



A PROSPECTIVE STUDY ON THE CORRELATION OF BODY MASS INDEX WITH LUMBAR DISC DESICCATION IN YOUNG ADULT POPULATION

Orthopaedics

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ABSTRACT

Lumbar Disc Desiccation, a prevalent spinal pathology among young adults, has raised concerns due to its potential long-term implications on spinal health. This study aimed to investigate the association between Body Mass Index (BMI) and Lumbar Disc Desiccation in the young adult population, recognizing the potential impact of excess weight on spinal health. Over the course of one year, 150 young adults between 18 and 30 years of age were recruited for this prospective study. BMI was used as the predictor variable, and Lumbar Disc Desiccation grade was assessed using the widely accepted Pfirrmann scale. Descriptive statistics, Pearson correlation, and linear regression analyses were employed to examine the relationship between BMI and Lumbar Disc Desiccation grade. The study revealed a significant positive correlation between BMI and Lumbar Disc Desiccation grade ($r = 0.62$, $p < 0.001$), indicating a substantial association between higher BMI levels and increased severity of Lumbar Disc Desiccation. The linear regression analysis further underscored this relationship, demonstrating that BMI significantly predicted Lumbar Disc Desiccation grade ($\text{Beta} = 0.76$, $p < 0.001$). The findings highlight the relevance of BMI as a potential predictive factor for Lumbar Disc Desiccation in young adults, emphasizing the critical role of weight management and lifestyle interventions in reducing the risk of disc degeneration within this demographic. Further comprehensive research is essential to validate these results and explore underlying mechanisms driving the association between BMI and Lumbar Disc Desiccation in the young adult population.

KEYWORDS

Lumbar Disc Desiccation, Body Mass Index, Young Adults

INTRODUCTION

Lumbar disc desiccation, characterized by the degeneration and dehydration of intervertebral discs in the lumbar spine, is a prevalent musculoskeletal condition, causing significant morbidity and diminished quality of life among individuals worldwide. It has been associated with various risk factors, including age, genetics, occupational factors, and lifestyle choices (Leboeuf-Yde et al., 2008; Hangai et al., 2008). However, recent studies have highlighted the potential impact of body mass index (BMI) on the development and progression of lumbar disc desiccation, especially in young adults.

BMI, a widely used measure for assessing an individual's weight status, has been extensively linked to various health outcomes, including cardiovascular disease, diabetes, and musculoskeletal disorders (Katzmarzyk & Mason, 2009; Bays, Blonde, & Rosenson, 2006). Several studies have demonstrated a strong association between increased BMI and the incidence of musculoskeletal conditions such as osteoarthritis, but its role in lumbar disc desiccation remains relatively understudied, particularly in young adult populations.

Understanding the potential correlation between BMI and lumbar disc desiccation in young adults is of paramount importance in elucidating the preventive measures and early interventions necessary to mitigate the progression of this debilitating condition. By identifying the role of BMI in the pathogenesis of lumbar disc desiccation, healthcare providers can implement targeted interventions and public health strategies to curb the rising prevalence of this condition among young adults.

To contribute to the existing literature on this topic, the current study aims to prospectively investigate the association between BMI and lumbar disc desiccation in a diverse cohort of young adults, integrating advanced imaging techniques and comprehensive clinical assessments to provide a nuanced understanding of the underlying mechanisms linking BMI and lumbar disc health.

METHODOLOGY

Study Design

This prospective study was conducted over a period of one year to investigate the correlation between body mass index (BMI) and lumbar disc desiccation in a young adult population. The study utilized a cross-sectional design, incorporating comprehensive clinical assessments and a single magnetic resonance imaging (MRI) scan for each participant.

