

## Knowledge and awareness toward lumbar disc herniation among general population

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### ABSTRACT

**Introduction:** Disc pathology is the most frequent cause of chronic LBP, with 39% of cases of LBP presenting with intervertebral disc disease, which makes it the most common condition among the degenerative abnormalities of the lumbar spine. Therefore, this study aims to investigate the knowledge and awareness of lumbar disc herniation among the public in single region in Saudi Arabia. **Methods and Materials:** This is a cross-sectional questionnaire-based study that was conducted among general population of Al Ahsa, the Eastern Province of Saudi Arabia in the period between January 2022 and June 2022. A previously published questionnaire in literature with similar research objectives was used in this study. Data were analyzed using descriptive analysis using Statistical Package for the Social Sciences (SPSS) v22. Results considered statistically significant with a P value less than 0.05. **Results:** A total of 995 participants completed the study questionnaire. A total of 100 (10.1%) were diagnosed with disc prolapse and 243 (24.4%) attended or watched an awareness about disc herniation. The exact 298 (29.9%) participants had good awareness levels, while 697 (70.1%) had poor awareness levels regarding Lumbar disc herniation (LDH), risk factors, clinical features and management. **Conclusion:** The study concluded that public awareness regarding lumbar disc herniation in Al-Ahsa was poor. Although, a good awareness level was observed among some groups such as, age group between 20-35 years, university educated, health care workers, single, high-income category and participants who had prior knowledge about the disease.

**Keywords:** knowledge and awareness, lumbar intervertebral disc prolapse, orthopedic spine surgery, lumber disc herniation, low back pain

### 1. INTRODUCTION

Low back pain (LBP) is known to be a significant public health issue, causing multiple severe consequences with a lifetime prevalence that goes up to 84% (Balague et al., 2012). There are various causes of back pain. However, disc pathology is considered the most frequent cause of chronic LBP, with 39% of cases of LBP presented by intervertebral disc diseases (Hakim and Mohsen, 2017; Adams and Dolan, 2012). In addition, a percentage of 2 to 3 of the

population may be affected by lumbar disc herniation (LDH), with a prevalence of 4.8% and 2.5% among men and women over 35, respectively, making it the most common condition among the degenerative abnormalities of the lumbar spine (Vialle et al., 2015). Lumbar disc herniation, which occurs at L4-5 and L5-S1 levels, results from the intervertebral disc's content dislocation (the pulposus nucleus) in which the outer layer annulus fibrosus is injured (Vialle et al., 2015). Once damaged, the inner gelatinous material (nucleus pulposus) bulges out with the content passing through the fibrous ring; in the posterolateral direction (Vialle et al., 2015). Consequently, the intervertebral disc loses its function as a load transferor and shock absorber (Vialle et al., 2015). Disc herniation is a condition that arises as a result of trauma, obesity, pregnancy, weight lifting, constipation and results from a rise in the disc pressure by potential overloading (Vialle et al., 2015). Patients usually present with low back pain that worsens during sitting and bending postures and often radiates down the posterior or lateral aspect of the leg to below the knee (Humphreys and Eck, 1999). Also, they might experience tingling, numbness, and muscle weakness in the leg or foot (Humphreys and Eck, 1999). The risk factors of LDH are multifactorial, some being modifiable like obesity and smoking and others are non-modifiable like genetic makeup and the aging process (Zielinska et al., 2021). As for age and gender, the most susceptible age group is between 35 to 50 years and men are two times more susceptible than women (Alobari et al., 2020). Also, physical activity and occupation have shown a significant positive association between extreme forward bending and lumbar disc herniation and significant relation between cumulative exposure to weight lifting and lumbar disc herniation (Seidler et al., 2003). Another study in Mexico showed an association between obesity, visceral fat area, body mass index and abdominal circumference with lumbar disc herniation (Mateos-Valenzuela et al., 2020).

