

# Epidemiological Characteristics Of Lumbar Disc Prolapse In A Tertiary Care Hospital

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## Abstract

**Study objectives:** To examine the sociodemographic characters of diagnosed case of lumbar disc prolapse in patients reporting to the Tertiary Care Hospital.

**Design:** Prospective case series study.

**Setting:** Varanasi, India

**Participants:** The 180 MRI proved new patients of lumbar disc prolapse who attended Neurosurgery out patient department from July 2003 to June 2005.

**Main results:** The most common age of presentation was 31-40 years (33.33%) and the incidence of lumbar disc prolapse above L4 was 13.3%. The incidence of lumbar disc prolapse was more common in people from rural area, moderate and heavy workers and vehicle drivers on bad roads.

**Conclusions:** Lumbar disc prolapse was more among people living or working in areas of poor infrastructures.

## INTRODUCTION

When long ago man forsook the trees to walk upright on the ground, he made novel demands on his lumbosacral spine but the upright posture thrown enormous stress on the spine, particularly during flexion and is undoubtedly responsible for many structural causes of backache such as lumbar disc prolapse.

The term disc prolapse is defined as extrusion of nucleus pulposus through a rent in annulus fibrosus<sub>1</sub>. This prolapse disc causes impairment of function by nerve root compression compelling the patient to seek medical advice for low backache.

The problem of prolapsed intervertebral disc is of great importance in this part of the world, because of the fact that people in this part are subjected to various physical stress either due to their peculiar living habits, low socioeconomic status or are subjected to live, work at places with poor infrastructure.

## MATERIAL AND METHODS

The present study was designed to evaluate various epidemiological aspects of lumbar disc prolapse at one neurosurgical center during two years period. It was a hospital based prospective case series study in which 180 new cases of lumbar disc prolapse (MRI proved) who attended neurosurgery OPD during July 2003 to June 2005 were included. A pretested self-administered proforma was used to elicit various informations. Which had two parts:

- (1) Patients Profile: The general detail of the patient like age, sex, body mass index<sub>2</sub>, occupation<sub>3</sub>, area of residence (Rural/Urban), conditions of roads in their locality (Good/Bad road) and vehicle used by them (Cycle/Motorcycle/Four wheeler) were recorded.
- (2) Clinico-radiological characteristics of patient: Patients were enquired regarding their complaints, total duration of illness, bladder/bowel disturbance, history of direct trauma and in female patients number of pregnancies. MRI finding of prolapsed disc such as level and type of disc prolapse

were also noted.

## STATISTICAL METHOD

Chi-square test was used to see the strength of association between various clinico-radiological characteristics and socio demographic variables

## RESULTS

Among 180 patients 65.6% were male and 34.4% were female. The most common age of presentation was 31-40 yrs (33.3%) followed by 21-30 yrs (23.3%) with the highest percentage of patients (89.4%) were between age of 21-60 yrs.

In this study 71.7% patients were from rural area and 59.4% patients were moderate workers. Similarly the percentage of rural moderate workers were 47.22% ( $p < 0.05$ ) (Table -1). Even among the female patients, most of them (72.58%) were rural moderate workers.

**Figure 1**

Table 1: Life style versus area of residence in lumbar disc prolapse patients

Area	Sedentary (n=45)		Moderate worker (n=107)		Heavy worker (n=30)		Total (n=180)	
	No.	%	No.	%	No.	%	No.	%
Rural	24	55.81	85	79.43	20	66.66	129	71.66
Urban	19	44.18	22	20.56	10	33.34	51	28.34

$\chi^2 = 8.87$ ; d.f. = 2;  $p < 0.05$

Among total patients, 125 were vehicle users, most commonly motorcycle drivers (47%) followed by cycle drivers (45%). Only 8% patients were four wheeler drivers. At the same time significant number of patients was from bad road locality i.e. 85.7% cyclist and 88.19% motorcyclist. On the other hand only 30% four-wheeler drivers were from bad road locality ( $p < 0.001$ ) (Table -2).

**Figure 2**

Table 2: Vehicle driving versus condition of roads in lumbar disc prolapse patients

	Vehicle (n=125)						Total	
	Cycle (n=56)		Motorcycle (n=59)		Four-wheeler (n=10)			
	No.	%	No.	%	No.	%	No.	%
Bad road	48	85.71	52	88.13	3	30.0	103	82.40
Good road	8	14.29	7	11.87	7	70.0	22	17.60

$\chi^2 = 20.70$  df=2  $p < .001$

History of direct trauma was noted only in 24.4% patients and in males having history of trauma (n=33) 91% were from 21-50 yrs age group. Majority of patients (59.4%) had

total duration of illness between 1-12 months and among the patients who presented within 1 month, 83.33% were moderate workers. Bladder/bowel involvement was present 9.4% patients and was more common in males (13%) compared to females (3%), similarly 59% patients having bladder/bowel involvement were males of 31-40 yrs age group.

