



Original Research Article

Quality of life and depressive symptoms in patients with lumbar disc herniation undergoing open discectomy: A 6-month follow up study from a tertiary care hospital in Eastern India

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ABSTRACT

Introduction : Aim of this 6-month follow-up study was to find the difference between the Quality of Life (QOL) and depressive symptoms of patients with Lumbar Disc Herniation undergoing open discectomy attending a tertiary care hospital in Eastern India

Materials and Methods: Hundred patients fulfilling inclusion and exclusion criteria were included in the study. Twenty patients either dropped out of follow-up or were not able to complete the investigations. Eighty patients was the final patient population. Socio-demographic profile sheet, Clinical profile sheet, GHQ 12, SF-36 for Quality of Life and Montgomery Asberg Depression Rating Scale were used at Pre-surgery i.e. at baseline (S0), at 1 months (S1), at 3 months (S2), and at 6 months (S3) post-discectomy.

Results: Sixty-three percent of patients were male and majority (75%) was from rural background. The most common site of disc herniation was at L4-L5 followed by L5-S1. Various subscales of SF-36 showed significant improvement at 3 months and 6-months post operation. GHQ-12 scores were significantly lower at the end of 6 months indicating an improvement in general physical and mental health. Depressive symptoms on MADRS showed that at the end of 6 months the scores were significantly lower compared to pre-surgery scores and at 6 months they could be categorized in the euthymic range.

Conclusion: The discectomy procedure not only relieves the pain symptom but also improves depression resulting from pain symptoms, functionality, general health and overall quality of life of patients suffering from herniated lumbar disc. Initial lack of improvement in pain symptoms and functionality post surgery could be due to Depressive symptoms. Assessment of depressive symptoms and its treatment could improve both functionality as well as perceived pain.

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1. Introduction

Back pain is now an international health issue of major significance. About 80% suffer from this at some time in their life. It is ranked as the most frequent cause of limitation of activity in people younger than 45 years by the National Centre for Health Statistics.¹ With a 12-month prevalence of 15–45%, a 12-month incidence of up to 20%, and a

yearly recurrence rate of up to 60%, low back pain (LBP) is a major health problem. About 75–85% of all individuals will experience LBP at some time during their life (lifetime prevalence).² It is also an important cause of sickness absenteeism in our country, therefore finding the most appropriate treatment for it is prudent. Disc herniation is an important cause of low back pain and L3-4 and L4-5 showed the greatest degree of disc degeneration.^{3,4} Low back pain has a severe impact on the individual, families, and society.

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And most common cause of low back pain is herniated lumbar disc. The annual incidence of prolapsed lumbar intervertebral disc is about 5–10%. Lumbar disc herniation is the pathologic condition for which spinal surgery is most often performed.² Discectomy is the frequently done procedure for lumbar disc prolapsed. Disc prolapse amounts for 5% of lower back disorders and is one of the most common causes for surgery.⁵ Treatment for lumbar disc herniation can be conservative or surgical, and which one is effective is always controversial.⁶ Open discectomy is recommended if conservative treatment fails, and the success rate is reported to be 70%–90%.⁷ Indications for surgery include moderate or severe neurological damage that is clinically confirmed, unclear response to the oral analgesics, or a high risk of relapse with no other available therapeutic options.⁸

Surgery for herniation of a lumbar disc is the most common spinal operation and is currently considered the treatment of choice. Health-related quality of life (HRQOL) refers to those dimensions of life which may be affected by a disease and its treatment. The natural course of events after sciatic pain originating from lumbar disc herniation is most often favorable, but surgery is frequently performed in patients with persistent sciatic pain.⁷ In recent years, outcome based on patients' own assessments, such as satisfaction with treatment,⁹ patients' global assessment, health-related quality of life (HRQoL) have gained increasing interest in spinal surgery.^{9–15}

Furthermore, good correlations have been shown between patients' assessments and validated objective outcome scores.^{9,16} The aim of using HRQoL instruments is to measure the influence of a disorder/disease on a patient's daily life and activities. The most popular health status instruments are the EuroQol-5 Dimension (EQ-5D) and the 36-Item Short-Form Health Survey (SF-36)¹⁷ which are both patient-based questionnaires. Since these instruments are not specific for a certain condition, they allow comparisons of the effects of different treatment modalities for a specific condition and also the individual effects of different medical conditions on daily life. There is wide evidence that severe mental illnesses affect the quality of life to a great extent. General Health Questionnaire (GHQ 12)¹⁸ is a measure of current mental health. It focuses on two major areas – the inability to carry out normal functions and the appearance of new and distressing experiences.

