment effect is small and the evidence is greater for acute than chronic pain. Paracetamol (acetaminophen) is slightly less effective than NSAIDs but has fewer or less severe side effects. Minimal evidence exists that non-steroidal anti-inflammatory drugs are effective for radiculopathy, or that one drug is better than others. **(Chou et al.,2007)**

**Surgery:**

Surgical interventions for LBP secondary to major pathologies such as infections, tumors, and fractures are often effective in protecting neurological structures, preventing deformity, and relieving pain. In patients with persistent radiculopathy resulting from common degenerative conditions, surgery can reduce pain and improve function. For disc herniations without severe neurological deficits, the main benefit of surgery may be a more rapid return of function compared with the natural course.

Compared with nonoperative therapy, surgical intervention for spinal stenosis and spondylolisthesis results in superior outcomes, which persist for at least two years after surgery. **(Weinstein et al., 2008)** In patients with chronic LBP who present with common degenerative changes seen on imaging, surgical interventions (fusion or disc arthroplasty) are less effective. Whether surgery in this group gives much better results than a comprehensive rehabilitation programmer with cognitive behavioral therapy is not clear. Only 15-40% of patients can expect a highly functional outcome after surgery. **(Riew et al., 2006) .**

# Chapter 3: Materials and Methodology

## 3.1 Study Setting:

The setting for this study was large public hospitals, large private hospitals and doctor's clinics in Sana'a city.

## 3.2 Design of Study:

This study is cross-sectional study which was conducted through self-administered structured English questionnaire.

## 3.3 Study Population:

The study population for this study was neurosurgeons, whether consultants, specialists, or residents of both male and female gender in Sana'a city according to the data base that was taken from the Yemeni Medical Council and from the Yemeni Neuro Surgical Society with a number of 150 neurosurgeons.

## 3.4 Simple Size:

The sample size of this study was all the sample that was mentioned in the study population except 7 individuals were temporarily outside Sanaa, 8 individuals couldn't be reached because of busy schedule, 4 individuals refused to participate, and 17 individuals were as exclusion criteria.

## 3.5 Data Collection, Tools and Techniques:

We have obtained the database of neurosurgeons from the Yemeni Medical Council and from the Yemeni Neuro Surgical Society and went down to meet them at their place of work, whether at their place of work in private or public hospitals, or even their private clinics.

The data was collected through a self-administered questionnaire. The self-administered questionnaire was good in clarifications and additional probing, enabling a more comprehensive understanding of the participants. The questionnaire was designed to gather information on various aspects related to the research topic. It has been revised by three expert doctors, which enhances the reliability of the questionnaire and the quality of the measures

used to collect the data. This also contributes to ensuring that the questions and required information are accurate and valid.

The questionnaire consisted of three sections, each addressing different areas of interest:

- The first section is socio-demographic data. This included information such as age, sex, BMI, marital status, body fitness and exercise, and habits. These details are vital for understanding the characteristics of the study population and analyzing any potential correlations.
- The second section was formed to gather information related to the participants personal characteristics that may carry potential risk of LBP. This involved questions about the years of practice, duration of time that spend sitting on chair, number of preformed operations. A horizontal 10-point Visual Analogue Scale is used to assess the stress level during work and work satisfaction. For stress measuring, point number one on the scale indicates no stress at all, while Point number ten represents extremely high levels of stress. **(Lesage, Berjot ,2011)** Similarly for work satisfaction level, point number one represents being extremely dissatisfied while Point number ten represents being extremely satisfied. **(Ugwu et al., 2007)**
- The third section was formed to assess the prevalence of LBP and its characteristics. Participants were asked about time of the first attack, the duration of pain, frequency, radiation of pain, primary cause, sick leave, type of prevention and treatment that are used, and severity of pain. Similarly, the severity was assessed by using a 10-point horizontal Visual Analogue Scale (VAS), in which point number one indicates absence of LBP, while point number 10 indicates the worst pain. **(Huskisson,1982), (Huskisson,1974)**

## 3.6 Inclusion and Exclusion Criteria:

### 3.6.1 Inclusion Criteria:

Neurosurgeons who are in Sana'a city, whether consultants, specialists, or residents.

### 3.6.2 Exclusion Criteria:

- Participants, who have any fracture or disorder in the pelvic region.
- participants with spinal deformities, osteoporosis, back or spinal tumor, or any other malignancies.
- Residents neurosurgeons who have not taken the first written exam.

## 3.7 Statistical Analysis:

- The collected data was analyzed by computer using IBM Statistical Package for the Social Sciences (SPSS) version 27.
- Descriptive statistics was used to describe participants' demographic characteristics.
- Categorical data was reported as frequencies and percentages
- To measure the associations between two qualitative variables proportion was used to summarize the data, and the difference of the proportions in the subgroups was determined and subjected to the tests of significance (Chisquare, $P < 0.05$ as statistically significant)

## 3.8 Ethical Considerations

Ethical considerations are going to submit the following conditions:

Ethical considerations submitted the following conditions:

- Approval and dispatch: They were obtained from 21UMAS, and from community medicine department in 21UMAS to the hospitals that we have mentioned in the Study Setting.
- Anonymity, confidentiality and privacy: This is obtained by keeping secret by not identifying the ethnic or cultural background of respondents, refraining from referring to them by their names or divulging any other sensitive information about a participant. (Mugenda,2011) This is why, we promised to protect the information given in confidence by the respondent. But, if any information had to be revealed, then we took a consent from the respondent. This enhances honesty towards the research subjects by protecting them from physical and psychological harm, ensuring that in our research questionnaire there's was no embarrassing questions which can disguise or even shock the respondent.
- Beneficence: The concept of beneficence means, "doing good". **(Churchil, L.R 1995)** It was one of our roles to sit in direct contact with a participant and explain the purpose of the study and the benefits that would accrue from it, far from exaggerating or minimizing the benefits. It's also the examination of the benefits of the study that leaded us to examine the concept of beneficence in research which according to Beauchamp and Childress, **(Beauchamp & Childress, 2001)** and Mugenda, **(Mugenda,2011)** is associated with the Hippocratic "be of benefit, do not harm".The major purpose of maintaining ethics in research is to serve and promote the welfare

of people and avoid bias or deception.

- Non deception: Telling the participant part of the truth or completely denied the truth, could lead to deception. Such a situation occurs if the researcher is biased when conducting a survey or conducts research just to protect the sponsor of the research project. **(Blumberg,2005)** In our survey, we didn't tell the participant anything except the truth for the purpose of avoiding falling into deception.
- Non-maleficence: Beneficence asserts the usefulness of the study while, non-maleficence expresses the potential risks of participation.

It emphasizes on what constitutes harm which could be physiological, emotional, social or even economic in nature. **(Burns & Grove, 2005)** The concept of non-maleficence focuses on avoiding harm. It centers on the fact that; it is important to prevent any intentional harm or minimize any aspect of potential harm by refraining from injuring the respondent. The maleficence could be physically or psychologically:

- Physically: This is as a result of medical intervention, medical images, even by taking samples or others. But in our study, nothing of these was requested, so it had nothing to do with physical injuries.
- Psychologically: This could be by either asking questions which are embarrassing, disappointing, or forcing people to divulge information which could result in anxiety or even fear among the respondents. **(Journal of Educational Policy and Entrepreneurial Research,2017)**

To avoid this, we tried to be far as much as possible from these questions in the questionnaire of the study.

- Voluntary and informed consent: This is one of the major ethical issues in conducting research which implies the fact that "a person knowingly, voluntarily, intelligently, and in a clear and manifest way, gives his or her consent" in participating in the Study **(Arminger, B. 1997)**, and we did these all.

# Chapter 4: Results

## 4.1 Socio-demographic Data

### 4.1.1 Age Group

**The table 4.1** classifies the participants according to their age which is found that, participants who are in the age of 25-35 years, 36-45 years, 46-55 years, 56-65 years and above this age, are 53 (46%), 45 39%, 12 (11%), 4 (4%) and 0 (%0) respectively.

**Table 4.1 Distribution of Study Sample by Age Group**

| Variable | Characteristics | Frequency | % |
|---|---|---|---|
| Age | 25-35y | **53** | 46% |
| | 36-45y | **45** | 39% |
| | 46-55y | **12** | 11% |
| | 56-65y | **4** | 4% |
| | More | **0** | 0% |

### 4.1.2 Sex

**The table 4.2** classifies the participants according to their sex which is found that,106 (93%) are male, while 8 (7%) are female.