When level of disc prolapse was taken into consideration L<sub>4</sub>-L<sub>5</sub> level disc prolapse was most common (34.4%) followed by L<sub>5</sub>-S<sub>1</sub> (26.7%) and multiple level disc prolapse (25.6%). Higher level disc involvement L<sub>1</sub>-L<sub>2</sub>, L<sub>2</sub>-L<sub>3</sub> and L<sub>3</sub>-L<sub>4</sub> was present in 2.8%, 2.2% and 8.3% cases respectively.

Irrespective of age of presentation L<sub>4</sub>-L<sub>5</sub> was most common prolapse found, except in age of 51-60 and 61-70 yrs in which multiple level disc involvement was most common (Table -3). Disc involvement above L<sub>3</sub> was not found in females. When level of disc involvement was compared with condition of road and vehicle driving all L<sub>1</sub>-L<sub>2</sub> and L<sub>2</sub>-L<sub>3</sub> level disc prolapse patients were cycle users and among them (n=9) 78% were from bad road locality. Even multiple level disc prolapse patients were mainly cycle users 37% (n=46). Whereas 52% of L<sub>5</sub>-S<sub>1</sub> level disc diseased were motorcycle drivers of bad roads (n=48). Majority of patients (55.4%) were having normal weight but 54% of multiple level disc prolapse patients had their weight above normal. On the other hand among females of multiple level disc prolapse 87.5% had 3 or more pregnancies.

**Figure 3**

Table 3: Age versus level of disc prolapse

Age group (years)	Level											
	L1-L2 (n=5)		L2-L3 (n=4)		L3-L4 (n=15)		L4-L5 (n=62)		L5-S1 (n=48)		Multiple (n=46)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-20	-	0.0	1	25.0	1	6.66	6	9.67	4	8.33	2	4.34
21-30	-	0.0	-	0.0	6	40.0	15	24.19	10	20.83	11	23.91
31-40	2	40.0	2	50.0	2	13.33	23	37.09	20	41.66	11	23.91
41-50	-	0.0	1	25.0	3	20.0	13	20.96	10	20.83	13	28.26
51-60	3	60.0	-	0.0	3	20.0	2	3.22	4	8.33	5	10.86
61-70	-	0.0	-	0.0	-	0.0	2	3.22	-	0.0	3	6.52
>70	-	0.0	-	0.0	-	0.0	1	1.61	-	0.0	1	2.17

When type of disc prolapse was taken into account the most common age of presentation for protruded disc was 21-30 years in males (31.88%) and 31-40 years in females (48.83%). Similarly the most common age of presentation for extruded disc was 31-40 years in males (41.46%) and 41-50 years in females (37.5%). Migrated disc was nil below 20 and above 60 years in both sexes. 55% of patients having migrated disc were male between 21-40 years (n=11). (Table 4)

**Figure 4**

Table 4: Age and sex versus type of disc prolapse

Age (years)	Type											
	Protruded (n=112)				Extruded (n=57)				Migrated (n=11)			
	Male		Female		Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-20	3	2.67	4	3.57	3	5.26	4	7.01	-	0.0	-	0.0
21-30	22	19.64	13	11.60	4	7.01	-	0.0	3	27.17	-	0.0
31-40	15	13.39	21	18.75	17	29.82	3	5.26	3	27.27	1	9.09
41-50	17	15.17	2	1.78	12	21.05	6	10.52	1	9.09	2	18.18
51-60	10	8.92	-	0.0	3	5.26	3	5.26	1	9.09	-	0.0
61-70	1	0.89	3	2.67	2	2.50	-	0.0	-	0.00	-	0.0
>70	1	0.89	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0

## DISCUSSION

Degeneration of the intervertebral disc begins early in life and is partly a consequence of aging. Although the actual cause is not known, many factors (autoimmune, genetic, re-absorption and biomechanical) have been implicated in accelerating the process. The volume of intervertebral tissue decreases with degeneration<sub>4</sub> and it has been shown that failure of the human lumbar intervertebral disc occur most often in the part of spine that is subjected to heaviest mechanical stress<sub>5,6,7</sub>. However, the most commonly identified risk factor associated with lumbar disc herniation includes young age, male gender, familial association, environmental factor, trauma and cigarette smoking<sub>8</sub>.