The influence of social and psychological factors on the outcome of disc surgery has been well documented. Data regarding depression and anxiety in patients undergoing disc surgery are rare, and studies differ widely depending on the assessment methods used. Patients undergoing disc surgery have a higher risk of suffering from depression and anxiety than the general population. The serious impact of depression and anxiety on the post-operative outcome of surgery return to work. Analgesia abuse, pain experience,

abnormal illness behaviour and health-related quality of life make further investigations valuable and important. A systematic review by Zieger and coworkers¹⁹ found that the prevalence rates for depression and anxiety in patients undergoing disc surgery varied between 21.5% and 49.3% before and between 4.1 % and 79.6% after disc surgery.

In the present study patients who were undergoing elective discectomy for lumbar PIVD at single level were selected for the study by purposive sampling method. The present study was a 6-month follow up study post surgery.

2. Materials and Methods

Our institutional ethics committee (Institute of Postgraduate Medical Education and Research, Kolkata, West Bengal India) approved the study and all patients provided written informed consent. The subjects were informed of the details of all the procedures and their voluntary participation and freedom to withdraw was emphasized. As per the inclusion criteria patients who presented with lower back and lower extremity pain with radiating pain at our hospital were diagnosed with lumbar PIVD at single level by combining magnetic resonance image (MRI) and physical examination findings, especially the positive straight leg raise (SLR) test were included in the study. Symptomatic patients of prolapsed lumbar intervertebral disc (PIVD) with failure to conservative treatment who were admitted in Neurosurgery in-patient unit of a Tertiary care Government Hospital in Eastern India and the study period was from January 2014 – May 2015.

Patients with back pain less than 6 months, history of previous discectomies, other spinal pathologies, presence of chronic psychiatric illnesses, history of chronic debilitating medical illnesses, symptomatic but no evidence of disc herniation in CT/ MRI were excluded from the study.

Hundred patients (n=100) fulfilling the inclusion criteria and who voluntarily consented for the study were initially recruited for the study. The primary objectives of this present study were to describe in detail the characteristics of the patients in terms of age, gender and other demographic variables, clinical presentation of patients with lumbar prolapsed disc and disease related factors affecting quality of life of these patients after surgery. Internationally accepted and well validated Questionnaires like Medical Outcomes Study Short Form (SF-36)¹⁸ for assessing Quality of life, General Health Questionnaire (GHQ-12)²⁰ for assessing general mental health and Montgomery-Asberg Depression Rating Scale (MADRS)²¹ for assessing depressive symptoms were used in the study. The Medical Outcomes Study Short Form 36 (SF-36)¹⁸ has a 36-item questionnaire with eight subscales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Each subscale is scored from 0 (poor health) to 100 (optimal health). MADRS score of > 7 is indicative of Major

Depressive Disorder. Furthermore the quality of life (QOL) scores, GHQ scores and depressive symptoms were assessed at four different points viz. Before Surgery (S0), 1-month post surgery (S1), 2-month post surgery (S2) and at 6-months post surgery (S3) was compared.

Statistical analysis data was analyzed using SPSS Inc released 2009, PASW statistics for windows, version 18.0 (Chicago).²² appropriate parametric and non-parametric statistical analysis was done to describe the socio-demographic variables. ANOVA was used to compare the SF-36 Scores (QOL Scores), GHQ scores and MADRS scores before surgery (S0), 1-month post-surgery (S1) 2-month post surgery (S2) and at 6-months post surgery. Value of p was considered statistically significant at $p < 0.05$. Post hoc analysis was done using Tukey's HSD Post Hoc Analysis.

