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Research Article

**INCIDENCE RATE OF JUVENILE DISC DEGENERATION &
ASSOCIATED LOWER BACK PAIN AMONG OBESE
YOUNGSTERS****Hameed Ullah Khan¹, Ishtiaque Ali Memon² & Dildar Khan³**¹Dept. of Neurosurgery, Indus Medical College, Tando Muhammad Khan²Dept. of Orthopedic Surgery & Traumatology, LUMHS, Jamshoro³Dept. of Orthopedic Surgery, Indus Medical College, Tando Muhammad Khan**Abstract:**

Background: Juvenile obesity is becoming an increasing concern around the world; with the prevalence having tripled from 1980 to 2000. Many problems have been associated with obesity and are well described in the literature, including cardiovascular problems, diabetes mellitus, sleep apnea, and specific types of cancer. However recently, orthopedic complications have also began to surface.

Objective: To study the incidence rate of patients presenting with juvenile disc degeneration and associated lower back pain among obese youngsters at a tertiary care hospital. **Methods:** This cross-sectional, observational analysis was carried out at Indus Medical College Hospital, T.M.K from January 2016 to June 2018 on a sample of 90 obese youngsters (chosen via non-probability, consecutive sampling) aged thirteen to twenty years, presenting to the study setting with lower associated back pain. After taking written informed consent from subjects (and guardians when necessary), data was collected using a pre-structured, interview based questionnaire containing inquiries about basic sociodemographic details, lifestyle and eating habits and self-reported lower back pain levels. Sagittal T2-weighted magnetic resonance images (MRI) were evaluated for the presence and extent of disc degeneration as well as other spinal findings. The data obtained was analyzed using MS. Excel 2013 and SPSS v. 19.0. **Result:** A total of 90 juvenile obese subjects were enrolled during the study duration (27 in 2016, 44 in 2017 and 29 in just the initial 6 months of 2018). The mean age of sample stood at 16 years ($SD \pm 1.5$) and most of the subjects (70%) were males. Juvenile disc degeneration was present in 58.89% of the subjects; disc bulging or extrusion and high intensity zones on the MRI were seen in 13.3% and 10% of the subjects respectively. Lower back pain was the primary presenting complaint in 81.1% of the subjects while the rest presented with complaints of generalized body ache or a history of trauma. The mean self-reported level of back pain increased significantly with increasing BMI. **Conclusion:** After carefully considering the results, it can be concluded that the incidence rate of juvenile patients presenting together with obesity, disc degeneration and associated lower back pain has risen. Furthermore, a strong association between BMI and self-reported back pain level is present.

Keywords: Juvenile, Obesity, Juvenile Disc Degeneration and Lower Back Pain.

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INTRODUCTION:

Obesity is public health concerns that affect many

populations worldwide and its prevalence continues to rise. [1] Approximately, 10 to 23 percent of the world's adult populations are overweight and obese, respectively. In fact, such prevalence rates are expected to increase exponentially by the year 2030 if preventative measures are not employed. [2]

For example, in the United States it has been estimated that a third of children are obese, which is distressing because childhood obesity increases the risk of adulthood obesity. [3] In Europe, several countries (e.g., United Kingdom, Germany and Croatia) have noted that over 60% of their populations to be at least overweight. Even in parts of Asia (e. g., China), the prevalence of overweight and obesity has increased due to the rise of the fast food culture, adoption of more Westernized lifestyles, and financial affluence. [4]

Many problems have been associated with obesity and are well described in the literature, including cardiovascular problems, diabetes mellitus, sleep apnea, and specific types of cancer. However recently, orthopedic complications such as lower back pain (LBP) have also began to surface. Low back pain occurs in every population worldwide and has serious socioeconomic consequences. [5] Low back pain may affect daily function, diminish the quality of life, increase health-care costs, and lead to psychological distress. [6] Several pathophysiological mechanisms exist that can account for low back pain. Degeneration of the lumbar intervertebral disc is a major factor associated with low back pain. In fact, the risk of developing low back pain increases with the severity of degenerative disc changes. [7]