In the present study there was preponderance of males which is the usual presentation among lumbar disc prolapse patients<sub>9</sub>. The age incidence is comparable with Weber's study<sub>10</sub> which showed highest incidence in age of 30-50 years with initial symptoms occurring in patients during third decade of life, although slight early age incidence was noted in the present study. The highest percentage of patients 89.4% were between the age of 21-60 years that might be because people between 21-60 years are involved in outdoor activities and are exposed to continuous trivial trauma to spine.

Rural moderate workers are at significantly higher risk of lumbar disc prolapse it may be because people in rural area are subjected to work with poor infrastructures that lead to trauma to spine resulting in disc degeneration and prolapse. At the same time females in rural area are more involved in outdoor activities and they use hand pumps that lead to continuous jerk to the spine resulting in disc prolapse. Jensen MV and Tuschent F<sub>11</sub> had similar findings as they observed elevated risk in males involved in moderate or heavy working.

85.7% cyclist and 88.19% motorcyclist were from bad road

locality. The data is statistically significant ( $p<0.001$ ) and suggesting higher risk of lumbar disc prolapse by vehicle driving on bad roads may be due to the continuous repeated jerks they sustain.

Because of being tertiary level health center the cases of acute disc prolapse were very few (6.7%) but majority of them were moderate workers (83.33%). Statistically significant relation could not be elicited when total duration of illness was compared to area of residence and life style. This shows that irrespective of area of residence and lifestyle due importance has been given to the disease because of the significant disability caused by it. The incidence of bladder/bowel involvement is comparable to Wein's study<sub>12</sub> in which it was 1-18%.

When level of prolapse disc was evaluated several studies have shown variable incidence<sub>13,14,15,16,17,18</sub> (Table 5) but in comparison to other studies the incidence of upper level disc involvement was higher and L4-L5, L5-S1 disease was lower, at the same time other studies did not comment about the multiple level disc involvement which was 26.7% in our series.

**Figure 5**

Table 5: The incidences of level of disc prolapse in various studies

	T12-L1, L1-L2, L2-L3	L3-L4	L4-L5	L5-S1
Ken Hsu et al <sup>13</sup>	1.6%	4.5%	-	-
Basacco SJ et al <sup>14,15</sup>	<1%	-	-	-
Deker and Shapiro <sup>16</sup>	0.7%	2.9%	37%	59%
Spangfort EV review <sup>17</sup>	3.3%		49.8%	46.9%
Spangfort EV own article <sup>17</sup>	2.1%		47.4%	50.0%
Kortelainen P et al <sup>18</sup>	0.7%	1.7%	56.8%	40.7%
Present study	5.0%	8.3%	34.4%	26.7%

With the increase in age there was more incidence of multiple level disc prolapse. On the other hand no cases of upper level (L1-L2 & L2-L3) disc involvement was found in females but in males 15.25% patients had disc prolapse above L4.

Out of 24 patients above L4 (all were less than 60 years age), 20 (83%) were either moderate or heavy workers which was comparable with Ken Hsu et al<sub>13</sub> series in which 67% of patients younger 50 year with high level disc lesion were involved in more stressful work but differs from Dammer et al<sub>19</sub> results which suggested that with increasing age lumbar disc herniation become more cranially localized. Similarly multigravida women also found to have multiple level disc prolapse.

The type of prolapse disc was also evaluated and it was found that the incidence of far lateral herniation was 8.9%

which is comparable to other studies where it was 4%<sub>20</sub> and 3-10%<sub>20</sub>. When age and sex was taken into account females presented a decade earlier as compared to males in both protruded and extruded type of disc prolapse, also there was decadal difference in presentation among both the sex groups when individual type of prolapse is considered.

To summarize, in the present series lumbar disc prolapse patients had early age incidence with male preponderance. Rural area, moderate and heavy working, more outdoor activities and vehicle driving on bad roads may be the contributory factors. The incidence of higher level disc involvement was more in present series and a decadal difference in presentation was found when types of prolapse was compared to age and sex of the patients. Still more studies with large sample size are needed to evaluate their facts.

## POLICY IMPLICATIONS

Although the study is small to conclude on policy but good infrastructure can change a lot in the disease scenario and reduce the DAILY lost due to disease which affect the rural productive population of India.

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