**Table 4.2 Distribution of Study Sample by Sex**

| Variable | Characteristics | Frequency | % |
|---|---|---|---|
| Sex | Male | **106** | 93% |
| | Female | **8** | 7% |

## 4.2 Prevalence of Low Back Pain

### 4.2.1 Prevalence of Low Back Pain

**Figure 4.1** shows the prevalence of LBP among neurosurgeons and residents neurosurgeons, which was 81.6%.

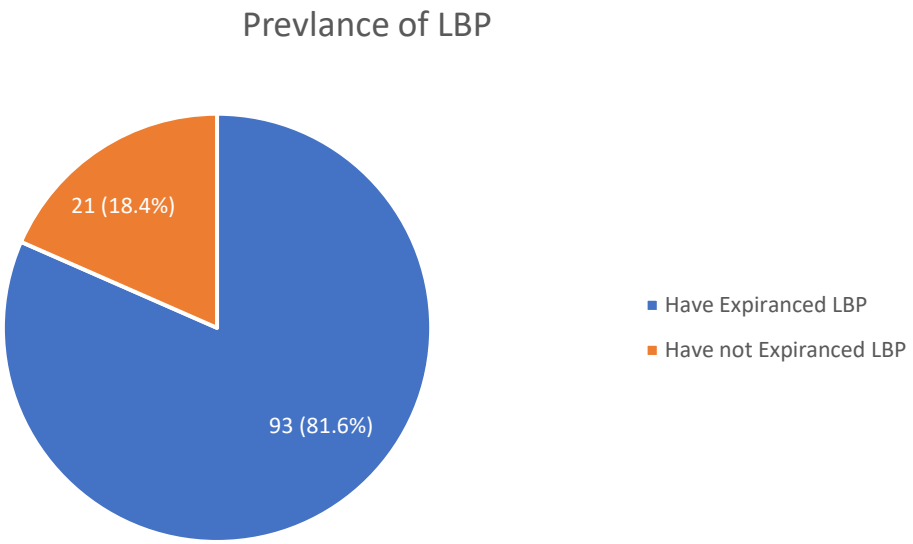



**Fig. 4.1 Prevalence of Low Back Pain among Neurosurgeons and Residents Neurosurgeons**

### 4.2.2 Time of the First Attack of Low Back Pain

**Figure 4.2** shows the time of the first attack among the affected individuals, in which 68 (73.1%) of the affected individuals, had their first attack of LBP only after they have started to work as neurosurgeons, while 25 (26%) had their first attack of LBP before they have started to work as neurosurgeons.

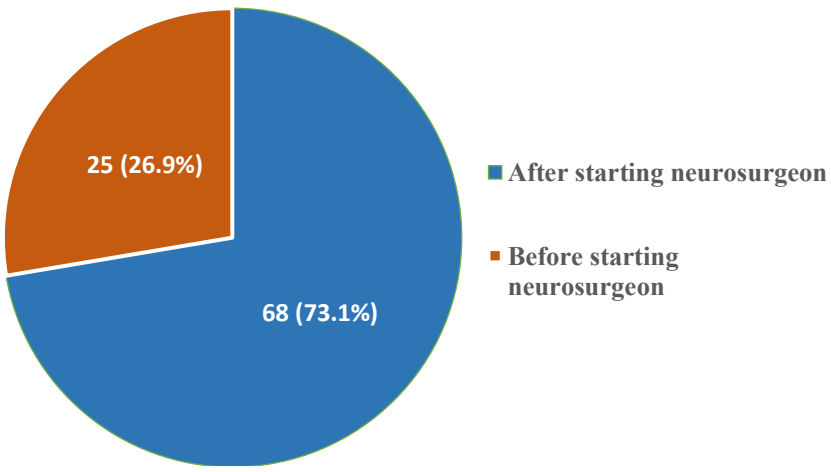



**Fig. 4.2 Time of The First Attack of Low Back Pain**

### 4.2.3 After How Many Years of Practicing Neurosurgery Did, They Have There Frist Attack

**Table 4.3** shows the time of after how many years of practicing neurosurgery they had their first attack of LBP, which is found that 44 (65%) had their first attack in 1-5 years of practicing neurosurgery, 14 (21%) had their first attack in 6-10 years, 7 (10%) had their first attack in 11- 15 years, 1 (1%) had his first attack in 16-20 years, and 2 (3 %) had their first attack in more than 20 years of practicing neurosurgery.

**Table 4.3 After How Many Years of Practicing Neurosurgery Did They Have There Frist Attack**

| Years | Frequency | % |
|---|---|---|
| **1-5y** | **44** | 65% |
| **6-10y** | **14** | 21% |
| **11-15y** | **7** | 10% |
| **16-20y** | **1** | 1% |
| **More** | **2** | 3% |
| **Total** | **68** | 100% |

## 4.3 Association between Sociodemographic Variables and Low Back Pain

### 4.3.1 Association between Age and Low Back Pain

**Table 4.4** shows the association between age and LBP, which is found that participants between the age of (25-35y) are 53 participants, 41 (77.4%) have LBP while 12 (22.6%) don't have LBP , participants between the age of (36-45y) are 45 participants,39 (86.7%) have LBP while 6 (13.3%) don't have LBP, participants between the age of (46-55y) are 12 participants, 9 (75%) have LBP while 3 (25%) don't have LBP ,and neurosurgeons between the age of (56-65y) are 4 participants, all of them have LBP .

This implies that there is no significant association between age and LBP with p. Value (0.15), that means LBP affects neurosurgeons without consideration to their age.

Table 4.4 Association between Age and Low Back Pain

| Age | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| 25-35y | 41<br>77.4% | 12<br>22.6% | 53<br>100% | 0.4 |
| 36-45y | 39<br>86.7% | 6<br>13.3% | 45<br>100% | |
| 46-55y | 9<br>75% | 3<br>25% | 12<br>100% | |
| 56-65y | 4<br>100% | 0<br>0% | 4<br>100% | |
| Total | 93<br>81.6% | 21<br>18.4% | 114<br>100% | |

### 4.3.2 Association between Sex and Low Back Pain

Table 4.5 shows the association between six and LBP, as noticed, out of 106 male participants, 88 (83%) have LBP while 18 (17%) don't have LBP, and out of 8 female participants, 5 (62.5%) have LBP while 3 (37.5) don't have LBP.

Table 4.5 Association between Sex and Low Back Pain

| Sex | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| Male | 88<br>83% | 18<br>17% | 106<br>100% | 0.15 |
| Female | 5<br>62.5% | 3<br>37.5% | 8<br>100% | |
| Total | 93<br>81.6% | 21<br>18.4% | 114<br>100% | |

### 4.3.3 Association between Body Mass Index and Low Back Pain

Table 4.6 shows the association between BMI and LBP, as noticed, individuals who their BMI is more or equal to 25 were 74 participants, 65 (87.8%) have LBP while only 9 (12.2%) don't have LBP, and those individuals who their BMI is less than 25 were 40 participants, 28 (70%) have LBP while 12 (30%) don't have LBP. This indicates that participants who their BMI is more or equal to 25 have a higher chance rate of getting LBP, than those individuals who their BMI is less than 25.

**Table 4.6 Association between Body Mass Index and Low Back Pain**

| BMI | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| ≥25 | **65**<br>87.8% | **9**<br>12.2% | **74**<br>100% | **0.01** |
| <25 | **28**<br>70% | **12**<br>30% | **40**<br>100% | |
| Total | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

### 4.3.4 Association of Chewing Qat and Low Back Pain

Table 4.7 shows the association between chewing qat and LBP which is found that participants who chew qat are 92, 77 (86.17%) have LBP, while 15 (13.83 %) don't have LBP, and participants who don't chew qat are 22, 16 (55.56%) have LBP while 6 (44.44%) don't have LBP.

**Table 4.7 Association of Chewing Qat and Low Back Pain**

| Chewing Qat | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| **Yes** | **77**<br>86.17% | **15**<br>13.83% | **92**<br>100% | **0.237** |
| **No** | **16**<br>55.56% | **6**<br>44.44% | **22**<br>100% | |
| **Total** | **93**<br>81.25% | **21**<br>18.75% | **114**<br>100% | |

### 4.3.5 Association between Smoking and Low Back Pain

**Table 4.8** shows the association between smoking and LBP which is found that participants who don't smoke at all are 66 participants, 50 (75.8%)have LBP while 16(24.2%)don't have LBP, 7 of the participants used to smoke in the past , 5 (71.4%) have LBP while 2 (22.6) don't have LBP, 24 participants smoke sometimes, 22 (91.7) have LBP while 2 (8.3%) don't have LBP, 16 participants smoke every day, 15 (93.7%) have LBP while only 1 (6.3%) doesn't have LBP , and there is a participant preferred not to say.

**Table 4.8 Association between Smoking and Low Back Pain**

| Smoking | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| **Not at all** | **50**<br>75.8% | **16**<br>24.2% | **66**<br>100% | **0.06** |
| **Yes, in the past** | **5**<br>71.4% | **2**<br>22.6% | **7**<br>100% | |
| **Yes, sometimes** | **22**<br>91.7% | **2**<br>8.3% | **24**<br>100% | |
| **Yes, every day** | **15**<br>93.7% | **1**<br>6.3% | **16**<br>100% | |
| **Prefer not to say** | **1**<br>100% | **0**<br>0% | **1**<br>100% | |
| **Total** | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

### 4.3.6 Association between Doing Exercise and Low Back Pain

Table 4.9 shows the association between doing exercise and LBP, the individuals who do regular exercise are 12 (100%), 6 (50%) of them have LBP while 6 (50%) don't have LBP, whereas the individuals who do exercise few times per week are 37, 30 (81.1%) of them have LBP while 7 (18.9%) don't have LBP, while the individuals who do exercise few times per month are 35 (100%), 29 (82.9%) of them have LBP, while 6 (50%) don't have LBP. In other hand, the individuals who didn't do exercise at all are 30 (100%), 28 (93.3%) of them have LBP while only 2 (6.7) don't have LBP.

