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Frequency of Recurrence Lumbar Disc Herniation after Conventional Discectomy

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ABSTRACT

Background: Lumbar disc herniation is a frequent spinal condition that may require surgical intervention when conservative management fails. Conventional discectomy remains a widely practiced approach, yet recurrence of herniation continues to pose a clinical challenge, contributing to postoperative morbidity and repeated interventions. Understanding recurrence rates and associated risk factors is essential for improving surgical outcomes. **Objective:** To determine the frequency of recurrence lumbar disc herniation in patients with conventional discectomy. **Study Design:** Descriptive study. **Duration and Place of Study:** This study was conducted from January 2025 to May 2025 in the Department of Neurosurgery, Lady Reading Hospital, Peshawar. **Methodology:** A total of 119 patients aged 20–60 years with lumbar disc herniation confirmed on magnetic resonance imaging and undergoing conventional discectomy were included. Recurrence was defined as a new or increased protrusion or extrusion exceeding 25% of the disc circumference at the same or adjacent level within six months of surgery, confirmed on magnetic resonance imaging with associated clinical features. **Results:** The mean age of participants was 41.65 ± 10.24 years, with a male predominance (67.2%). Recurrence occurred in 11 patients (9.2%). Diabetes showed a significant association with recurrence ($p < 0.001$), while other factors such as age, gender, body mass index, socioeconomic status, residence, duration of complaints, and smoking were not statistically significant. **Conclusion:** The recurrence rate of lumbar disc herniation following conventional discectomy was 9.2%, with diabetes emerging as a significant predictor.

INTRODUCTION

Lumbar disc herniation is one of the most frequent spinal disorders seen in clinical practice, and presenting with low back pain and radiculopathy resulting from compression of the nerve roots.[1] This disorder is largely linked with degenerative alterations in the intervertebral disc, resulting in annular tears and extrusion of the nucleus pulposus.[2] There is mostly functional impairment, neurological symptoms, and diminished quality of life for the patient, necessitating early diagnosis and appropriate management for optimum results.[3] Although initial management is conservative, an appreciable number of the patients finally need surgical management.[4]

Discectomy has also long been the accepted gold standard surgical management for lumbar disc herniation, with goals for decompressing impinged lumbar nerve roots and for removing attendant symptoms.[5] Standard discectomy utilizes intertrochanteric excision of the offending herniated fragment by the posterior approach, with the rapid relief of radicular pain and neurologic deficiency.[6] This operation is most frequently carried out because of its efficacy, reduced perioperative complication ratio, and accepted postoperative restoration of functional capability.[7] Long-term results are inconsistent, however, with postoperative problems consisting of chronic pain, scarring, and risk for recurrence remaining clinical issues.[8] Recurring lumbar disc herniation after standard discectomy continues to be an appreciable issue, with an incidence between 5% to 15% according to the follow-up period and patient-related risk factors.[9] Recurrence most often results as the consequence of an inadequate removal of fragmental disc material, annular inadequacy after removal, or remaining degenerative changes at the surgery level.[10] Recurring patients most often develop similar symptoms to the initial event with the need for additional diagnostic assessment and, in the overwhelming majority, reoperation.[11] Recurrence not only intrudes on the quality of the patient's life but also burdens the health system with an early need for perfection of the surgical procedure as well as the establishment of preventive protocols with the aim to reduce the risk of reherniation.[12]

In a study by Park JS, et al. has shown that frequency of recurrence lumbar disc herniation was 5.2% in patients

with conventional discectomy.[13]

METHODOLOGY

This descriptive study was carried out in the Department of Neurosurgery at Lady Reading Hospital, Peshawar, from January 2025 to May 2025. Approval for the study was obtained from the institutional ethics review committee and the College of Physicians and Surgeons of Pakistan before data collection began. The study included 119 patients, with sample size estimated using the World Health Organization sample size calculator, applying a 95% confidence level, 4% margin of error, and an expected recurrence frequency of 5.2% following conventional discectomy.[13] Participants were recruited using a non-probability consecutive sampling method.

Patients aged 20 to 60 years of either sex, with lumbar disc herniation confirmed on magnetic resonance imaging and scheduled for conventional discectomy, were eligible. Those with a history of fragment removal without disc space entry, multi-level disc herniation, surgery for trauma or infection, prior spinal surgery at the same level, spinal deformity, or pregnancy confirmed by human chorionic gonadotropin were excluded. Informed written consent was obtained from all participants prior to inclusion, with assurance of confidentiality and voluntary participation.