3. Results

Out of 100 patients, 15 patients were lost to follow up and 5 patients could not complete the required investigations. So the ultimate sample consisted of 80 patients. Out of the 80 PIVD patients 51 (63.7%) were males and 29 (36.3%) were females. Majority (90%) of patients were married, 57.5% (n=46) were employed, were either primary (45%) or passed Matriculation (36.3%). Majority of the patient population (75%; n=60) were of rural background and 81.3% (n=65) were Hindus whereas 18.8% were Muslims. On local examination none of the patients had local tenderness which ruled out possibility of traumatic event to spine or spinal inflammation. The range of SLRT (Straight Leg Raising Test) was between 60-80 degrees in all patients. None of the patients had neurodeficits. MRI of lumbar spine showed that majority (77.5% n=62) of patients had disc herniated disc at the level of L4-L5 and the next most common site of disc herniation was at the level of L5-S1 (21.3% N= 17).

Health-related quality of life (HRQOL) in patients with low back pain is measured using the Medical Outcomes Study Short Form 36 (SF-36) which has a 36-item questionnaire with eight subscales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Each subscale is scored from 0 (poor health) to 100 (optimal health). The physical functioning of the patients was found to be moderately affected due to low back pain before surgery. However the scores on this subscale increased significantly after 1 month of surgery and continued to improve significantly at 3rd and 6 months. At the end of 6 months patients had achieved almost optimal physical functioning (Mean 91.06). The subscale Role Physical measured the effect of low back pain on fulfilling their roles physically. The scores which were low at the onset improved significantly after 1 month of surgery but remained constant at 3rd month and further improved significantly at 6th month follow up. The bodily pain

subscale documented much lower scores than any other subscales at the onset (before surgery). The bodily pain scores improved significantly at 1st month after surgery and showed significant increase further at 3rd and 6th months. However at the end of 6 months there was no optimal improvement in pain (Mean 95.12). Similarly the general health subscale too heralded lower scores before surgery and showed statistically significant improvement over 1st, 3rd and 6th month follow-ups. The scores of vitality subscale were lower before the surgery and did not show any significant improvement at 1st and 3rd months. However these scores improved significantly at the end of 6 months. Similarly, the scores of social functioning and role emotional subscales were lower before the surgery and did not show any improvement at 1st and 3rd months. However these scores improved significantly at the end of 6 months. The mental health subscale scores increased significantly at all the 3 follow-ups compared to the scores before surgery.

Table 2 depicts the results of statistical analysis of the scores of General Health Questionnaire-12. On GHQ-12 questionnaire, higher the score, more worse is the general health and quality of life of the patient. In our study population, the scores were higher before surgery and did not show any significant improvement at 1st and 3rd month follow-ups. However the scores were significantly lower at the end of 6 months.

Table 3 depicts the results of statistical analysis of scores on Montgomery-Asberg Depression Rating scale. On MADRS scale cut off is 7 points to be considered as euthymic. More the score, more worse is the depression. In our study population, the mean scores did not change significantly at 1st and 3rd months. However, at the end of 6 months the scores were significantly lower compared to pre-surgery scores.

Table 4 provides the details of patients who had a clinical diagnosis of depression based on MADRS scores. Total of 11 patients (13.75 %) had a diagnosis of depression before surgery. Out of these 11 patients, majority of the patients were moderately depressed. None had clinically severe depression. Only one patient achieved remission after 1st month of surgery. Most of the patients took 6 months to achieve remission after surgery. However 9 out of 11 depressed patients were euthymic at the end of 6 months. Two (2) patients still had depressive symptoms at the end of 6 months.

4. Discussion

The socio-demographic characteristics of our study population were similar to other previous studies of spinal surgery patients. The characteristics like religion and race could not be compared as other similar studies were not found from India. The mean age of our study population was 37.5 years whereas in other studies the mean age ranged from 39 years to 53.4 years.^{9,13–15,23–25} The older mean age groups

Table 1: Comparison of SF-36 Quality of Life scores before surgery and various follow-up time points using ANOVA and Tukey HSD Post-Hoc test