**Table 4.9 Association between Doing Exercise and Low Back Pain**

| Doing exercise | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| **Yes, regularly** | **6**<br>50% | **6**<br>50% | **12**<br>100% | **0.05** |
| **Yes, few times/weak** | **30**<br>81.1% | **7**<br>18.9% | **37**<br>100% | |
| **Yes, few times/ month** | **29**<br>82.9% | **6**<br>17.1% | **35**<br>100% | |
| **Not at all** | **28**<br>93.3% | **2**<br>6.7% | **30**<br>100% | |
| **Total** | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

## 4.4 The Associations between a Set of Work and Job-Related Risk Factors and Low Back Pain

### 4.4.1 The Association between Low Back Pain and Years of Practice as Neurosurgeon

Table 4.10 shows the association between years of practice as neurosurgeon and LBP where it is found that, neurosurgeons who have a practice duration for (1- 5y) are 40 (100%), 32 (80%) of them have LBP while 8 (20%) don't have LBP, neurosurgeons who have a practice duration for (6 -10 y) are 32 (100%), 24 (75%) of them have LBP while 8 (25%) don't have LBP, neurosurgeons who have a practice duration for (11-15y) are 19 (100%), 17 (89.5%) of them have LBP while only 2 (10.5%) don't have LBP, neurosurgeons who have a practice duration for (16-20y) are 17 (100%), 15 (88.2%) of them have LBP while only 2 (11.8%) don't have LBP, and neurosurgeons who has a practice duration for more than 20y are only 6 (100%) participants, 5 (83.3%) of them have LBP while only one (16.7%) don't have LBP.

**Table 4.10 Association between Years of Practice and Low Back Pain**

| Years of practice | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| 1-5y | **32**<br>80% | **8**<br>20% | **40**<br>100% | **0.26** |
| 6-10y | **24**<br>75% | **8**<br>25% | **32**<br>100% | |
| 11-15y | **17**<br>89.5% | **2**<br>10.5% | **19**<br>100% | |
| 16-20y | **15**<br>88.2% | **2**<br>11.8% | **17**<br>100% | |
| More than 20y | **5**<br>83.3% | **1**<br>16.7% | **6**<br>100% | |
| Total | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

### 4.4.2 Association between Standing Hours at Work and Low Back Pain

Table 4.11 shows the association between standing hours at work and LBP, where it is found that participants who stand more than 4 hours at work are 94, 80 (85.1%) of them have LBP while only 14 (14.9%) don't have LBP, and participants who stand less or equal to 4 hours are 20, 13 (65%) of them have LBP while 7 (35%) don't have LBP.

**Table 4.11 Association between Standing Hours at Work and Low Back Pain**

| Standing hrs. | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| > 4hrs | **80**<br>85.1% | **14**<br>14.9% | **94**<br>100% | **0.03** |
| ≤ 4hrs | **13**<br>65% | **7**<br>35% | **20**<br>100% | |
| Total | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

### 4.4.3 Association between Daily Sitting Hours at Work and Low Back Pain

Table 4.12 shows the association between daily sitting hours at work and LBP, as it is shown in the table, participants who set more than 4 hours are 86, 75 (87.20%) of them have LBP while only 11 (12.80%) don't have LBP. While participants who set less or equal to 4 hours are 28, 18 (64.30%) of them have LBP while 10 (35.70%) don't have LBP. That means neurosurgeons who sit more than 4 hours have a great susceptibility of getting LBP unlike those individuals who sit equal or less than 4 hours.

**Table 4.12 Association between Daily Sitting Hours at Work and Low Back Pain**

| Sitting hours | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| >4hrs | **75**<br>87.20% | **11**<br>12.80% | **86**<br>100% | **0.007** |
| ≤4hrs | **18**<br>64.30% | **10**<br>35.70% | **28**<br>100% | |
| Total | **93**<br>81.60% | **21**<br>18.40% | **114**<br>100% | |

### 4.4.4 Association between Number of Operations/Week and Low Back Pain

**Table 4.13** shows the association between number of performed operations per week and LBP, neurosurgeons who do more than 3 operations per week are 71, 63 (88.70%) of them have LBP while only 8 (11.30%) don't have LBP. In other hand neurosurgeons who do equal or less than 3 operations per week are 43, 30 (69.80%) of them have LBP while 13 (30.2%) don't have LBP. This explains the significant association between number of operations per week and LBP with P value = 0.01.

**Table 4.13 Association between Number of Operations/Week and Low Back Pain**

| Operations / Week | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| >3/w | **63**<br>88.70% | **8**<br>11.30% | **71**<br>100% | **0.01** |
| ≤3/w | **30**<br>69.80% | **13**<br>30.2% | **43**<br>100% | |
| Total | **93**<br>81.6% | **21**<br>18.4% | **114**<br>100% | |

## 4.5 The Associations between a Set of Emerging Workplace Psychosocial Risk Factors and Low Back Pain

### 4.5.1 The Association between Stress and Low Back Pain

Table 4.14 shows the association between stress and LBP according to VAS, which is found that, participants how have a stress level more or equal to 4 are 83, 71 (85.5%) of them have LBP, and 12 (14.5%) don't have LBP. While those participants who have a stress level less than 4 are 31, 22 (70.9) of them have LBP and 9 (29.1) don't have LBP.

**Table 4.14 Association between Stress and LowBack Pain**

| Stress Level | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| < 4 | **22**<br>70.9% | **9**<br>29.1% | **31**<br>100% | **0.075** |
| ≥ 4 | **71**<br>85.5% | **12**<br>14.5% | **83**<br>100% | |
| **Total** | **93**<br>81.25% | **21**<br>18.75% | **114**<br>100% | |

### 4.5.2 Association between Job Satisfaction Level and Low Back Pain

Table 4.15 shows the association between job satisfaction level and LBP according to VAS, as noticed participants who their job satisfaction level is less than 4 are 31, 24 (77.40%) of them have LBP and 7 (22.6%) don't have LBP. While individuals who their job satisfaction level is between 4-6 are 45, 40 (88.9%) of them have LBP and 5 (11.11%) don't have LBP. Lastly, individuals who their job satisfaction level is more than 6 are 38, 29 (76.3%) of them have LBP and 9 (23.7%) don't have LBP.

**Table 4.15 Association between Job Satisfaction Level and Low Back Pain**

| Job Satisfaction Level | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| Less than 4 | **24**<br>77.40% | **7**<br>22.6% | **31**<br>100% | **0.66** |
| 4-6 | **40**<br>88.9% | **5**<br>11.11% | **45**<br>100% | |
| More than 6 | **29**<br>76.3% | **9**<br>23.7% | **38**<br>100% | |
| Total | **93**<br>81.6% | **21**<br>18.40% | **114**<br>100% | |

### 4.5.3 Association of Number of Sleeping Hours/Day with Low Back Pain

**Table 4.16** shows the association between sleeping hours per day and LBP, which is found that, participants who sleep less than 5 hours a day are found to be 38, 35 (92.11%) of them have LBP and 3 (7.89%) don't have LBP.

While those participants who sleep more or equal to 5 hours a day are 76, 58 (76.32%) of them have LBP and 18 (23.68%) don't have LBP.

**Table 4.16 Association of Number of Sleeping Hours/Day with Low Back Pain**

| Sleeping Hours/day | LBP | | Total | P. Value |
|---|---|---|---|---|
| | Yes | No | | |
| < 5 h | **35**<br>92.11% | **3**<br>7.89% | **38**<br>100% | **0.072** |
| ≥ 5-8 h | **58**<br>76.32% | **18**<br>23.68% | **76**<br>100% | |
| Total | **93**<br>81.58% | **21**<br>18.42% | **114**<br>100% | |

## 4.6 Characteristics of Low Back Pain

Table 4.17 shows the characteristics of LBP that the affected individuals had in their episode of pain.

- First, the frequency of pain which was found that, 24 (26%), 20 (22%), 25 (27%),12 (13%) and 12 (13%) of the affected individuals had a frequency of daily, once a week, once a month, once a year and other, respectively.
- The radiation of pain was also mentioned in which 57 (62%),3 (3%), and 32 (35%) affected individuals, had no radiation pain, had radiation pain to both legs, and had radiation pain to only one leg, respectively.
- Intensity of the pain was assessed using a 10-point horizontal VAS in which point number one indicates absence of LBP while point number 10 indicates worst pain, and it was found that, 36 (32%), 50 (44%), and 7 (6%) of the affected individuals had intensity of pain of (1-3), (4-6), and (7-10), respectively.
- Duration of pain was also recorded in which 2 (2%), 49 (53%), 36 (39%), and 6 (6%) of the affected individuals, had a pain duration of continuous, days, hours, and weeks, respectively.

**Table 4.17 Characteristics of Low Back Pain**

| Pain Characteristics | Variables | Frequency | % |
|---|---|---|---|
| **Frequency of pain** | Daily | **24** | 26% |
| | Once a week | **20** | 22% |
| | Once a month | **25** | 27% |
| | Once a year | **12** | 13% |
| | Other | **12** | 13% |
| **Radiation of pain** | No | **57** | 62% |
| | Yes, to both legs | **3** | 3% |
| | Yes, to leg | **32** | 35% |
| **Severity** by VAS | 1-3 | **36** | 32% |
| | 4-6 | **50** | 44% |
| | 7-10 | **7** | 6% |
| **Duration of Pain** | Continuous | **2** | 2% |
| | Days | **49** | 53% |
| | Hours | **36** | 39% |
| | Weeks | **6** | 6% |

## 4.7 Treatment for Relieving Low Back Pain

**The figure 4.3** shows what methods of treatment did those affected individuals had for relieving their pain.

As the figure shows, out of 93 affected individuals 38 (41%) had medications, 36 (39%) had only rest, 17 (18%) had physiotherapy, and only two participants (2%) who underwent surgery for relieving their LBP.