Multiple studies have been done in Saudi Arabia to assess people's knowledge regarding LDH in different regions (Alshammari et al., 2021). In a hospital-based study in Al Madinah Al Munawarah, the results showed they had good knowledge regarding LDH, as most of them had disc pathology and had been educated in the hospital (Murshid et al., 2020). On the other hand, in Aseer region, the awareness was very poor regarding disc prolapse, its risk factors, management and prevention (Alshehri et al., 2019). Studies have been conducted in Hail and Taif cities, showing higher knowledge in the latter (Alreshidi et al., 2021; Sahrah et al., 2016). However, there is a lack of knowledge about this matter in the eastern province. Therefore, this study aims to investigate the knowledge and awareness of lumbar disc herniation among the public in Al-Ahsa region in the Eastern Province of Saudi Arabia.

## 2. MATERIALS AND METHODS

This is a cross-sectional anonymous questionnaire-based study that was performed among 995 participants of general population of Al Ahsa, the Eastern Province of Saudi Arabia in the period between January 2022 and June 2022. The questionnaire used in this study acquired from a previous study in the literature with similar research objectives (Alobari et al., 2020). The questionnaire was transferred to Google Forms and distributed online in the social media among the general population of Al Ahsa region. Informed consent was obtained stating the study's demands before proceeding with the questionnaires, with those who agreed to participate were enrolled. Those who denied giving their permission for their data to be used in this study were excluded.

The study was approved by the Institutional Research Board (IRB) and the Research Ethics Committee of King Faisal University in Al-Ahsa, Saudi Arabia with number (KFU-REC-2021-DEC-EA000278). The questionnaire has several questions distributed in 3 sections. The first section covers the personal and socio-demographic data including age, sex, job, marital status, level of education and monthly income. The second section evaluates the participants' awareness regarding low back pain and risk factors, clinical features, conservative and surgical management of LDH. The third section tests the participants' attitude and perception towards patients' satisfaction after surgery and possibility of recovery from LDH.

### Data analysis

After extraction, data were revised, coded and entered to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). The statistical analysis in this study was completed using two-tailed tests. P value less than 0.05 was statistically significant. For knowledge and awareness questions, one point for each question answered correctly and total score for all the questions was calculated. Good awareness level is considered for the participants who got 60% or more of the total, while poor awareness level is considered for the participants who got less than 60%. Based on frequency and percent distribution, descriptive analysis was used for all variables including participants' socio-demographic data, being diagnosed with LDH, attending health education regarding LDH and type of awareness activity. Also, participants' awareness items with overall awareness level regarding LDH were tabulated and graphed besides their attitude towards LDH recovery and patients' satisfaction. For the assessment of factors associated with participants' awareness level of LDH cross-tabulation was used. Pearson chi-square was used to test relations and exact probability test for small frequency distributions.

### 3. RESULTS

A total of 995 participants completed the study questionnaire. Participants' ages varied between 18 to more than 50 years, with a mean age of  $27.3 \pm 12.9$  years old. The exact 502 (50.5%) participants were males and 704 (70.8%) had a university level education while 242 (24.3%) had a secondary level education. As for the study field, 454 (64.5%) were non healthcare workers, while 250 (35.5%) were healthcare workers. A total of 620 (62.3%) were married. A monthly income of less than 5000 SR was reported among 26%, 31.8% had a monthly income of 5000-10000 SR and 21.4% exceeded 15000 SR. A total of 100 (10.1%) were diagnosed with disc prolapse and 243 (24.4%) attended or watched an awareness about the herniated disc. The primary source was electronic pamphlets (50.6%), Health education campaigns (41.6%), Paper pamphlets (30.9%) and conferences (16.9%) (Table 1)

**Table 1** Personal data of study participants, Al-Ahsa region, Eastern of Saudi Arabia

Personal data	No	%
Age in years		
< 20	80	8.0%
20-35	515	51.8%
36-50	280	28.1%
> 50	120	12.1%
Gender		
Male	502	50.5%
Female	493	49.5%
Education		
Below secondary	49	4.9%
Secondary	242	24.3%
University / above	704	70.8%
Study field		
Non-health care sector	454	64.5%
Health care sector	250	35.5%
Marital status		
Single	365	36.7%
Married	620	62.3%
Divorced / widow	10	1.0%
Monthly income		
< 5000 SR	259	26.0%
5000-10000 SR	316	31.8%
10000-15000 SR	207	20.8%
> 15000 SR	213	21.4%
Have you been diagnosed with a herniated disc?		
Yes	100	10.1%
No	895	89.9%
Have you ever attended or watched awareness about herniated disc?		