Baseline demographic information was recorded, including age, sex, body mass index, socioeconomic class, residential status, diabetes, smoking habits, and duration of complaints. Detailed history and clinical examination were performed before surgery, and findings were documented. Lumbar disc herniation was described as extrusion of nucleus pulposus material through the annulus fibrosus involving less than one-quarter of the disc circumference on magnetic resonance imaging. Recurrence was identified when a new or increased disc protrusion or extrusion exceeding one-quarter of the circumference was noted at the operated or adjacent level within six months of surgery, along with back pain greater than three on the Visual Analogue Scale, nerve root compression, or scar tissue formation on magnetic resonance imaging.

Data analysis was carried out using SPSS version 26. Continuous variables were expressed as mean with standard deviation or median with interquartile range depending on normality tested by Shapiro–Wilk. Categorical data were summarized as frequencies and percentages. Recurrence was stratified across subgroups, and associations were tested using chi-square or Fisher's exact test, with $p \leq 0.05$ considered statistically significant.

RESULTS

The study included 119 patients with a mean age of 41.65±10.24 years and mean BMI of 24.35±2.51 Kg/m^2. The duration of complaints averaged 6.45±3.32 months (Table-I). The cohort was predominantly male with 80 patients (67.2%) compared to 39 females (32.8%). Regarding socioeconomic distribution, 49 patients (41.2%) were from poor backgrounds, 48 (40.3%) from middle class, and 22 (18.5%) from rich families. Residential status showed 57 patients (47.9%) from rural areas and 62 (52.1%) from urban areas. Diabetes was present in 18 patients (15.1%) while 101 (84.9%) were non-diabetic. Smoking history was reported in 26 patients (21.8%) with 93 (78.2%) being non-smokers (Table 1).

Table 1

Patient Demographics

Demographics		Mean ± SD
Age (years)		41.65±10.24
BMI (Kg/m^2)		24.35±2.51
Duration of complaints (months)		6.45±3.32
Gender	Male n (%)	80 (67.2%)
	Female n (%)	39 (32.8%)
Socioeconomic Status	Poor n (%)	49 (41.2%)
	Middle n (%)	48 (40.3%)
	Rich n (%)	22 (18.5%)
Residential Status	Rural n (%)	57 (47.9%)
	Urban n (%)	62 (52.1%)
Diabetes	Yes n (%)	18 (15.1%)
	No n (%)	101 (84.9%)
Smoking	Yes n (%)	26 (21.8%)
	No n (%)	93 (78.2%)

The overall frequency of recurrence lumbar disc herniation after conventional discectomy was 11 cases (9.20%) while 108 patients (90.80%) remained recurrence-free (Table 1).

Table 2

Frequency of Recurrence Lumbar Disc Herniation After Conventional Discectomy

Recurrence Lumbar Disc Herniation	Frequency	% age
Yes	11	9.20%
No	108	90.80%
Total	119	100%

Stratified analysis revealed no significant association between recurrence and age groups, with 4 cases (7.0%) in patients ≤40 years versus 7 cases (11.3%) in those >40 years (p=0.533). Gender distribution showed 9 recurrences (11.3%) in males and 2 (5.1%) in females (p=0.337). BMI stratification demonstrated 8 recurrences (11.0%) in patients with BMI ≤25 Kg/m^2 compared to 3 cases (6.5%) in those with BMI >25 Kg/m^2 (p=0.526). Socioeconomic status analysis revealed 7 recurrences (14.3%) in poor patients, 4 cases (8.3%) in middle class, and no recurrences (0.0%) in rich patients (p=0.135). Rural patients experienced 7 recurrences (12.3%) while urban patients had 4 cases (6.5%) (p=0.349). Duration of complaints showed 3 recurrences (12.0%) in patients with ≤3 months duration versus 8 cases (8.5%) in those with >3 months duration (p=0.697). Notably, diabetes demonstrated a highly significant association with recurrence, showing 9 cases (50.0%) in diabetic patients compared to only 2 cases (2.0%) in non-diabetic patients (p<0.001). Smoking status revealed 4 recurrences (15.4%) in smokers and 7 cases (7.5%) in non-smokers (p=0.253) (Table 3).