As mentioned above, a principal underlying determinant for LBP incidence is intervertebral disk degeneration, [8] the risk of which has been attributed to genetic, environmental, and lifestyle factors. Among these, obesity, has been associated with increased LBP rates. [9] Although it has been a long-standing belief that body weight exerts its

deleterious effects on the spine due to altered biomechanics, mounting evidence suggests that biochemical and metabolic changes brought upon by fat may also play a role in the development of disk degeneration and LBP. [10]

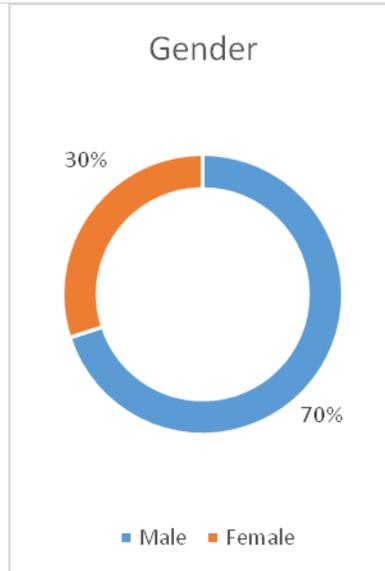
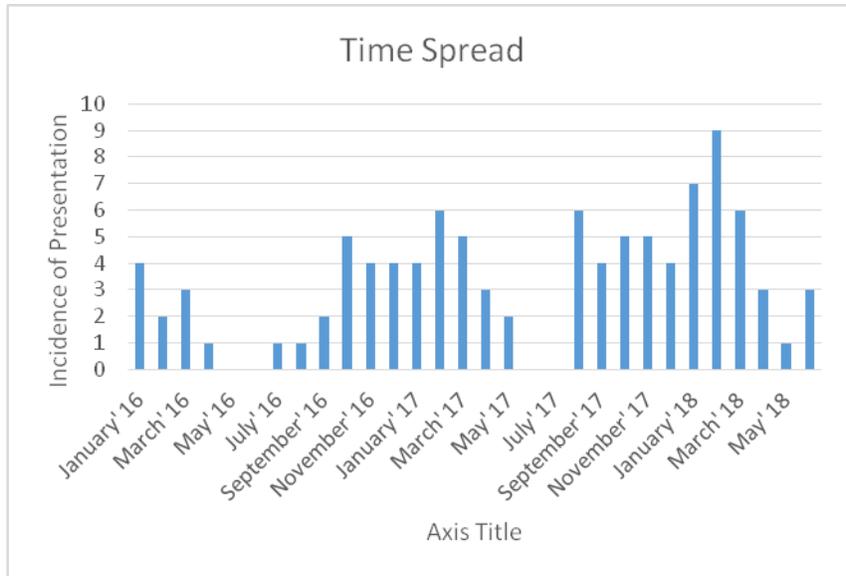
It has been hypothesized that an increase in body weight may result in greater mechanical demands on the spine and subsequent structural degeneration and pain, however, literature supporting this claim is not sufficient. Our research hopes to study the incidence rate of patients presenting with juvenile disc degeneration and associated lower back pain among obese youngsters at a tertiary care hospital, in an attempt to shed more light on this association. This research shall also yield valuable baseline data that may be used as a basis for further detailed research.

METHODOLOGY:

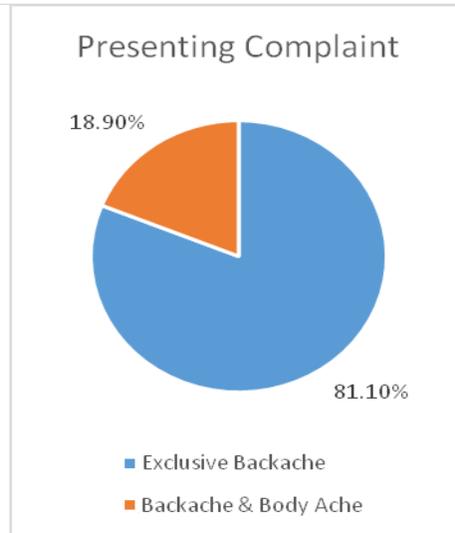
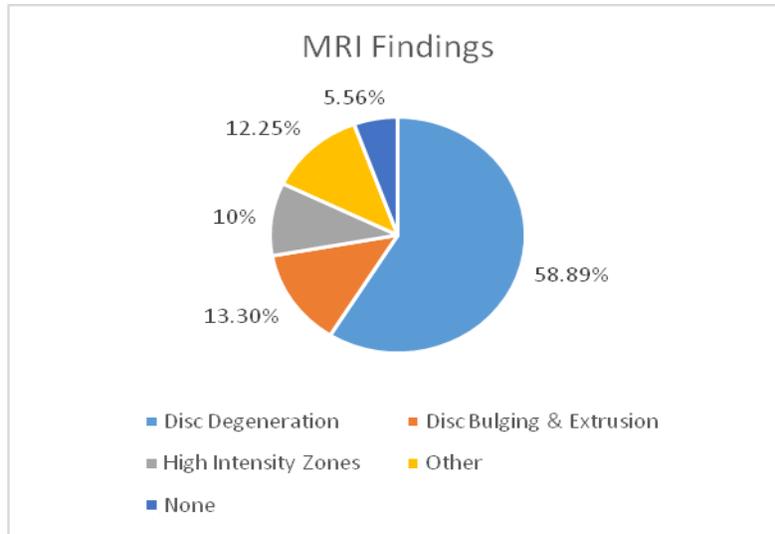
This cross-sectional, observational analysis was carried out at Indus Medical College Hospital, T.M.K from January 2016 to June 2018 on a sample of 90 obese youngsters (chosen via non-probability, consecutive sampling) aged thirteen to twenty years, presenting to the study setting with lower back pain. After taking written informed consent from subjects (and guardians when necessary), data was collected using a pre-structured, interview based questionnaire containing inquiries about basic sociodemographic details, lifestyle and eating habits and self-reported lower back pain levels. Sagittal T2-weighted magnetic resonance images (MRI) were evaluated for the presence and extent of disc degeneration as well as other spinal findings. The data obtained was analyzed using MS. Excel 2013 and SPSS v. 19.0.

RESULTS:

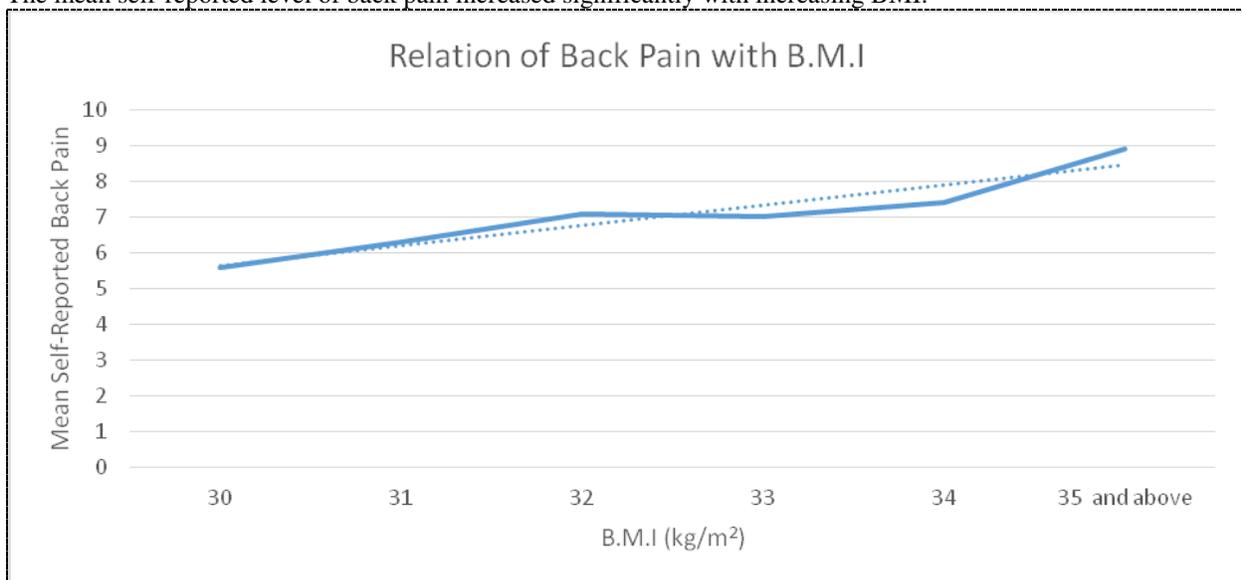
The mean age of sample stood at 16 years (SD ± 1.5) and most of the subjects (70%) were males. A total of 90 juvenile obese subjects were enrolled during the study duration (27 in 2016, 44 in 2017 and 29 in just the initial 6 months of 2018).