Yes	243	24.4%
No	752	75.6%
Type of awareness activity		
Health education campaigns	101	41.6%
Conferences	41	16.9%
Paper pamphlets	75	30.9%
Electronic pamphlets	123	50.6%
Others	7	2.9%

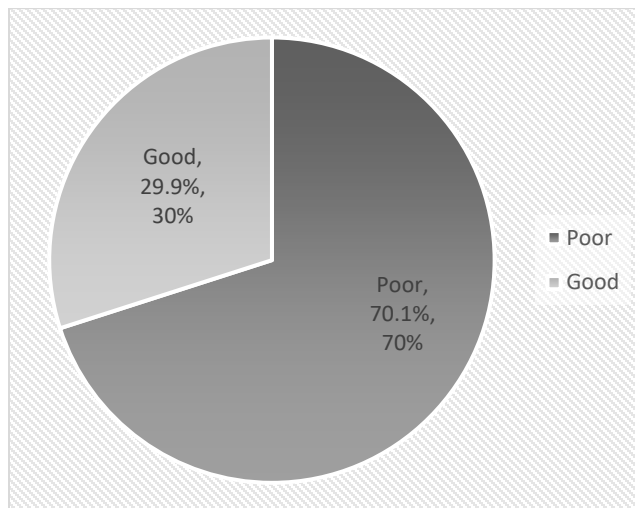
**Table 2** Participants awareness regarding Lumbar disc herniation (LDH), risk factors, clinical features and management, Al-Ahsa region, Eastern of Saudi Arabia

Awareness items		No	%
The reason for herniated disc is injury or weakness causes slipping the inner part of cartilage across the external ring?	Yes	583	58.6%
	No	55	5.5%
	Don't know	357	35.9%
Risk factors of disc herniation?	Old age	506	50.9%
	Increased weight	694	69.7%
	Carrying heavy weights	841	84.5%
	Sitting for long hours	391	39.3%
	Smoking	66	6.6%
	Lack of knowledge	120	12.1%
Which is incorrect about vertebral column?	The back and abdominal muscles do not support the spine	339	34.1%
	Between each vertebra and another is a disc works on shock absorbers	161	16.2%
	The vertebrae form a channel through which the spinal cord passes	92	9.2%
	It consists of the cervical, thoracic, lumbar and sacral vertebrae	143	14.4%
	Don't know	260	26.1%
What is backpain?	Pain in any part of the back, from the neck to the pelvis	460	46.2%
	Lower chest intercostal pain and pelvis	292	29.3%
	Pains will be in the abdomen or the anterior pelvis	67	6.7%
	Don't know	176	17.7%
Back pain is?	Common health problem	674	67.7%
	Health problem at old age	141	14.2%
	Indicate serious disease	34	3.4%
	Rare health problem in our	37	3.7%