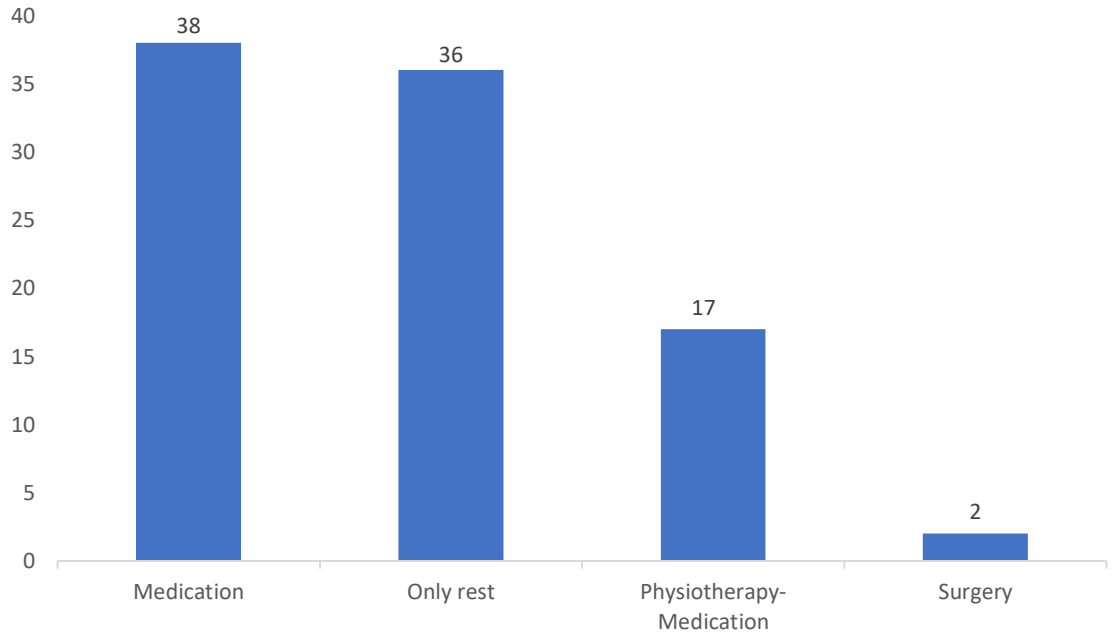



**Fig. 4.3 Types of Treatment That Were Used For Relieving The Pain**

## 4.8 What Affected Individuals Believe is the Cause of their Low Back Pain

**The figure 4.4** shows what affected individuals believe is the most common case of their LBP which is found that ,54 (58%) individuals believe that prolonged standing is the most common cause, 26 (28%) individuals attribute LBP to poor or awkward posture, additionally, 6 (6%) individuals attribute LBP to other causes, and 4 (4%) individuals believe that prolonged sitting is the cause. Furthermore, 3 (3%) individuals are not sure about the exact cause of their LBP.

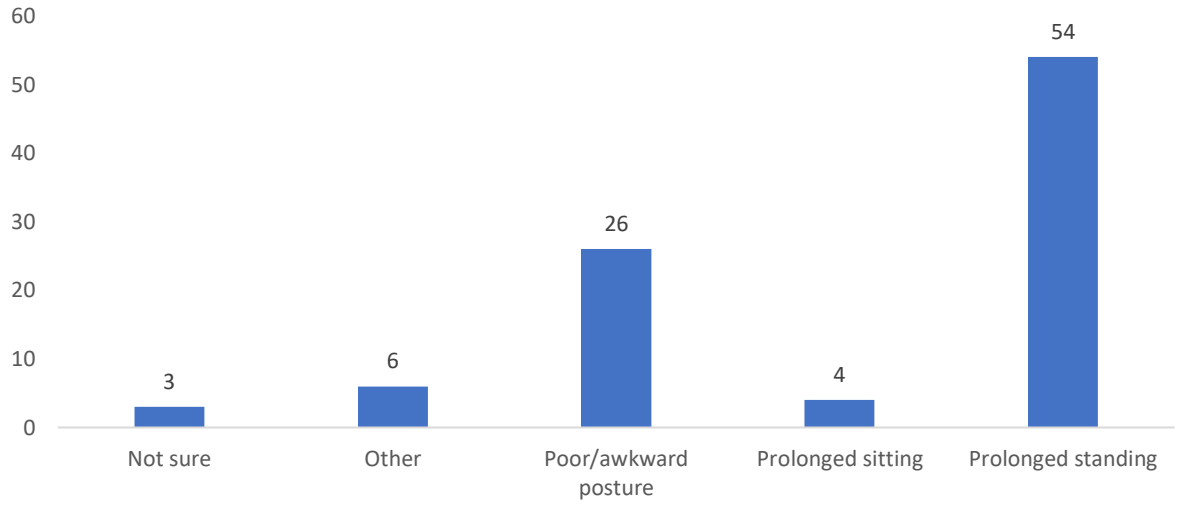



**Fig. 4.4 What Neurosurgeons and Residents Neurosurgeons Believe, Is The Most Common Cause of Low Back Pain**

## 4.9 Sick Leave for Affected Individuals

**The figure 4.5** shows whether the affected individuals had sick leave for their pain or not, which was found that, the majority of the affected individuals 68 (73%) didn't get sick leave for their pain ,16 (17%) got sick leave, while 9 (10%) weren't sure about getting sick leave.

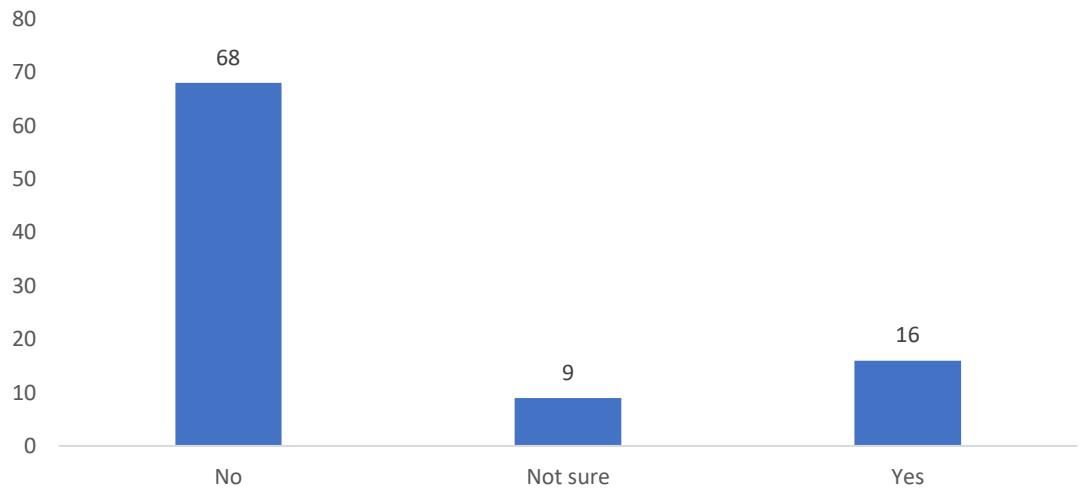



**Fig. 4.5 Sick Leave for Affected Individuals**

## 4.10 Preventative Strategies:

**The table 4.18** shows what types of preventive strategies do the participants use, and it has found that, all the in affected individuals 21 (18.4%) don't use any of the preventive strategies, and the affected individuals are 93 (81.6%), 10 (10.7%) of the affected individuals don't use preventive strategies, while 83 (89.25) of the affected individuals use preventive strategies.

The preventive strategies list was (avoid sitting with poor posture, sleeping in flat surface, avoid lifting heavy stuff, wearing special shoe, and none of these), and they are used by 55 ,38, 50, 21, and 10 individuals, respectively, (most of the participants have chosen more than one option).

**Table 4.18 Types of Preventative Strategies**

| Preventative Strategies | Number of Participants |
|---|---|
| Avoid sitting with poor posture | 55 |
| Sleeping in flat surface | 38 |
| Avoid lifting heavy stuff | 50 |
| Wearing special shoe | 21 |
| None of these | 12 |

# Chapter 5: Discussion

We performed a cross-sectional study to assess the prevalence of LBP among neurosurgeons and residents neurosurgeons in Sana'a city, and to explore the potential risk factors associated with LBP.

Results showed a high prevalence of LBP (81.6%) among neurosurgeons and residents neurosurgeons in Sana'a city ،which was comparable to major LBP prevalence rates reported in the literature, which varies from 40% to 86%. Of the low back sufferers, 73.1% had their first attack of LBP only after they have started to work as neurosurgeons. in 2012 a study was done in Surat to determine the prevalence of LBP and its associated risk factors among doctors in Surat and the study reported that doctors who had developed symptoms of LBP only after they have started to work as doctors was 73.33%. **(Salvi Shah, Beena Dave,2012)**

Higher age was found to be associated with LBP in many studies among the general population and even among hospital staff with or without a statistical significance. **(Bandpei et al.,2011), (Bandpei et al., 2006), (Keriri ,2013), (Maniadakis, Gray ,2000), (Bejia et al., 2005)**

In our study, there was no significant association between age and LBP (p= 0.40). As a study was done in Taif, Saudi Arabia, which aimed to assess the prevalence and associated risk factors of LBP among surgeons in Taif city which found no significant association between age and LBP. **(Alzidani et al., 2019).** In this study men have high prevalence of LBP (83.02%) than women (62.5%) however, this might be due to the small sample size of female. While the study that was done in Surat reported that women had high prevalence of LBP (68.88%) than men (31.11%). **(Salvi Shah, Beena Dave,2012)** Other previous studies also suggested that gender differences occurred because women were more likely to report any pain problem than men as women tended to have a lower pain threshold than men. **(Abdul Samad,Abdullah, Moin. 2010) .Marital** status showed no association with LBP, as the majority of participants reported being married and were affected at similar rate to those who were single.