Subscale	Before surgery (S ₀) Mean ± SD	1-month follow-up (S ₁) Mean ± SD	3-month follow-up (S ₂) Mean ± SD	6-month follow-up (S ₃) Mean ± SD	P value (Tukey HSD test)
Physical functioning	61.0 ± 6.02	79.4 ± 5.4	87.1 ± 3.7	91.06 ± 5.4	S ₀ vs S ₁ < 0.01** S ₀ vs S ₂ < 0.01** S ₀ vs S ₃ < 0.01**
Role physical	57.5 ± 16.1	78.5 ± 11.4	78.56 ± 11.40	84.93 ± 12.48	S ₀ vs S ₁ < 0.01** S ₀ vs S ₂ < 0.01** S ₀ vs S ₃ < 0.01**
Bodily Pain	36.01 ± 8.35	76.35 ± 5.20	89.97 ± 13.24	95.12 ± 10.21	S ₀ vs S ₁ < 0.01** S ₀ vs S ₂ < 0.01** S ₀ vs S ₃ < 0.01**
General health	45.25 ± 10.96	68.1 ± 11.06	73.67 ± 14.07	80.43 ± 4.87	S ₀ vs S ₁ < 0.01** S ₀ vs S ₂ < 0.01** S ₀ vs S ₃ < 0.01**
Vitality	67.34 ± 10.45	67.34 ± 10.45	71.43 ± 11.50	74.52 ± 13.34	S ₀ vs S ₁ NS S ₀ vs S ₂ NS S ₀ vs S ₃ < 0.01**
Social functioning	63.28 ± 14.38	63.28 ± 14.38	63.28 ± 14.38	82.81 ± 11.14	S ₀ vs S ₁ NS S ₀ vs S ₂ NS S ₀ vs S ₃ < 0.01**
Role emotional	67.52 ± 23.10	73.07 ± 16.50	73.07 ± 16.50	81.68 ± 16.67	S ₀ vs S ₁ NS S ₀ vs S ₂ NS S ₀ vs S ₃ < 0.01**
Mental health	63.3 ± 11.00	75.05 ± 7.95	76 ± 7.66	80.43 ± 10.32	S ₀ vs S ₁ < 0.01** S ₀ vs S ₂ < 0.01** S ₀ vs S ₃ < 0.01**

NS= Not Significant **p<0.01

Table 2: Comparison of GHQ-12 scores before surgery and various follow-up time points using ANOVA and Tukey HSD Post-Hoc test

GHQ 12	Before surgery (S ₀) Mean ± SD	1-month follow-up (S ₁) Mean ± SD	3-month follow-up (S ₂) Mean ± SD	6-month follow-up (S ₃) Mean ± SD	P value (Tukey HSD test)
	12.27 ± 1.17	12 ± 0.96	12 ± 0.96	10.33 ± 0.88	S ₀ vs S ₁ NS S ₀ vs S ₂ NS S ₀ vs S ₃ < 0.01**

NS= Not Significant **p<0.01

Table 3: Comparison of MADRS scores before surgery and various follow-up time points using ANOVA and Tukey HSD Post-Hoc test

MADRS	Before surgery (S ₀) Mean SD	1-month follow-up (S ₁) Mean SD	3-month follow-up (S ₂) Mean SD	6-month follow-up (S ₃) Mean SD	P value (Tukey HSD test)
	7.65 6.18	6.92 4.74	6.38 3.45	5.61 1.46	S ₀ vs S ₁ NS S ₀ vs S ₂ NS S ₀ vs S ₃ < 0.05*

NS= Not Significant *p<0.05

Table 4: Comparison of improvement in severity of Depression (MADRS scores) before surgery and various follow-up time points using ANOVA and Tukey HSD Post-Hoc test