	community		
	Don't know	109	11.0%
What is acute low back pain?	Sudden pain in the lower back region and disappears within three to six weeks of treatment or without	402	40.4%
	Pain in the lower back region that lasts for more than three months	158	15.9%
	Pain in the lower back region that requires surgical intervention	149	15.0%
	Pain cannot be treated in the lower area of the back	53	5.3%
	Don't know	233	23.4%
	What is chronic low back pain?	Pain in the lower back region that lasts for more than three months	326
It is pain in the lower back area and usually disappears within three to six weeks of treatment or without		113	11.4%
It is pain in the lower back region that requires surgical intervention		201	20.2%
Are pain cannot be treated in the lower area of the back		134	13.5%
Don't know		221	22.2%
What is sciatica?	The pain will be between the Low thoracic ribs and stretch to legs and feet	438	44.0%
	Pains in the abdomen or the anterior part of the pelvis	72	7.2%
	Pain in any part of the back, from the neck to the pelvis	201	20.2%
	Don't know	284	28.5%
Complications of diseases in the lower vertebrae that cause pain:	Lower extremity paralysis	336	33.8%
	Weakness in the lower extremities	511	51.4%
	Sexual problems	233	23.4%
	Urinary bladder dysfunction	241	24.2%
	Don't know	333	33.5%
The following symptoms may accompany the low back pain:	Lower back pain that worsens with heavy lifting	797	80.1%
	Difficulty picking up things from below	740	74.4%
	Cough with loss of energy	51	5.1%
	Difficult breathing	92	9.2%
	Don't know	121	12.2%

Which of the following may cause low back pain?	Arthritis and herniated disc	844	84.8%
	Wrong postures	844	84.8%
	Tumours	396	39.8%
	Infection and fractures	396	39.8%
	Cold weather	378	38.0%
	DM	87	8.7%
	Don't know	126	12.7%
Severe low back pain can:	Continue for a long time	502	50.5%
	Influence the patient's lifestyle	680	68.3%
	Frequent use of analgesics indicates the severity of the pain	427	42.9%
	Not influence the patient's lifestyle	35	3.5%
	Don't know	161	16.2%
For the treatment of acute low back pain:	Requires an extended period of rest	522	52.5%
	Low back pain may get better without treatment	277	27.8%
	Avoid resting, sluggish, and lying down all day	299	30.1%
	Requires extended sick leave from work	380	38.2%
	Don't know	230	23.1%
What can be used to treat lower back pain?	Long use of anti-inflammatory drugs	166	16.7%
	Exercises and guide to protect the spine	640	64.3%
	Bier's oven	195	19.6%
	The use of support belt	545	54.8%
	Don't know	221	22.2%
Regarding physical activities and low back pain:	Walking three times a week for an hour can improve lower back pain	121	12.2%
	Vigorous exercise required to treat acute lower back pain	459	46.1%
	Aquas activities may help treat chronic lower back pain	89	8.9%
	The most recommended exercises are exercises to strengthen the abdominal muscles and lower back	118	11.9%
	Don't know	208	20.9%
To protect the spine:	Got to get out of bed slowly	92	9.2%
	Avoid carrying heavy objects on one side of the body	156	15.7%
	Avoid spraining the spine	50	5.0%

	Wearing high heels all day long	564	56.7%
	Don't know	133	13.4%
For acute low back pain:	The majority of patients recover within three to six weeks	279	28.0%
	After the improvement and recovery from the pain no return	122	12.3%
	Only when pain occurs, you must follow the instructions to protect the spine	443	44.5%
	Awareness of how to protect the spine should be routine	599	60.2%
	Don't know	232	23.3%
For low back surgery:	It is required in some cases	597	60.0%
	It may be important in cases of pressure on the nerve roots	594	59.7%
	Surgical intervention ensures recovery from lower back pain	142	14.3%
	It is the best treatment for any type of lower back pain	139	14.0%
	Don't know	208	20.9%
For the drug treatment of lower back pain:	Anti-inflammatory drugs and analgesics can be used when pain occurs	119	12.0%
	Corticosteroids may be necessary when acute pain occurs	135	13.6%
	Antidepressants and anticonvulsants can be used for chronic low back pain	243	24.4%
	Topical medications such as gels, patches and ointments are always required	185	18.6%
	Don't know	313	31.5%
Which of the following may be used to treat chronic low back pain or sciatica?	Acupuncture	150	15.1%
	Ironing	97	9.7%
	Physiotherapy	650	65.3%
	Surgical intervention when needed	549	55.2%
	Don't know	221	22.2%