Table 3
Association of Recurrence Lumbar Disc Herniation with Demographic Factors

Demographic Factors		Recurrence Lumbar Disc Herniation		p-value
		Yes n(%)	No n(%)	
Age (years)	≤40	4 (7.0%)	53 (93.0%)	0.533*
	>40	7 (11.3%)	55 (88.7%)	
Gender	Male	9 (11.3%)	71 (88.8%)	0.337*
	Female	2 (5.1%)	37 (94.9%)	
BMI (Kg/m^2)	≤25	8 (11.0%)	65 (89.0%)	0.526*
	>25	3 (6.5%)	43 (93.5%)	
Socioeconomic Status	Poor	7 (14.3%)	42 (85.7%)	0.135*
	Middle	4 (8.3%)	44 (91.7%)	
	Rich	0 (0.0%)	22 (100.0%)	
Residential Status	Rural	7 (12.3%)	50 (87.7%)	0.349*
	Urban	4 (6.5%)	58 (93.5%)	
Duration of Complaints	≤3 months	3 (12.0%)	22 (88.0%)	0.697*
	>3 months	8 (8.5%)	86 (91.5%)	
Diabetes	Yes	9 (50.0%)	9 (50.0%)	<0.001*
	No	2 (2.0%)	99 (98.0%)	
Smoking	Yes	4 (15.4%)	22 (84.6%)	0.253*
	No	7 (7.5%)	86 (92.5%)	

*Fischer Exact Test

DISCUSSION

Our findings demonstrate an overall recurrence rate of 9.2%, which falls within the acceptable range reported in contemporary spine surgery literature. The demographic profile of our cohort reflects typical characteristics of patients presenting with lumbar disc herniation, with a mean age of 41.65 years representing the peak working-age population most susceptible to degenerative disc disease due to cumulative mechanical stress and age-related changes in disc composition. The male predominance observed in our study (67.2%) aligns with the established epidemiological pattern of lumbar disc herniation, likely attributable to occupational factors, higher engagement in physically demanding activities, and biomechanical differences in spinal loading patterns between genders. The mean BMI of 24.35 Kg/m^2 indicates a patient population within the normal-to-overweight range, suggesting that severe obesity was not a predominant factor in our cohort, though the relationship between BMI and recurrence showed no statistical significance, possibly due to the multifactorial nature of disc herniation pathophysiology.

Most significantly, diabetes emerged as the sole statistically significant predictor of recurrence ($p<0.001$), with diabetic patients demonstrating a dramatically elevated recurrence rate of 50% compared to 2% in non-diabetic patients. This finding can be explained by the deleterious effects of chronic hyperglycemia on collagen synthesis, impaired wound healing, compromised microvascular circulation, and altered inflammatory responses that collectively impair proper disc healing and predispose to structural failure at the surgical site.

Our observed recurrence rate of 9.2% aligns closely with the literature, falling within the established range reported by multiple studies. Ovcharov ME et al. [14] documented a cumulative re-operation rate of 7.5% in their 5-year retrospective cohort of 589 patients, while Parker SL et al. [15] reported re-operation rates of 6% in their prospective registry study, both demonstrating comparable frequencies to our findings. Similarly, Park JS et al. [13] found recurrence rates of 5.2-7% in their case-control study comparing different surgical techniques. However, some studies have reported slightly higher rates, with Kim YG et al. [16] documenting 21.1% same-level recurrence in their Korean cohort, though this discrepancy may be attributed to their older patient population (mean age 61.9 years) compared to our cohort's mean age of 41.65 years, as advanced age is associated with progressive degenerative changes and compromised healing capacity.

The demographic profile of our study population mirrors patterns observed internationally. Our male predominance of 67.2% is consistent with Eissa MA et al. [17] who reported 75% male patients, Goker B & Aydin S [18] with 73% males, and Kim YG et al. [16] with 81.7% male patients, reinforcing the established epidemiological trend of lumbar disc herniation affecting men more frequently due to occupational and biomechanical factors. Our mean age of 41.65 years falls within the typical working-age demographic reported across studies, though slightly younger than some cohorts such as Eissa MA et al. [17] (49.5 vs 40.3 years) and Kim YG et al. [16] (61.9 years), which may partially explain our favorable recurrence rates as younger patients typically demonstrate better healing responses.