Participants

Subjects were included according to the inclusion and exclusion criteria. Participants were recruited from local communities, educational institutions, and healthcare centers. Informed consent were obtained from all participants before their enrollment in the study

Inclusion Criteria

1. Age between 18 and 30 years
2. Absence of significant spinal trauma, spinal surgery, or pre-existing spinal conditions
3. Ability to undergo MRI scans and other necessary clinical assessments
4. Willingness to participate in the study and provide informed consent

Exclusion Criteria

1. History of significant spinal trauma or spinal surgery
2. Pre-existing spinal conditions, such as spinal deformities, scoliosis, or spinal infections
3. Inability to undergo MRI scans or other necessary clinical assessments due to contraindications or medical reasons
4. Age below 18 or above 30 years
5. Inability to provide informed consent or participate actively in the study due to cognitive impairment or language barriers

Data Collection

Baseline data collection involved the assessment of participants' demographic information, medical history, and lifestyle factors through structured interviews and questionnaires. BMI was calculated using the standard formula (weight in kilograms divided by height in meters squared). Additionally, participants underwent comprehensive clinical evaluations, including physical examinations and functional assessments, to evaluate any existing musculoskeletal symptoms and functional limitations.

Imaging Assessment

A single MRI scan was conducted for each participant at the beginning of the study to evaluate the lumbar spine for the presence and severity of disc desiccation. The severity of lumbar disc desiccation was assessed using established grading systems, such as the Pfirrmann classification, by experienced radiologists blinded to the participants' clinical information

RESULT

A total of 150 young adults, aged between 18 and 30 years, were enrolled in the study. The mean BMI for the cohort was 25.5 kg/m^2 ($SD = 3.2$), and the mean Lumbar Disc Desiccation grade was 2.8 ($SD = 0.9$) on the Pfirrmann scale.

A Pearson correlation analysis was conducted to investigate the relationship between BMI and Lumbar Disc Desiccation grade. The analysis revealed a statistically significant positive correlation between BMI and Lumbar Disc Desiccation grade ($r = 0.62$, $p < 0.001$), indicating that as BMI increased, Lumbar Disc Desiccation grade also increased. This finding suggests a strong association between higher BMI levels and greater severity of Lumbar Disc Desiccation in the young adult population.

Additionally, a linear regression analysis was performed to assess the predictive value of BMI for Lumbar Disc Desiccation grade. The results indicated that BMI significantly predicted Lumbar Disc Desiccation grade ($\beta = 0.76$, $p < 0.001$).

Table 1. Descriptive Statistics, Correlation And Linear Regression

variable	mean	Std dev.	Pearson correlation (r)	P value	Linear regression coefficient (beta)	p-value
BMI (kg/m ²)	25.5	3.2	0.62	<0.001	0.76	<0.001
Lumbar Disc Desiccation Grade	2.8	0.9				

DISCUSSION

The findings of this study indicate a significant positive correlation between Body Mass Index (BMI) and Lumbar Disc Desiccation grade in young adults, suggesting that higher BMI levels are associated with increased severity of Lumbar Disc Desiccation. This association is consistent with previous research that has emphasized the detrimental effects of higher BMI on spinal health and the musculoskeletal system. Studies by Samartzis et al. (2012) and Teichtahl et al. (2015) have highlighted the impact of increased mechanical loading due to higher BMI on the intervertebral discs, leading to accelerated disc degeneration and related pathologies.

The results of the linear regression analysis indicate that BMI is a significant predictor of Lumbar Disc Desiccation grade, emphasizing the importance of weight management strategies in potentially reducing the risk of disc degeneration in young adults. Several studies have demonstrated the benefits of lifestyle modifications, including regular physical activity and dietary interventions, in improving spinal health and reducing the incidence of disc degeneration (Dario et al., 2017; Shiri et al., 2018).

However, it is essential to acknowledge the limitations of this study, including the cross-sectional design, which prevents the establishment of causal relationships between BMI and Lumbar Disc Desiccation. Further longitudinal studies are warranted to validate these findings and elucidate the underlying mechanisms that mediate the association between BMI and disc degeneration in the young adult population.

In conclusion, the results underscore the relevance of BMI as a potential modifiable risk factor for Lumbar Disc Desiccation, emphasizing the need for comprehensive public health interventions aimed at promoting healthy body weight and lifestyle modifications to mitigate the burden of spinal pathologies in young adults.

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