	Before surgery (S₀)	1-month follow- up (S₁)	3-month follow- up (S₂)	6-month follow- up (S₃)
Diagnosis based on MADRS score	N (%)	Remission achieved at 1 month (MADRS score > 7) N (%)	Remission achieved at 3 month (MADRS score > 7) N (%)	Remission achieved at 6 month (MADRS score > 7) N (%)
Mild depression	5 (6.25)	1 (9.09) Out of 11 patients	2 (18.18) Out of 11 patients	6 (54.54) Out of 11 patients
Moderate depression	6 (7.5)			
Severe depression	0 (0)			
Total prevalence	11 (13.75)	10 (12.5)	8 (10)	2 (2.5)

were found in those studies where surgery was considered for relapsed disc herniation.²³ However, studies like the present one where primary disc degeneration cases were considered had a similar age at presentation.^{9,13–15,23–25} Like in previous studies^{9,13–15,23–25} our study population also had a male preponderance which can be owed to more outdoor and strenuous job types amongst males (especially in the Indian scenario) leading to disc degeneration and male dominance of help seeking in health sector. Most of the patients in our study population belonged to rural backgrounds which could be because of the vast rural catchment area that our institute and hospital renders service to. Majority (77.5%) of our patients had the level of herniation at L4-L5 which was similar to study by Kagaya et al.¹⁴

We considered using SF-36 because it gives a holistic measure of HRQOL.¹⁴ We found that all the subscales of SF-36 showed significant improvement at 6 months. Vitality, social functioning and role emotional subscale did not show any significant improvement in the first 3 months. These coincided with the patients who had diagnosis of depression based on MADRS scores. So the initial lack of improvement can be correlated to depression. An average depressive episode last for 6 months. The other patients who did not have clinical depression but did not show any improvement on vitality, social functioning and role emotional scales had the baseline scores of almost a normal individual. The most affected parameters were bodily pain, physical functioning, role physical and general health. Whereas in a study by Patrick et al²⁶ in patients with sciatica, role physical and bodily pain were low at baseline, and general health had not improved after 3 months of follow-up.

In our study physical function and role physical which are measures of functional status improved in 1st month follow up and improved further in 3rd and 6th month. But in a pilot study of HRQOL in selected types of lumbar surgeries by Saban et al²³ functional status was significantly improved after surgery, subjects remained moderately disabled three months after surgery. Yukawa et al^{27,28} reported that in a study of 62 subjects who underwent a laminectomy for spinal stenosis, functional status was

significantly improved 6 to 18 months postoperatively. Similar improvements in functional status were reported in a study of patients following anterior lumbar fusion.²⁸ Further research is needed to clarify the expected time of optimal functional recovery following different types of spinal surgery.

Albert and co-workers²⁹ reported that role physical and bodily pain scores were low before surgery, and all subscales of the SF-36 except general health increased significantly after lumbar laminectomy for radiculopathy. These studies support our results except the general health scores which increased significantly in all the follow ups. In another study it was noted that the bodily pain distinguished most patients who had back problems from those without back problems.³⁰ Some studies described similar results for shoulder surgery, total hip arthroplasty and total knee arthroplasty where the role of physical and bodily pain were low before surgery, and general health had not improved much after surgery.^{31–33} We concluded that low back pain interfere the most with bodily pain, physical functioning of HRQOL which is supported by the conclusions deduced in study by Kagaya and his coworkers.¹⁴

The factors which affect the vitality or energy levels of the patients before and after surgery is another very important aspect to be studied. This is because lack of energy or increased fatigability is a major symptom criterion for the diagnosis of depression as per ICD 10-DCR. Lack of energy also leads to decreased functionability. Before surgery the vitality can be affected due to pain symptoms or mood changes related pain whereas after surgery, vitality can be decreased because of the recovery process from a major surgical procedure itself. Attitude towards the recovery process and cultural variations can also lead to increased perception of fatigability. In our study we found that the vitality subscale of SF-36 had lower scores before surgery and they did not improve significantly at 1st and 3rd months even though there was relief in pain. This can be assumed to be due to the perceived distress related to a major surgery and the belief in Indian culture that a person experience fatigability after major surgeries and requires prolonged duration of rest. In study by Saban et al,²³ postoperative fatigue and lack of vitality were identified

as lower than published norms for both the POMS Brief Form and the SF-12v2 (SABAN) Although no studies were found related to level of fatigue in postoperative lumbar spinal surgery patients, several studies considered fatigue in patients with low back pain. For example, Fishbain et al³⁴ found that patients with chronic low back pain were significantly more fatigued than a non-patient control group. Furthermore, Fishbain et al³⁴ found that higher levels of fatigue were predicted by pain, female gender, depression and number of psychiatric comorbidities in chronic low back pain patients. In another study of 457 patients with low back pain compared to a normative sample, Hagen et al³⁵ found that low back pain sufferers reported more sleep disturbances related to pain, depression and anxiety.