The most striking finding in our study was the highly significant association between diabetes and recurrence ($p<0.001$), with diabetic patients showing a 50% recurrence rate compared to 2% in non-diabetic patients. This finding is strongly supported by the WFNS committee recommendations by Zileli M et al. [19] who identified diabetes as a risk factor with strong consensus agreement among spine surgeons. The pathophysiological basis for this association lies in diabetes-induced impairment of collagen synthesis, compromised wound healing, and altered inflammatory responses that collectively predispose to structural failure at the surgical site. Interestingly, while Yin S et al. [20] in their meta-analysis of percutaneous endoscopic procedures identified obesity (BMI ≥25) as an independent risk factor with recurrence rates of 4.8% versus 1.5% in non-obese patients, our study found no significant association between BMI and recurrence, possibly due to our relatively normal mean BMI of 24.35 kg/m^2 and different surgical approach.

Contrary to some literature findings, our study did not demonstrate significant associations between recurrence and age, gender, or smoking status. While Yin S et al. [20] reported higher recurrence rates in patients ≥50 years (4.3% vs 2.7%), and Zileli M et al. [19] identified younger age, male sex, and smoking as risk factors with strong agreement, our results suggest that in the presence of diabetes as a dominant risk factor, these traditional demographic variables may have diminished predictive value. The lack of significance in our smoking analysis (15.4% recurrence in smokers vs 7.5% in non-smokers, $p=0.253$) contrasts with established knowledge about smoking's detrimental effects on tissue healing, possibly indicating that our sample size was insufficient to detect this association or that diabetes overwhelmed other risk factors in our population.

Our findings contribute to the growing body of evidence supporting comprehensive preoperative assessment of metabolic comorbidities, particularly diabetes, as integral components of surgical decision-making and patient

counseling. The dramatic difference in recurrence rates between diabetic and non-diabetic patients underscores the importance of optimizing glycemic control preoperatively and implementing enhanced postoperative monitoring protocols for high-risk patients. Several limitations must be acknowledged in interpreting our results. This was a single-center study conducted at one institution, which may limit the generalizability of our findings to other healthcare settings with different patient populations, surgical techniques, or postoperative care protocols. The relatively small sample size of 119 patients, while adequate for detecting the strong association with diabetes, may have been insufficient to identify more subtle associations with other demographic factors such as smoking or BMI. The follow-up duration and methodology for detecting recurrence were not standardized, potentially leading to underreporting of asymptomatic recurrences or those managed conservatively. Furthermore, we did not account for surgeon-specific factors, variations in surgical technique, extent of disc removal, or postoperative rehabilitation protocols, all of which may influence recurrence rates and could represent important confounding variables in our analysis.

CONCLUSION

Our study has concluded that conventional discectomy remains an effective surgical intervention for lumbar disc herniation with an acceptable recurrence rate that aligns with contemporary literature. The comprehensive analysis of demographic factors revealed that metabolic comorbidities, particularly diabetes mellitus, represent the most significant predictor of recurrence, while traditional risk factors including age, gender, BMI, socioeconomic status, residential location, duration of symptoms, and smoking history showed no significant association with recurrence in our population.