BMI also has been investigated in the current study and found to be associated with LBP with statistically significant (p=0.0105), Other studies showed no statistical significance between BMI and LBP, such as the study that was done in Taif city. **(Alzidani et al., 2019)** While many other studies showed clear association between BMI and LBP. **(Bandpei et al.,2011, Keriri ,2013, Bejia et al.,2005, Bin Homaid et al., 2016)**

Chewing qat wasn't really associated with LBP with p. value (0.237).

Smoking was not significantly associated with LBP (p= 0.06) as the Surat study which also reported that smoking is not significantly associated with LBP **(Shah, Dave,2012)** a result that differs from that of Frank et al study where they showed that smoking was significantly associated with LBP and herniated disc conditions. **(Frank, Townsend, 1993)**

Exercise in our study didn't show a protective role against LBP but it was nearly the significant value within a p value of 0.05. In the Demblans Dechans et al **(Dechans et al., 1988)** study, which reported that sports activity was considered a risk factor for LBP, whereas Fanello et al **(Fanello et al., 1994)** and Henchoz et al **(Henchoz et al.,2008)** found that regular sports practice was associated with lower rate of LBP prevalence and was effective for primary and secondary prevention of LBP.

In this study, the number of years practicing neurosurgery showed no significant association, as both those who worked for less than or equal to 10 years and those who worked for more than 10 years were affected with LBP in nearly the same percentage within p value of (0.26). Which means that working as neurosurgeon has a high susceptibility of getting LBP whatever the years of practicing neurosurgery are.

In this study, daily standing hours at work, weekly number of performed operations, and daily sitting hours at work have significant association with LBP with *p values* of (0.0367), (0.01), and (0.007), respectively.

As the study that was done in Taif city, has also found that prolonged daily standing hours at work has a significant association with LBP. **(Alzidani et al., 2019).** Which means that neurosurgeons who have more standing hours at work, more sitting hours at work and those who perform more operations have a high prevalence of LBP.

Intensity of the stress level at work was assessed using a 10-point horizontal VAS in which point number one indicates the lowest level of stress while point number 10 indicates the higher level of stress and this study found no significant association between LBP and stress level at work (p=0.075), consistent to the study by Cunningham et al., (2006) **(Cunningham et al., 2006)** and Yip et al., (2001) **(Yip et al., 2001)**. However, in study by Karahan et al., (2009) **(Karahan et al., 2009)**, there was a significant association between perceived stress level and LBP. Factors associated with disability due to LBP are work situation, low self-efficacy and depression (Marina et al., 2012). **(Marina et al., 2012)**

The job satisfaction level at work was assessed using a 10-point horizontal VAS in which point number one indicates the lowest level of job satisfaction while point number 10 indicates the higher level of job satisfaction and the data from our study showed that there is no association between LBP and job satisfaction as most of the participants reported that they have high job satisfaction level and they were even more affected than those who had low satisfaction level about their job with p value (0.66). Our results were completely opposing previous studies as they reported that surgeons and other hospital staff who had low job satisfaction are at greater risk of having LBP, and in addition Mohseni-Bandpei reported that none of the participants with high job satisfaction suffered from LBP. **(Poppel et al., 1998, Hoogendoorn et al., 2002, Bandpei et al., 2006, Bandpei et al.,2011)** .Also sleeping hours per day has no significant association with LBP with *p values* (0.07).

In this study the majority of the affected individuals 68 (73%) didn't get sick leave for their pain ,16 (17%) got sick leave, while 9 (10%) weren't sure about getting sick leave ،the nearly same percentage of the affected individuals who had sick leave, was found in the research that was done in Taif city which was 24.7%. **(Alzidani et al., 2019)**

Among the affected participants, 38 (41%) reported that medication is the option that was used for relieving their pain, 36 (39%) participants only had a rest, 17 (18%) participants received physiotherapy along with medication, and only two (2%) neurosurgeons who underwent surgery for their LBP.

A study conducted among hospital stuff in Tunisia reported that 42% of the sample received medical treatment, 15.9% received thermal care and 9.6% received physiotherapy, and only one participant needed surgical intervention. Moreover, 26.1% of the sample got sick leave due to LBP with a mean duration of 4.5 days. **(Bejia et al., 2005)** Another study done among surgeons in Iran showed that 29.1% of the participants used medication for their LBP, 23.6% received physiotherapy, 39.1% had both medication and physiotherapy, 8.2% had surgery along with medication and physiotherapy, and 24.7% had sick leave. **(Bandpei et al.,2011)** Furthermore, many other studies reported high rates of having days off work because of the LBP. **(Bandpei et al., 2006, Vasiliadou et al.,1995)**

In this study, 54 individuals (58%) who are affected by LBP believe that prolonged standing is the primary cause, while 26 individuals (28%) attribute LBP to poor or awkward posture. Additionally, 6 individuals (6%) attribute LBP to other causes, and 4 individuals (4%) believe that prolonged sitting is the cause. Furthermore, 3 individuals (3%) are not sure about the exact cause of their LBP.

## 5.1 Limitations:

- The sample size was small because of the number of neurosurgeons in Sana'a city is a little bit small comparing to other international cities, where there are a huge number of neurosurgeons.
- In the current study, the data were obtained through a self-administrated questionnaire, while some neurosurgeons were in their place of work and have no enough time to complete the questionnaire adequately, especially those questions that need time to remember, such as the time of the first attack, the number of attacks and the frequency of LBP.
- In this study the sample size of female sex was small, this made the real association between LBP and sex not obvious.
- Some of the participants had so busy schedule which made the access to them impossible, and some refused to participate.

## 5.2 Conclusion:

LBP is described as multifactorial biopsychological problem. It is defined as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain.

LBP is the most common complaint in workers. As job nature of neurosurgeons included doing surgery on patients, awkward posture and may have to stand and/or sit for prolong period of time for examining and/or treating the patients. It's formed to be almost twice more common in neurosurgery than other occupations.

Results in this study showed a high prevalence of LBP (81.6%) among neurosurgeons and residents neurosurgeons in Sana'a city.

A (73.1%) of these affected individuals with LBP have had their first attack just after starting working as neurosurgeons.

It also was found that LBP was significantly associated with work related risk factors such as obesity, number of preformed operations per week ,prolonged sitting ,and prolonged standing at work , others might be associated, but with no statistically significant ($P>0.05$), such as age, gender, years of practice, stress, smoking, daily sleep hours, and job satisfaction, also these identified risk factors highlight the need for their avoidance, and primary prevention strategies should be considered to minimize the occurrence of LBP in this population.

The most commonly reported options for relieving the pain among affected neurosurgeons were medication and rest.

## 5.3 Recommendations:

Based on the results of the study, the study recommends the following:

- Educational programs and campaigns must be implemented for neurosurgeons and residents neurosurgeons to raise awareness about LBP and applying more studies to evaluate the effect of these programs for higher quality of life and better job performance for them.
- Doing exercises, proper sitting, and standing at work, training on back care, and manual handling should be emphasized to reduce the problem.

# References


Abdalla Mala, Aram, and Shwan Kader Media. “Prevalence of LBP Among Physicians in Erbil City”. Kufa Medical Journal, vol. 18, no. 2, Dec. 2022, pp.31-41, doi:10.36330/kmj. v18i23688.

Alem Deksisa Abebe, Ephrem Mamo Gebrehiwot, Seblewengel Lema, Tilaye Workineh Abebe. Prevalence of Low Back Pain and Associated Risk Factors Among Adama Hospital Medical College Staff, Ethiopia. (2015). European Journal of Preventive Medicine. Vol. 3, No.6, 2015, pp.188-192.doi: 10.11648/ -j.ejpm. 20150306.15

Al-Ruwaili B, Khalil T. Prevalence and Associated Factors of Low Back Pain Among Physicians Working at King Salman Armed Forces Hospital, Tabuk, Saudi Arabia. Open Access Maced J Med Sci. 2019 Aug 31;7(17): 28072813.Doi: 10.3889/oamjms.2019.787.PMID: 31844441; PMCID: PMC69018 51

Andersson GB. Epidemiology of low back pain. Acta Orthop Scand Suppl.1998 Jun; 281:28-31. Doi: 10.10 80/17453674.1998.11744790. PMID: 9 771538.

Andersson, Gunnar. The burden of musculoskeletal diseases in the United States: prevalence, societal and economic cost. American Academy of Orthopaedic Surgeons, 2008.

Arminger, B. (1997). “Ethics in Nursing Research: Profile, principles, perspective”. Nursing Research. 26 (5):330-333.

Aseri, K. S.; Mulla, A. A.; Alwaraq, R. M.; Bahannan, R. J. Characterizing Occupational Low Back Pain Among Surgeons Working in Ministry of Health Hospitals: Prevalence, Clinical Features and Risk and Protective Factors. JKAU Med Sci 2019, 26, 19-34.

Awosan KJ, Yikawe SS, Oche OM, Oboirien M. Prevalence, perception and correlates of low back pain among healthcare workers in tertiary health institutions in Sokoto, Nigeria. Ghana Med J. 2017 Dec;51(4):164-174. PMID :29622830; PMCID: PMC 5870785.

Battié MC, Bigos SJ, Fisher LD. 1989.Isometric lifting as a strength predictor of

Béatrice D. Priority Medicines for Europe and the World “A Public Health Approach to Innovation” Update on 200 4 Background Paper, BP 6.24 Low back pain 2013; 6.24-24.