**Figure 1** Overall public awareness level regarding Lumbar disc herniation (LDH), risk factors, clinical features and management, Al-Ahsa region, Eastern of Saudi Arabia

Participants' attitude and perception toward patients' satisfaction and recovery of lumbar disc herniation is described in Table 3. A total of 30 (3%) participants think that all patients are satisfied with surgical treatment of LDH, 197 (19.8%) believe that most patients are satisfied and 167 (16.8%) believe that half of the patients are satisfied. In comparison, 199 (20%) think few patients are satisfied. Also, 668 (67.1%) participants agreed that it is possible to recover from disc prolapse (Table 3).

**Table 3** Participants attitude and perception towards patients' satisfaction and recovery of lumbar disc herniation

Participants attitude and perception	No	%
Patients' satisfaction regarding surgical treatment		
All patients are satisfied	30	3.0%
Most patients are satisfied	197	19.8%
Half patients are satisfied	167	16.8%
Few patients are satisfied	199	20.0%
Don't know	402	40.4%
Do you think there is a possibility of recovery for a person with a disc prolapsed?		
Yes	668	67.1%
No	73	7.3%
Don't know	254	25.5%

Factors associated with public awareness levels regarding Lumbar disc herniation (LDH) are explained in Table 4. Good awareness level regarding LDH was detected among 36.1% of participants aged 20-35 years compared to 19.3% of those aged 36-50 years with recorded statistical significance (P=.001). Furthermore, 34.7% of university educated participants had a good level of awareness versus 8.2% of the low educated group (P=.001). Additionally, 59.6% of healthcare workers had a good level of awareness in comparison to 20.9% of non healthcare workers (P=.001). A total of 35.3% of single participants had a good awareness of LDH compared to 26.8% of the married group (P=.018). Good awareness was among 43.7% of the high-income category versus 25.5% of the low income group (P=.001). Exactly 40.3% of those who attended or watched an awareness about herniated disc had a good level of awareness versus 26.6% of others who did not (P=.001). Also, 35.9% of participants who think there is a possibility of recovery for a person with a disc prolapse had good awareness versus 14.2% who did not know (P=.001) (Table 4).

**Table 4** Factors associated with public awareness level regarding Lumbar disc herniation (LDH), Al-Ahsa region, Saudi Arabia

Factors	Overall awareness level				P value
	Poor		Good		
	No	%	No	%	



Age in years					.001*
< 20	60	75.0%	20	25.0%	
20-35	329	63.9%	186	36.1%	
36-50	226	80.7%	54	19.3%	
> 50	82	68.3%	38	31.7%	
Gender					.643
Male	355	70.7%	147	29.3%	
Female	342	69.4%	151	30.6%	
Education					.001*
Below secondary	45	91.8%	4	8.2%	
Secondary	192	79.3%	50	20.7%	
University/above	460	65.3%	244	34.7%	
Study field					.001*
Non-health care sector	359	79.1%	95	20.9%	
Health care sector	101	40.4%	149	59.6%	
Marital status					.018*\$
Single	236	64.7%	129	35.3%	
Married	454	73.2%	166	26.8%	
Divorced / widow	7	70.0%	3	30.0%	
Monthly income					.001*
< 5000 SR	193	74.5%	66	25.5%	
5000-10000 SR	235	74.4%	81	25.6%	
10000-15000 SR	149	72.0%	58	28.0%	
> 15000 SR	120	56.3%	93	43.7%	
Have you been diagnosed with a herniated disc?					.255
Yes	75	75.0%	25	25.0%	
No	622	69.5%	273	30.5%	
Have you ever attended or watched awareness about herniated disc?					.001*
Yes	145	59.7%	98	40.3%	
No	552	73.4%	200	26.6%	
Do you think there is a possibility of recovery for a person with a disc prolapsed?					.001*
Yes	428	64.1%	240	35.9%	
No	51	69.9%	22	30.1%	
Don't know	218	85.8%	36	14.2%	

P: Pearson X<sup>2</sup> test\$; Exact probability test \* P < 0.05 (significant)