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REFERENCES

1. Musa G, Makirov SK, Susin SV, Chmutin GE, Kim AV, Hovrin DV, et al. Repeat discectomy for the management of same-level recurrent disc herniation: a study of 50 patients. Cureus. 2023;15(6):e40469. https://doi.org/10.7759/cureus.40469.
2. Musa G, Abakirov MD, Arzoumi N, Mamyrbaev ST, Castillo REB, Chmutin GE, et al. Is transforaminal endoscopic discectomy the best option for recurrent lumbar disc herniation? A systematic review. Int J Spine Surg. 2025;19(1):49-56. https://doi.org/10.14444/8698.
3. Xing Z, Guo H, Song Y, Cai L, Zhang R, Zhu M. Development and validation of a nomogram for predicting postoperative recurrent lumbar disc herniation after unilateral biportal endoscopic discectomy. Sci Rep. 2025;15(1):26336. https://doi.org/10.1038/s41598-025-10943-w.
4. López AG, Ezquerro MTH, Pérez MM. Risk factor analysis of persistent low back pain after microdiscectomy: a retrospective study. Heliyon. 2024;10(19):e38549. https://doi.org/10.1016/j.heliyon.2024.e38549.
5. Beck J, Westin O, Klingenstierna M, Baranto A. Full-endoscopic lumbar discectomy vs standard discectomy: a noninferiority study on clinically relevant changes. Int J Spine Surg. 2023;17(3):364-369. https://doi.org/10.14444/8458.
6. AlAli KF. Minimally invasive tubular microdiscectomy for recurrent lumbar disc herniation: step-by-step technical description with safe scar dissection. J Orthop Surg Res. 2023;18(1):755. https://doi.org/10.1186/s13018-023-04226-1.
7. Song K, Liang J, Zhang M, Cai S, Wang Y, Wu W. Comparison of different treatments for lumbar disc herniation: a network meta-analysis and systematic review. BMC Surg. 2025;25(1):259. https://doi.org/10.1186/s12893-025-02992-9.
8. Li G, Park WM, Cha T. A perspective on reoperations after surgical treatments of degenerative lumbar diseases. J Orthop Transl. 2025;51:159-162. https://doi.org/10.1016/j.jot.2025.01.014.
9. Ambrosio L, Vadalà G, de Rinaldis E, Muthu S, Ćorluka S, Buser Z, et al. Discectomy versus sequestrectomy in the treatment of lumbar disc herniation: a systematic review and meta-analysis. Spine J. 2025;25(2):211-226. https://doi.org/10.1016/j.spinee.2024.09.007.
10. Moon KS, Villanueva-Solorzano PL, Lee CN, Park SS. Hybrid unilateral biportal endoscopy-unilateral laminotomy for bilateral decompression/percutaneous endoscopic lumbar discectomy surgery for the treatment of multilevel lumbar spine pathology. J Minim Invasive Spine Surg Tech. 2025;10(Suppl 2):S306-S314. https://doi.org/10.21182/jmisst.2024.01893.
11. Xie L, Dong C, Fang H, Cui M, Zhao K, Yang C, et al. Prevalence, clinical predictors, and mechanisms of resorption in lumbar disc herniation: a systematic review. Orthop Rev (Pavia). 2024;16. https://doi.org/10.52965/001c.121399.
12. Musa G, Makirov SK, Chmutin GE, Susin SV, Kim AV, Antonov GI, et al. Management of recurrent lumbar disc herniation: a comparative analysis of posterior lumbar interbody fusion and repeat discectomy. Ann Med Surg (Lond). 2024;86(2):842-849. https://doi.org/10.1097/MS9.0000000000001600.
13. Park JS, Choi SE, Cho TK, Kim S, Rhee W, Kim WJ, et al. Recurrence rate after herniotomy only versus discectomy in lumbar disc herniation. Korean J Spine. 2013;10(4):227-231. https://doi.org/10.14245/kjs.2013.10.4.227
14. Ovcharov ME, Valkov IV, Mladenovski MN, Vasilev NV. Recurrence rate of lumbar disc herniation after standard discectomy and microdiscectomy: a 5-year study. J Biomed Clin Res. 2019;12(2):139-145. https://doi.org/10.2478/jbcr-2019-0020
15. Parker SL, Mendenhall SK, Godil SS, et al. Incidence of low back pain after lumbar discectomy for herniated disc and its effect on patient-reported outcomes. Clin Orthop Relat Res. 2015;473(6):1988-1999. https://doi.org/10.1007/s11999-015-4193-1.
16. Kim YG, Yang JC, Kim TW. Risk factors for recurrence of disc herniation after single-level lumbar discectomy. Asian J Pain. 2021;7:1-6. https://doi.org/10.31487/j.AJP.2021.01.03.
17. Eissa MA, El Shimy MM, El Falaky O, Eldabaa KA. Conventional open discectomy versus interlaminar discectomy in management of lumbar disc prolapse: a comparative study. Med J Cairo Univ. 2023;91(1):363-369.

18. Goker B, Aydin S. Endoscopic surgery for recurrent disc herniation after microscopic or endoscopic lumbar discectomy. Turk Neurosurg. 2020;30(1):112-118. https://doi.org/10.5137/1019-5149.JTN.27360-19.3.
19. Zileli M, Oertel J, Sharif S, Zygourakis C. Lumbar disc herniation: prevention and treatment of recurrence: WFNS spine committee recommendations. World Neurosurg X. 2024;22:100275. https://doi.org/10.1016/j.wnsx.2024.100275.
20. Yin S, Du H, Yang W, et al. Prevalence of recurrent herniation following percutaneous endoscopic lumbar discectomy: a meta-analysis. Pain Physician. 2018;21(4):337-350