Beauchamp T.L & Childress, J.F. (2001). Principles of Biomedical ethics, 5th ed, Oxford University Press: Oxford.

Bejia I, Younes M, Jamila HB, Khalfallah T, Ben Salem K, Touzi M, et al. Prevalence and factors associated to low back pain among hospital staff. Joint Bone Spine 2005; 72:254-9

Bin Homaid M, Abdelmoety D, Alshareef W, Alghamdi A, Alhozali F, Alfahmi N, Hafiz W, Alzahrani A, Elmorsy S. Prevalence and risk factors of low back pain among operation room staff at a Tertiary Care Center, Makkah, Saudi Arabia: across-sectional study. Ann Occup Environ Med. 2016 Jan 29; 28:1. Doi:10.1186/s40557-016-0089-0. PMID: 26835129; PMCID: PMC 4731917.

Biyani, Ashok, and Gunnar BJ Andersson. "Low back pain: pathophysiology and management." JAAOS Journal of the American Academy of Orthopaedic Surgeons 12.2 (2004): 106-115.

Blumberg, B, Cooper D.R, & Schindler P.S. (2005). Business Research Methods, Mc Graw Hill: Berkshire.

Burns N. & Grove, S.K. (2005). The practice of nursing research: Conduct critique and utilization, 5th ed, St. Louis, MO, Elsevier/Saunders.

Casser HR, Seddigh S, Rauschmann M. Acute Lumbar Back Pain. Dtsch Arztebl Int. 2016 Apr 1;113(13):223-34. Doi: 10.3238/arztebl. 2016.0223. PMID: 27120496; PMCID: PMC485 7557.

Chiodo, A. (2003). Acute Low Back Pain, Guidelines for Health System Clinical Care. University of Michigan.

Chou, Roger, et al. "Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society." Annals of internal medicine 147.7 (2007): 478-491.

Christopher Lucasti, MD Mark Maraschiello, BS Josh Slowinski, BS Joseph Kowalski, MD. Prevalence of Back and Neck Pain in Orthopaedic Surgeons in Western New York. January 2022, Vol 6, No 1.

Churchil, L.R (1995). “Beneficence”. Encyclopedia of Bioethics. Simon & Shuster, Macmillan: New York.

Cunningham, C, Flynn, T & Blake, C. (2006). Low back pain and occupation among Irish health service workers. Occupational Medicine.

Demblans-Dechans B, Ayrolles C, Clement JL, Lassoued S, Fournie B and Fournie A. 1988. Biomecanique lombaire et sport: l‟isthmolyse de L5. Rev Rhum 405-10

Deyo RA, Cherkin D, Conrad D, Volinn E. Cost, controversy, crisis: low back pain and the health of the public. Annu Rev Public Health. 1991; 12:141-56. Doi: 10.1146/annurev. pu.12.05019 1. 001041.PMID: 1828670.

Diatchenko L, Fillingim RB, Smith SB, Maixner W. The phenotypic and genetic signatures of common Musculoskeletal pain conditions. Nat Rev Rheumatol. 2013 Jun;9(6):340-50. Doi: 10.1038/nrrheum.2013.43. Epub 2013 Apr 2. PMID: 23545734; PMCID: PMC3991785

Fanello S, Furber A, Cardinal SL, Furber A, Roquelaure Y and Penneau-Fontbonne D. 1994.La pathologie lombaire chez les medecins: Incidence, prevalence et facteurs de risque. Concours Méd. 2937-40.

Galukande M, Muwazi S, Mugisa DB. Aetiology of low back pain in Mulago Hospital, Uganda. Afr Health Sci. 2005 Jun;5(2):164-7. PMID: 16006225; PMCID: PMC1831909.

Ghilan K, Al-Taiar A, Yousfi NA, Zubaidi RA, Awadh I, Al-Obeyed Z. Low back pain among female nurses in Yemen. Int J Occup Med Environ Health. 2013 Aug;26(4):605-14. Doi: 10.2478/s13382-013-0124-0.Epub 2014 Jan 25. PMID:24052152

Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, et al., What low back pain is and why we need to pay attention. Lancet 2018;391: 2356- 67 Doi: 10.1016/S01406736(18) 30480-X.

Hayashi, Yasufumi. "Classification, diagnosis, and treatment of low back pain." JAPAN MEDICAL ASSOCIA-TION JOURNAL. 47.5 (2004): 227-233.

Holt, Richard IG, et al. "NIDDK international conference report on diabetes and depression: current understanding and future directions." Diabetes care 37.8 (2014): 2067-2077. 56/Steinert, Tilman. "Nationale Versorgungsleitlinie Kreuzschmerz." Psychiatrische Praxis 38.08 (2011): 411-411.

Hoogendoorn WE, Bongers PM, de Vet HC, Ariëns GA, van Mechelen W, Bouter LM, et al. High physical work load and low job satisfaction increase the risk of sickness absence due to low back pain: Results of a prospective cohort study. Occup Environ Med 2002; 59:323-8.

Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of low back pain. Best Pract Res Clin Rheumatol. 2010 Dec;24(6):769-81. doi:10.1016/j. berh. 2010 .10.002. PMID: 21665125.

Huskisson EC. Measurement of pain J Rheumatol. 1982;9(5):768–9.

Huskisson EC. Measurement of pain. Lancet.1974;2(7889):1127–31, http://dx.doi.org/10.1-016/S01406736(74)90884-8 industrial back pain. Spine (Phila Pa 1976) .14(8):851-6.

Javed S, Dawood MH, Memon MW, Selod IZ, Seja A. Prevalence of low back pain among medical doctors of the teaching hospitals in Karachi, Pakistan: Across-sectional survey.

SAGE Open Med.2023Mar18; 11:20503121231157217. Doi:10.1177/20503121231157217 P MID:36949826; PMCID: PMC10026094.

Javeria Aslam, Muhammad Imran Nawaz, Muhammad Ahmed Sajjad, Memoona Aslam, Iqra Naz, Ramsha Masood, Ibraheem Zafar, Kashaf Nadeem. Survey on Prevalence and Comparison of Back Pain Among Surgeons. (2022). https://doi.org/10.54393/pbmj.v5i2.285.

Journal of Educational Policy and Entrepreneurial Research ISSN: 2408-770X (Print), (2016).

Kanakkarthodi R, Edakalathur Baby B, Anapattath AN, Kallikkattu Valappil J, Afsar A, Jakribettu RP, Binub K. Low Back Pain Among Nurses in a Tertiary Care Teaching Hospital at Malappuram Kerala. Cureus. 2022 Nov 17;14(11): e31622.Doi: 10.7759/cureus. 31622. PMID: 36540497; PMCID: PM C9759498.

Karahan, A, Kav, S, Abbasoglu, A & Dogan, N. (2009). Low back pain: Prevalence and associated risk factors among hospital staff. Journal of Advanced Nursing. 65(3): 516-524.

Kehrer M, Pedersen C, Jensen TG, Lassen AT. Increasing incidence of pyogenic spondylodiscitis: a 14-year population-based study. J Infect. 2014 Apr;68(4):313-20 doi: 10.1016/j.jinf. 2013.11.011. Epub 2013 Dec 1. PMID: 24296494.

Kent PM, Keating JL. The epidemiology of low back pain in primary care. Chiropr Osteopat. 2005; 13:13, http://d x.doi.org /10.1186/1746-1340-13-13.

Keriri H. Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia. Am J Res Commun 2013; 1:25.

Kopec JA, Sayre EC, Esdaile JM. Predictors of back pain in a general population cohort. Spine (Phila Pa 197 6).2004 Jan 1;29(1):70-7; discussion 77-8. doi: 10.1097/01. BRS.000010394 2.81227.7F. PMID:14699279

Landry MD, Raman SR, Sulway C, Golightly YM, Hamdan E. Prevalence and risk factors associated with low back pain among health care providers in a Kuwait hospital. Spine (Phila Pa 19 76). 2008 Mar 1;33(5):539-45. Doi: 10.1097/BRS.0b013e3181657df7. PMID: 18317200.

Lee, K. Y., et al. "PREVALENCE OF LOW BACK PAIN AND ITS ASSOCIATED FACTORS AMONG DOCTORS IN A HOSPITAL IN SEL - ANGOR." International Journal of Public Health and Clinical Sciences 1.1 (2014).

Lesage FX, Berjot S. Validity of occupational stress assessment using a visual analogue scale. Occup Med (Lond). 2011;61(6):434–6, http://dx.doi.org/10.1093/occmed/kqr037 back

pain. Nat Rev Dis Primers.2018 Dec 13;4(1):52. Doi: 10.1038/s41572-018-0052-1. PMID: 30 546064.

Linton SJ, Hellsing AL, Halldén K. A population-based study of spinal pain among 35-45-year-old individuals. Prevalence, sick leave, and health care use. Spine (Phila Pa 1976). 1998 Jul 1;23(13):1457-63. doi: 10.1097/00007632-199807010-00006.PMID:967 0397.

Lucasti C, Maraschiello M, Slowinski J, Kowalski J. Prevalence of Back and Neck Pain in Orthopaedic Surgeons in Western New York. J Am Acad Orthop Surg Glob Res Rev. 2022 Jan 6 ;6(1): e21. 00252.Doi:10.5435/ JAAOS Global-D-21-00252. PMID: 34989709; PMCID: PMC8740880.

Luo X, Pietrobon R, Sun SX, Liu GG, Hey L. Estimates and patterns of direct health care expenditures among individuals with back pain in the United States Spine. 2004;29(1): 79–86, http://dx.doi.org/10.1097/01.BRS.0000105 -527.13866.0F.

