

# Association of Occupational Risk Factors with the Level of Lumbar Disc Nucleus Pulposus Herniation

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## ABSTRACT

**Background:** Lumbar disc nucleus pulposus herniation causes functional and life quality impairment.

**Objective:** To evaluate the association of various occupations with increased risk of lumbar disc herniation.

**Study Design:** Retrospective study.

**Place and Duration of Study:** Department of Neurosurgery, Shaikh Zayed Hospital, Lahore from 1<sup>st</sup> June 2011 to 30<sup>th</sup> June 2020.

**Methodology:** Eighty patients between 30-60 years were enrolled after complete examination and lumbar disc herniation (nucleus pulposus) diagnosis. Variable including occupations type, working hours, clinical history were noted.

**Results:** There were 86% males and 13.8% females. The mean age of patients was 51±7.3 years. Majority of patients were either educationist or office worker with 28.75% those who were lifting weight >10 kg by bending forward flexion at >90°. The working hours of 65% was >8 hours daily.

**Conclusion:** Occupations with greater sitting, bending and weight lifting activities are risky and can result in lumbar disc nucleus pulposus herniation.

**Key words:** Occupational risk, Disc degeneration, Lumbar disc, Nucleus pulposus

## INTRODUCTION

Back pain due to degenerative lumbar disc results in functional impairment, decreased quality of life, health issues and reduced work proficiency.<sup>1,2</sup> Many studies have been conducted to identify the risk factors for lumbar disc nucleus pulposus herniation (LDNPH). But only aging is considered as established risk factor towards LDNPH.<sup>3-5</sup> There are few factors which are related with advancing disc degeneration. These includes smoking, diabetes, hypertension, obesity or activities involving weight lifting.<sup>6-7</sup>

Various studies have elaborated the importance of occupation on spinal health. However specific occupations which might affect in LDNPH have only been discussed in a few studies only.<sup>8,9</sup> A case study published LDNPH results on a truck driven occupation with long hour sittings lead into herniation of the disc where as another study revealed a positive association of weight lifting occupations with lumbar disc herniation. Another study also revealed the fact that jobs where twisting and bending spine was required results in building of disc which is visible on magnetic resonance scans.<sup>10,11</sup> The present study was designed to identify occupations which results in LDNPH in Pakistani population.

## MATERIALS AND METHODS

A retrospective study was conducted at neurosurgery department of Sheikh Zayed Medical Complex from 1<sup>st</sup> June 2011 to 30<sup>th</sup> June 2020. A total number of 80 patients between 30-60 years were enrolled who had complain of spinal lumbar pain. Unconfirmed diagnosed patients and

those with history of malignancies were put in the exclusion criteria. After physical and clinical assessment of the patients a complete digital examination requiring X-ray followed by MRI was performed. The data extracted from their clinical findings and other variable data including patient's occupation and working hours was documented. Data analysis was conducted through SPSS tool (version 24.0) using mean ± standard deviation and chi square analysis for P value <0.05 was taken as significant.

## RESULTS

There were 86% males and 13.8% females. The mean age was 51±7.3 years with majority within the age group of 51-60 years (Table 1).

In this study majority of the patients were from educational departments such as teachers, lecturers, administrators or had an office job with sitting for maximum day hours on a chair while working or long-standing hours during lecture deliverance. Followed by these patients were labour workers especially daily wagers with brick throwing, bending activities involved in their day to day work (Table 2).

The present study also found that among young adults as well as middle forties there were 28.75% who were lifting weights above 10 kg either during gym or in labour work (Table 3).

The daily working hours greater than 12 were documented in 35% of patients followed with 30% those who were having working hours greater than 8 to 12 hours daily (Fig 1).

Table 1: Demographic information of patients (n=80)

Variable	No.	%
Gender		
Male	69	86.2
Female	11	13.8
Age (years)		
30-40	8	10.0
41-50	30	37.5
51-60	42	52.5

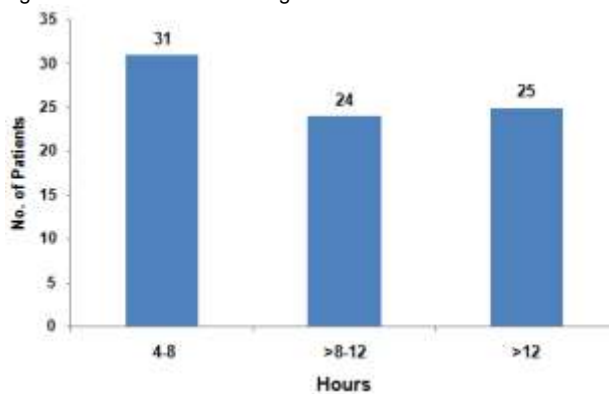
Table 2: Occupational distribution of the patients (n=80)

Occupational status	No.	%
Student	5	6.4
Not working	10	12.5
Office worker	15	18.7
Military	3	3.7
Health care worker	6	7.5
Educationist	22	27.5
House wife	7	8.7
Other (labour workers)	12	15.0

Table 3: Weight lifting by bending lumbar spine

Weight lifting by bending	No.	%
<4 kg	8	10.0
4-10 kg	10	12.5
>10 kg	23	28.5

Fig 1: Time of forward bending >90° flexion



## DISCUSSION

Young men are more vulnerable for disc degeneration than young women as a consequence of increased stressful physical activities and injuries to their spine. Studies describes that men are susceptible for getting disc degeneration almost a decade before women.<sup>12-13</sup> The present documented the mean age of patients as 51±7.3 years. Literature supports that the interspaces between disc has been significantly seen to be displaced in patients above 45 years, therefore, making age as a high risk for causing disc degeneration.<sup>14</sup>

Various occupations have been linked with higher risk of LDNPH. In current study those occupation with maximum sitting and spinal bending hours were majorly recorded in patients suffering from lumbar disc nucleus pulposus herniation. A positive association have been seen with extreme forward bending and disc herniation.<sup>15</sup> A hard daily working hours and weight lifting has also shown negative impact on lumbar spine.<sup>16,17</sup> This infers that those occupation where cumbersome tiring hours accompanied by spine bending and hard physical effort are major risk factors for disc degeneration.<sup>18</sup> Howell<sup>20</sup> supports the fact that good physical exercise especially of spine can keep

your spine healthy. Those weight lifting exercises where appropriate posture is not maintained can instead of doing good to spine become terribly dangerous and lead into disc degenerative changes. In similar manner healthy spine could be achieved by stretching spine straight in situation where long hour hard work is being performed.<sup>21-23</sup>

## CONCLUSION

Occupations like educationist, office worker and labor duties requiring longer sitting, bending and weight lifting physical activities increase the risk of lumbar disc nucleus pulposus herniation.

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