#### 4. DISCUSSION

Lumbar disc herniation is a significant health problem and a leading cause of disability in developing countries. A total of 995 participants have completed the study questionnaire. The number of males compared to females is almost equal, 50.5% and 49.5%, respectively. Nearly two-thirds of the participants (70.8%) have a higher educational level than in the previous study where less than half were highly educated (Murshid et al., 2020). Moreover, 35.5% of the participants' works in the healthcare sector versus 64.5% are from the general population. An exact 10.1% of participants have been diagnosed with a herniated disc, as shown in Table 1. Most of the participants (75.6%) had not attended or watched awareness about disc herniation. Out of those who attended or watched an educational source, electronic pamphlets were the most common source of information about LDH, as shown in Table 1. A study conducted in Hail revealed that 92.2% of the participants reported that they haven't attended an awareness activity concerning disc herniation (Alreshidi et al., 2021).

According to participants' awareness regarding Lumbar disc herniation (LDH), risk factors, clinical features and management, nearly half of the participants (50.9%) think old age is a risk factor for LDH. Also, 69.7% of the participants consider increased

weight as a risk factor. Exact 84.5% of participants believe that carrying heavy weights is a risk factor. Otherwise, only 39.3% of the participants think that sitting for long hours is a risk factor. A study demonstrated that more than half of the participants believe that old age, physically demanding jobs and a sedentary lifestyle are risk factors for LDH (Murshid et al., 2020). Similar findings were reported in previous studies where lifting heavy weights and related work are considered a risk factor for having disk herniation (Hakim and Mohsen, 2017; Adams, 2018). Regarding surgical treatment, 3% of the participants think that all patients are satisfied, whereas 20% believe that few patients are satisfied. Moreover, around two-thirds of the participants (67.1%) think that recovery from disc prolapse is possible. Generally, the study showed greater than two-thirds of the participants (70.1%) had poor overall knowledge regarding LDH, risk factors, clinical features and management.

According to the factors associated with public awareness level, there is no significant difference between males and females in the overall awareness level. Furthermore, 36.1% of the participants aged between 20-35 had higher overall knowledge levels, followed by participants whose ages were more than 50 years old. Different results were reported in previous studies where increasing awareness level correlates with age (Murshid et al., 2020; Sahrah et al., 2016). The exact 34.7% of highly educated participants have a good level of awareness in comparison to 8.2% of participants with below secondary education. In addition, participants in the healthcare sector (59.6%) have good knowledge versus 20.9% of those who work in other occupations. Regarding marital status, the highest level of awareness was among single participants (35.3%), followed by divorced/widow (30%) and married (26.8%). However, previous studies demonstrated that married participants have a better knowledge level than single or divorced/widows (Murshid et al., 2020; Alshehri et al., 2019; Sahrah et al., 2016). In addition, 40.3% of participants who have attended or watched awareness about herniated disc have an excellent knowledge compared to 26.6% of those who have not.

## 5. CONCLUSION

The study revealed that the awareness level regarding Lumbar Disc Herniation among the public in Al-Ahsa was generally poor. However, a good awareness level was noticed among participants aged between 20-35 years, university educated, health care workers, single, high-income category and who previously received awareness about the disease. Male to the female difference in knowledge regarding LDH was not observed. The study concluded that appropriate measures are needed to promote public awareness regarding LDH in the region. Health education campaigns about the risk factors, clinical features and management of LDH targeting the general population in the area are recommended.

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### Author Contribution

All Authors contributed equally to study conception and design, data collection and presentation, supervision, literature review, writing manuscript, critical revision and final approval for publication.

### Ethical Approval

Ethical approval was obtained from the Institutional Research Board (IRB) and the Research Ethics Committee of King Faisal University in Al-Ahsa, Saudi Arabia with number (KFU-REC-2021-DEC-EA000278).

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This study has not received any external funding.

### Conflict of interest

The authors declare that there is no conflict of interests.

### Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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