Maher C, Underwood M, Buchbinder R. Non-specific low back pain. Lancet. 2017 Feb 18;389(10070): 736-747.doi:10.1016/S01406736(16)30970-9. Epub 2016 Oct 11. PMID: 27745712.

Maniadakis N, Gray A. The economic burden of back pain in the UK. Pain 2000; 84:95-103

Marina G.S., Cibele A.M.P., Patrícia E.B., Claudio F.C. (2012). Disability Related to Chronic Low Back Pain: Prevalence and Associated Factors. Rev Esc Enferm USP. 46(Esp):16-23.

Mathers C, Penm R. Health system costs of injury, poisoning and musculoskeletal disorders in Australia; 1993–1994. Canberra: University of Sydney and the Australian Institute of Health and Welfare; 1999.

Mitchell, T, O'Sullivan, PB, Smith, A, et al.1- (2008). Biopsychological factors are associated with the low back pain in female nursing student: A cross-sectional study. International Journal of Nursing Studies.

Mohseni-Bandpei MA, Ahmad-Shirvani M, Golbabaei N, Behtash H, Shahinfar Z, Fernández-de-las-Peñas C. Prevalence and risk factors associated with low back pain in Iranian surgeons. Manipulative Physiol Ther. 2011 Jul Aug;34(6):362-70. Doi: 10.1016/j.jmpt. 2011.05.010. PMID: 21807259.

Mohseni-Bandpei MA, Fakhri M, Bargheri-Nesami M, Ahmad-Shirvani M, Khalilian AR, Shayesteh-Azar M. Occupational back pain in Iranian nurses: An epidemiological study. Br J Nurs 2006; 15:914-7

Mugenda ARTS A.G. Press:(2011). Nairobi. Social Science Research Methods: Theory and Practice.

Nurul Izzah Abdul Samad, Haslinda Abdullah, Saidi Moin. 2010. Prevalence of Low back pain and its Risk Factors among School Teachers American Journal of Applied Sciences.7 (5): 634-639.

Reigo T, Timpka T, Tropp H. The epidemiology of back pain in vocational age groups. Scand J Prim Health Care. 1999 Mar;17(1):17-21. doi:10.10 80/028134399750002836. PMID:10229 987.

Riew, K. Daniel, et al. "Nerve root blocks in the treatment of lumbar radicular pain: a minimum five-year follow-up." JBJS 88.8 (2006): 1722-1725 60.

Saad Abbas Aldawsari, Ahmed Hamad Alhammad, Asim Dyab Salem Alanazi, Nashminawaf Al-Rashidi, Elsadig Yousif Mohamed, Syed Meraj Ahmed. A Study of the Prevalence of Low Back Pain and Associated Risk Factors Among Surgical Staff in Sudair Area, Saudi Arabia. International journal of medical research professionals. (2018). DOI:10.21276/ijmrp.2018.4.3.007.

Salvi Shah1*, Beena Dave2, Prevalence of Low Back Pain and Its Associated Risk Factors among Doctors in Surat International Journal of Health Sciences and Research www.ijhsr.org ISSN: 2249-9571, 2012.

Schneider S, Randoll D, Buchner M.2006.Why do women have back pain more than men? A representative prevalence study in the Federal Republic of Germany. Clin J Pain. 22: 738-47.

Skela-Savič B, Pesjak K, Hvalič-Touzery S. Low back pain among nurses in Slovenian hospitals: cross-sectional study. Int Nur's Rev. 2017 Dec;64(4):544- 551.Doi: 10.1111/inr. 12376. Epub 2017 Apr 26. PMID: 28444732.

Toroptsova NV, Benevolenskaya LI, Karyakin AN, Sergeev IL, Erdesz S."Cross- sectional" study of low back pain among workers at an industrial enterprise in Russia. Spine (Phila Pa 1976). 1995 Feb 1;20(3):328-32. doi: 10.1097/00007632199502000-00012. PMID: 7732469

Turki Hamdan Alzidani, Abdullah Mohammed Alturkistani, Basel Saad Alzahrani, Arwa Muneer Aljuhani, Khalid Mohammed Alzahrani. Prevalence and risk factors of low back pain among Taif surgeons. (2019). Saudi Journal for Health Sciences. IP: 185.80.140.241].

Ugwu AC, Egwu OA, Ochie K, Ewunonu EO, Ovuoba KN, Njoku CO. Incidence of occupational stress among medical radiographers: A population based zonal survey. Niger J Physiol Sci. 2007;22(1–2):123–7.

Urits I, Burstein A, Sharma M, Testa L, Gold PA, Orhurhu V, et al., Low Back Pain, a Comprehensive Review: Pathophysiology, Diagnosis, and Treatment. Curr Pain Headache Rep 2019; 23:1-10 Doi: 10.1007/s11916-019-0757-1.

Van Poppel MN, Koes BW, Devillé W, Smid T, Bouter LM. Risk factors for back pain incidence in industry: A prospective study. Pain 1998; 77:81-6.

Van Tulder MW, Koes BW, Bouter LM. A cost-of-illness study of back pain in the Netherlands. Pain. 1995;62(2): 233–40, http://dx.doi.org/10.1016/0304 3959(94)00272-G.

Vasiliadou A, Karvountzis GG, Soumilas A, Roumeliotis D, Theodosopoulou E. Occupational low-back pain in nursing staff in a greek hospital. J Adv Nurs 1995; 21:125-30.

Vlaeyen JWS, Maher CG, Wiech K, Van Zundert J, Meloto CB, Diatchenko L, Battié MC, Goossens M, Koes B, Linton SJ. Low38 - Kopec JA, Sayre EC, Esdaile JM. Predictors of back pain in a general population cohort. Spine (Phila Pa 197 6).2004 Jan 1;29(1):70-7; discussion 77-8. doi: 10.1097/01. BRS.000010394 2.81227.7F. PMID:14699279.

Waxman R, Tennant A, Helliwell P. A prospective follow-up study of low back pain in the community. Spine (Phila Pa 1976). 2000 Aug 15;25(16):2 085-90.doi: 10.1097/0000 7632200008 150-00013.PMID: 109546 40.

Weinstein, James N., et al. "Surgical versus nonsurgical therapy for lumbar spinal stenosis." New England Journal of Medicine 358.8 (2008): 794-810.

Yasufumi HAYASHI. Classification, Diagnosis, and Treatment of Low Back Pain. JMAJ 47(5): 227–233, 2004.

Yip Y. A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. J Adv Nurs. 2001 Dec;36(6):794804. Doi:10.1046/j.1365-2648.2001. 02037. x.PMID: 11903709.

# Appendices

## Appendix 1: Questionnaire

Republic of Yemen
Ministry of Higher Education and Scientific Research
21 September University of Medical and Applied Sciences


الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة 21 سبتمبر للعلوم الطبية والتطبيقية

# Prevalence of Low Back Pain and Its Associated Risk Factors among Neurosurgeons and Residents Neurosurgeons in Sana'a City., Yemen

**Dear Doctor....**

We kindly request your participation in this study which aim to assess the prevalence of low back pain and its associated risk factors among neurosurgeons and residents neurosurgeons in Sana'a city.

- Completing the questionnaire is estimated to take approximately 5 minutes of your time.
- We assure you that there are no risks associated with participating in this study.
- We have implemented measures to ensure the confidentiality and anonymity of your responses.
- Your participation in this study is entirely voluntary, and you have the right to decline to answer any question or to refuse participating.

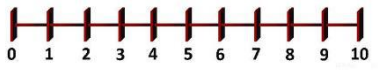
- If you agree to participate, please proceed to answer the provided questionnaire.

## First Section: Sociodemographic Variables:

| | | | |
|---|---|---|---|
| 1 | **Age :** | ☐ 25-35y | ☐ 36-45y |
| | | ☐ 46-55y | ☐ 56-65y |
| | | ☐ More | |
| 2 | **Sex:** | ☐ M | ☐ F |
| 3 | **Height :** | ☐ < 1.50m | ☐ 1,51 - 1.60m |
| | | ☐ 1.61 - 1.70m | ☐ 1.71 - 1.80m |
| | | ☐ More | |
| 4 | **Weight :** | ☐ 40-50kg | ☐ 51-60kg |
| | | ☐ 61-70kg | ☐ 71-80kg |
| | | ☐ More | |
| 5 | **Body mass index:** | ☐ <18.5 | ☐ 18.5-24.9 |
| | | ☐ 25 – 29.9 | ☐ >30 |
| | | If you do not know, write your exact height (.....)m ,and weight (.....)kg | |
| 6 | **Marital status :** | ☐ Single | ☐ Married |
| | | ☐ Divorced | ☐ Prefer not to say |
| 7 | **Body fitness and exercise :** | ☐ Yes, regularly | ☐ Yes, few times/weak |
| | | ☐ Yes, few times/ mont | ☐ Not at all |
| 8 | **Smoking:** | ☐ Not at all | ☐ Yes, in the past |
| | | ☐ Yes, sometimes | ☐ Yes, every day |
| | | ☐ Prefer not to say | |
| 9 | **Chewing Qat :** | ☐ Not at all | ☐ Yes, in the past |
| | | ☐ Yes, sometimes | ☐ Yes, every day |
| | | ☐ Prefer not to say | |