Lower back pain was the primary presenting complaint in 81.1% of the subjects while the rest presented with complaints of back and generalized body ache along or a history of trauma. Juvenile disc degeneration was present in 58.89% of the subjects, disc bulging or extrusion and high intensity zones on the MRI were seen in 13.3% and 10% of the subjects respectively.



The mean self-reported level of back pain increased significantly with increasing BMI.



DISCUSSION:

For the past two decades, magnetic resonance imaging (MRI) has been the gold standard for assessing intervertebral disk degeneration. [11] Although there have been numerous classification schemes proposed to assess disk degeneration on MRI, many investigators have traditionally referred to the Pfirrmann or the Schneiderman criteria, [12] both of which rely on signal intensity of the disk on imaging to denote grades of degeneration severity.

In one of the earliest spine degeneration MRI studies, Boden et al noted in 67 subjects that disk degeneration is quite common, even in asymptomatic individuals. [13] These and other observations raised questions regarding associations between disk degeneration assessed by anatomic imaging and clinical symptoms. However, more recent studies based on large populations (over 2,500 Southern Chinese subjects) have shown that disk degeneration on MRI is significantly associated with LBP history, and such an association increases according to the global severity of disk degeneration (i.e., degenerative disk disease score). [14]

Samartzis et al have also noted that disk degeneration severity in asymptomatic individuals is predictive for future first-time LBP episodes. [15] These trends appear generalizable as Takatalo et al have noted for the Northern Finnish Birth Cohort that the severity of disk degeneration on MRI is associated with the severity of low back symptoms over a 3-year period in young adults. [16] What's more, a systematic review by Chou et al, addressing the association of disk degeneration on MRI and symptoms in various populations throughout the world, observed a significant association between disk degeneration and chronic LBP. [17]

Although body weight has been noted to be associated with the development of cardiovascular disease, diabetes, and malignancies among other conditions, its effects upon disk degeneration have remained elusive. The nature of this is largely attributed to the lack of large epidemiologic studies with a proper study design, patient-based studies, insufficient statistical analyses, mode of radiographic/imaging assessment in defining the phenotype of disk degeneration, and/or conjecture arising from limited radiographic interpretation of additional spinal findings (e.g., Schmorl nodes) that may contribute to the degenerative process. [18]

Furthermore, the association of overweight and obesity with the extent (i.e., levels with disk degeneration) and severity of disk degeneration of the

lumbar spine remain unknown because previous studies have failed to quantitatively assess such parameters on advanced imaging. However, because overweight and particularly obesity have been associated with LBP, [19] and because disk degeneration on MRI is an etiologic factor related to LBP, [20] it would appear reasonable that elevated BMI may be instrumental in the development of disk degeneration.

CONCLUSION:

After carefully considering the results, it can be concluded that the incidence rate of juvenile patients presenting together with obesity, disc degeneration and associated lower back pain has risen over the years. Additionally, synonymous with international literature, strong association between BMI and self-reported back pain level is noticed. However, no clear association between BMI and extent of juvenile disc degeneration was evident from our study.

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