However, measurement of sleep disturbances, depression, anxiety, as well as a comprehensive assessment of pain may be helpful in determining what factors are associated with fatigue in lumbar spinal surgery patients. In addition it may be helpful for clinicians to be aware of when patients are expected to reach maximal improvement in levels of vitality and energy following lumbar spinal surgery so that rehabilitation and return to work activities can be appropriately timed.

The mental health component of SF-36 in our study population started improving from 1st month onwards and maintained improvement further. This finding is supported by other studies by Farzanegan et al.³⁶

The total GHQ12 questionnaire score in our subjects did not show considerable improvement at 1st and 3rd month but improved significantly at 6th month. In a study by Hassanijrdehi et al²⁵, patients with lumbar pain reported a significant amount of pain affecting their daily life and this effect was higher in patients with lower GHQ score or anxiety/depressive disorder

4.1. Low back pain, disc surgery and depression

Data regarding depression and anxiety in patients undergoing disc surgery are rare, and studies differ widely depending on the assessment methods used. Patients undergoing disc surgery have a higher risk of suffering from depression and anxiety than the general population. The serious impact of depression and anxiety on the postoperative outcome of surgery e.g. return to work, analgesia abuse, pain experience, abnormal illness behavior and health-related quality of life makes further investigations valuable and important. In a systematic review by Zieger et al¹⁹, the prevalence rates for depression and anxiety in patients undergoing disc surgery varied between 21.5% and 49.3% before and between 4.1 % and 79.6% after disc surgery. Our study found a prevalence of 13.75% of depression amongst subjects before surgery and the prevalence dropped down to 12.5%, 10% and 2.5% respectively at 1st, 3rd and 6th month follow ups respectively. The relatively lower prevalence compared to the former systemic review could

have been due to the assessment of purely depression in our study using MADRS scores and anxiety disorders were not included. Amongst the studies in which depression was the main condition studied, before disc surgery, depression prevalence rates ranged between 23.4%³⁷ and 49.3%.³⁸ Two studies^{39,40} gave additional information on severe and clinical relevant depression, each stating that 7.9 % of the patients undergoing disc surgery in their study were suffering from severe depression. After disc surgery, depression prevalence rates varied between 6%⁴¹ and 79.6%⁴² respectively. The two studies^{39,40} were differentiating between mild and severe depression, showed that 9.5% of the patients in their study undergoing disc surgery were still suffering from severe depression. The wide range of these prevalence rates is remarkable and is mainly attributable to methodological issues. Less than half of the few reviewed studies used a longitudinal study design to assess depression and anxiety. Also, there are tremendous differences between the studies with respect to follow up periods, assessment instruments and cut-off values.

The outcome data of a study by Tharin et al⁴³ indicate that microdiscectomy and lumbar decompression not only reduce disability and pain but also improve depressive symptoms and overall quality of life for patients. These findings support operative treatment of lumbar radiculopathy and neurogenic claudication including treatment performed in the depressed population

Small study sample – a larger study sample would have been more appropriate to assess the prevalence of depression amongst the low back pain patients. Lack of control group – a control group of healthy sample would have been useful to compare the co morbidities and occurrence of depressive symptoms. Another group of subjects with different treatment procedure like medical treatment or non surgical procedure such as steroid injection, physiotherapy would have been more apt to be included as we could have compared and contrasted the various measures of HRQOL. Relatively shorter duration of follow up – though our study showed that significant pain relief and functionality improves almost immediately after surgery, depression and role emotional parameters can take a slightly longer time to recover. Moreover some studies have shown that back pain can recur after 1-10 years of surgery.³⁷ We also did not include a scale to assess anxiety symptoms.

5. Conclusions

The discectomy procedure not only relieves the pain symptom but also improves depression resulting from pain symptoms thereby improving functionality, general health and overall quality of life of patients suffering from herniated lumbar disc.

6. Acknowledgement

None.

7. Conflict of Interest

None.

8. Source of funding

None.

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