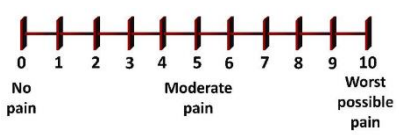
## Second Section: Professional and Personal Characteristics:

| | | | |
|---|---|---|---|
| 1 | **Years of practice as neurosurgeon (total pre and post graduated):** | ☐ 1-5y<br>☐ 11-15y<br>☐ More than 20y | ☐ 6-10y<br>☐ 16-20y |
| 2 | **During an average working day, how many hours do you spend sitting on a chair in work?** | ☐ Less than 2 h<br>☐ 5-7 h<br>☐ More than 10 h | ☐ 2-4 h<br>☐ 8-10 h |
| 3 | **During an average working day, how long do you spend on standing?** | ☐ Less than 2 h<br>☐ 5-7 h<br>☐ More than 10 h | ☐ 2-4 h<br>☐ 8-10 h |
| 4 | **On average, how many operations do you preform each week?** | ☐ Less than 1 /week<br>☐ 4-6 /week | ☐ 1-3 /week<br>☐ More than 6 /week |
| 5 | **On average, how many operations of these take more than 3 hours?** | ☐ Less than 1<br>☐ 4-6 | ☐ 1-3<br>☐ More than 6 |
| 6 | **How many hours do you sleep per a day?** | ☐ Less than 5 h<br>☐ 9-11 h | ☐ 5-8 h<br>☐ More than 11 h |
| 7 | **Stress level at work by using VAS* (see below ):** | ☐ Less than 4<br>☐ More than 6 | ☐ 4-6 |
| 8 | **Job satisfaction level at work, by using VAS* (see below ):** | ☐ Less than 4<br>☐ More than 6 | ☐ 4-6 |



## Third Section: Prevalence of Low Back Pain and Its Characteristics:

| | | | |
|---|---|---|---|
| 1 | **Have you ever had low back pain?** | ☐ Yes | ☐ No |
| 2 | **When was the first attack of your low back pain?** | ☐ Before starting neurosurgeon<br>☐ After starting neurosurgeon | |
| 3 | **If after starting neurosurgeon, after how many years of working as neurosurgeon?** | ☐ 1-5y<br>☐ 11-15y<br>☐ More | ☐ 6-10y<br>☐ 16-20y |
| 4 | **When was the last time you experience low back pain ?** | ☐ Last month<br>☐ More than a year | ☐ Last year |
| 5 | **How severe was the pain by using VAS* ( see below )?** | ☐ 1-3<br>☐ 7-10 | ☐ 4-6 |
| 6 | **Is it referred or radiate to any place?** | ☐ Yes, to leg<br>☐ No | ☐ Yes, to both legs |
| 7 | **What do you believe is the primary cause of your low back pain ?** | ☐ Prolonged standing<br>☐ Poor/awkward posture<br>☐ Other | ☐ Prolonged sitting<br>☐ Not sure |
| 8 | **Have you had a sick leave for your low back pain ?** | ☐ Yes<br>☐ Not sure | ☐ No |
| 9 | **For how long the duration of pain was ?** | ☐ Hours<br>☐ Weeks | ☐ Days<br>☐ Continuous |



| | | | |
|---|---|---|---|
| **10** | **How was the frequency of pain ?** | ☐ Daily<br>☐ Once a month<br>☐ Other | ☐ Once a week<br>☐ Once a year |
| **11** | **How many episodes of low back pain have you had during your career as neurosurgeon ?** | ☐ Only 1<br>☐ More than 6 | ☐ 2-5<br>☐ Not sure |
| **12** | **What type of prevention do you use?**<br>**(You can choose more than one option)** | ☐ Avoid sitting with poor posture<br>☐ Sleeping in flat surface<br>☐ Avoid lifting heavy stuff<br>☐ Wearing special shoe<br>☐ None of these | |
| **13** | **What type of treatment have you had for your low back pain?** | ☐ Only rest<br>☐ Physiotherapy- Medication<br>☐ Surgery | ☐ Medication |

# Appendix 2: Arbitration

| **Name of arbitrator: Dr. Abdulsalam Al-Aqel** | |
|---|---|
| **Department:** Community medicine | **Degree:** Professor |
| **Specialty:** Assistant professor of community medicine | **Institution:** Sana'a University |
| **Recommendations and amendments:**<br>➢ The title of the research has to be in the first page alone.<br>➢ The word gender has to be replaced by the word sex.<br>➢ The abbreviation LBP has to be replaced by low back pain.<br>➢ After the abbreviation VAS you have to add see below.<br>➢ You have to add question mark after each question. | |
| **Date:** 2023/9/23 | **Signature:** |

| **Name of arbitrator: Dr. Anwer Al-Arhabi** | |
|---|---|
| **Department:** Neurosurgery | **Degree:** Professor |
| **Specialty:** Neurosurgeon | **Institution:** 21UMAS |
| **Recommendations and amendments:**<br>➢ The question about socioeconomic status has to be removed. | |
| **Date:** 2023/10/2 | **Signature:** |

| **Name of arbitrator: Dr. Fekri Al-Naib** | |
|---|---|
| **Department:** Psychiatry | **Degree:** Professor |
| **Specialty:** Psychiatrist | **Institution:** 21UMAS |
| **Recommendations and amendments:**<br>➢ Non recommendations have to be added. | |
| **Date:** 2023/10/6 | **Signature:** |

الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
٢١ سبتمبر للعلوم الطبية والتطبيقية

# مدى انتشار آلم أسفل الظهر وعوامل الخطر المرتبطة به بين جراحي المخ والأعصاب وجراحي المخ والأعصاب المقيمين، في مدينة صنعاء، اليمن

**فريق البحث:**

**علي صالح عبد الله النعضي**
**آية عباس احمد الحاج**
**محمد ناجي احمد المسخن**
**عماد علي محمد الزنداني**
**بحار علي محمد الشوكي**
**احمد صالح ناجي البارعي**
**سامي ناجي عبد الله الشوكي**
**عمار خالد علي يحيى عواض**
**غدير عبد الكريم منصر الظفاري**
**سمية محمد عبد الله السامعي**
**عمر عبد الواسع عبده الصلوي**
**روضة احمد محمد ناجي**
**علي بغبغي قايد البغبغي**
**علي عبد الله احمد اللعساني**

**مشرفو البحث**

**أ.د/ مجاهد علي معصار**
**أستاذ جراحة المخ والاعصاب**
**أم. د/ اسماعيل الحوثي**
**أستاذ مساعد جراحة المخ والاعصاب**
**أم. د/ بشير النابهي**
**أستاذ مساعد طب مجتمع**

**١٤٤٤هـ - ٢٠٢٣م**

# الخلاصة

**الخلفية :**آلم أسفل الظهر هي مشكلة سائدة بين جراحي المخ والأعصاب وجراحي المخ الأعصاب المقيمين. حيث تعتبر واحدة من أكثر المشاكل الصحية المرتبطة بالعمل شيوعًا في هذه المهنة. ومن أجل الحصول على فهم أفضل لهذه المشكلة، تم إجراء هذه الدراسة لتحديد مدى انتشار مرض آلم أسفل الظهر وتحديد عوامل الخطر المرتبطة به بين جراحي المخ والأعصاب وجراحي المخ والأعصاب المقيمين، في صنعاء .

**منهجية الدراسة :**أجريت دراسة مقطعية بين جراحي المخ والأعصاب وجراحي المخ والأعصاب المقيمين في صنعاء. وقد تم الحصول على أسمائهم وأماكن عملهم من المجلس الطبي اليمني ومن الجمعية اليمنية لجراحة المخ والأعصاب. ثم ذهبنا للقائهم في أماكن عملهم سواء في المستشفيات الخاصة أو العامة أو في عياداتهم الخاصة. تم استخدام استبيان ذاتي يتكون من ٣٠ فقرة مقسمة إلى ثلاثة أجزاء، بما في ذلك البيانات الديموغرافية والخصائص الفردية والمهنية وبيانات الانتشار مع خصائص الألم .

**النتائج :**شملت الدراسة إجمالي ١١٤ مشاركًا، ١٠٦ (٩٣%) ذكور و٨ (٧%) إناث. وتبين أن معدل انتشار آلم أسفل الظهر بين المشاركين بلغ ٨١.٦ %. ارتبطت العديد من الخصائص الفردية والمهنية بانتشار آلم أسفل الظهر بقيمة ذات دلالة إحصائية ($p <$٠.٠٥)، مثل مؤشر كتلة الجسم ($p=$٠.٠١٠٥)، وساعات الوقوف اليومية ($p=$٠.٠٣٦٧)، والعدد الأسبوعي للعمليات المنفذة ($p=$٠.٠١)، وساعات الجلوس اليومية في العمل ($p=$٠.٠٠٧٩). وقد ترتبط عوامل أخرى، ولكن ليس لها دلالة إحصائية ($p>$٠.٠٥)، مثل العمر والجنس وسنوات الممارسة والإجهاد والتدخين وساعات النوم اليومية والرضا الوظيفي. كانت الخيارات الأكثر شيوعًا لتخفيف الألم بين جراحي الأعصاب المصابين هي الأدوية والراحة.

**الاستنتاج :**لوحظ ارتفاع معدل انتشار آلام أسفل الظهر بين جراحي المخ والأعصاب وجراحي المخ والأعصاب المقيمين. العديد من عوامل الخطر المحددة تسلط الضوء على الحاجة إلى تجنبها، وينبغي النظر في استراتيجيات الوقاية الأولية لتقليل حدوث آلم أسفل الظهر في هذه الفئة من السكان.

**الكلمات المفتاحية: آلم أسفل الظهر، جراحي المخ والأعصاب، مدينة صنعاء، اليمن**