Body Mass Index and its Correlation with Knee Pain in Osteoarthritis Patients.

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ABSTRACT

Background: The goal of this study was to evaluate the correlation between body mass index (BMI) and severity of knee pain. **Methods:** Total 105 OA patients with knee pain selected on the basis of radiological diagnosis of OA knee were included. Evaluation of OA was done by using Kallgren and Lawrence grading along with numerical pain rating scale (NPRS). **Results:** Findings of the present study showed that number of OA patients 12 (11.4%), 40(38.09%), 30 (28.57%) and 33 (31.4%) were suffering with grade1 to 4 OA severities respectively. Further, Pearson correlation coefficient showed a positive correlation between BMI and NPRS (r=0.237, p>0.001). **Conclusion:** Findings of the current study show that BMI is significantly correlated with severity of pain of knee in OA patients as higher the BMI greater the pain of knee. Therefore, pain in knee patients with higher BMI should be advised to decrease weight via suitable exercise program.

Keywords: Osteoarthritis (OA),Obesity, Numerical pain rating scale(NPRS).

INTRODUCTION

Osteoarthritis (OA) a well known degenerative disorder is one of the commonest forms of arthritis.[1] Knee OA is a heterogeneous disorder having different etiological factors in different patients. Among most common causative factors are advancing age, female gender, alignment defects, genetic factors and obesity etc.[3] Prevalence of knee pain has been found up to 50% in individuals above 50 years. Moreover, half of these patients suffer from severe and disabling knee pain.[2] Obesity is emerging as an epidemic throughout the world. Obesity is the most important risk factors in the development of OA.[2,3]

Obesity is a modifiable risk factor which can decrease the risk as well as the severity of knee pain in OA patients.[4] Therefore, present study was designed to evaluate the correlation higher body mass index (BMI) with knee pain of OA patients.

MATERIALS AND METHODS

This was an observational type of study conducted in Department of Orthopaedic RMRI, Bareilly (U.P.). Total one hundred five patient of OA with knee pain were included in this study. Inclusion criteria for the study were age ≥ 35 years and radiological evidence of knee OA with knee pain. Exclusion criteria for the study were: history of knee injury, smoking, hormonal therapy (corticosteroids, hyaluronidase, prolotherapy injections), HLA B 27, Gout. OA of knee was graded according to Kellgren and Lawrence grading.7 Simple linear regression analysis and Pearson correlation coefficient were used to evaluate if there is any association between BMI and numerical pain rating scale (NPRS). A p value <0.05 was considered statistically significant.

RESULTS

Total of one hundred and five patients (age 54.39 ± 13.17 years) were included in the present study. Among them 61 (58.08%) male patients and 44 (41.92%) were female patients. The subjects were comparable with respect of age, weight and BMI. Results are present as mean ± SD.

[Table 1] show that different variables of the OA patients. The age, Weight and BMI of the OA patients were 50.58 ± 10.87 years, 66.84 ± 11.08 Kg and 1.57 ± 0.12 kg/m^2 correspondingly.

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Table 1: Demographic Parameters.

No. of patients (n=105)	Mean ± SD
Age (yrs)	50.58 ± 10.87
Weight (Kg)	66.84 ± 11.08
Height (m)	1.57 ± 0.12

[Table 2] reveals that among all OA patients 52% bilateral, 27.6% right and 20.4% left knee pain suffering. Further, it is evident from table 2 that number of OA patients 12 (11.4%), 40(38.09%), 30 (28.57%) and 33 (31.4%) were suffering with grade1 to 4 OA severities respectively according to Kellgren and Lawrence grading. It is evident from table 2 that NPRS of the study ranged from 2 to 9 (mean 5.62±1.89).

[Table 3]. shows that there was a significant positive correlating of the NPRS score with BMI (r=0.237, p=<0.0001).Further, regression analysis shows that NPRS can significantly estimated from respective BMI (R2 = 0.561).

Table 2: Comparison of BMI and NPRS.

Grade	No.	BMI (Mean±SD)	NPRS (Mean±SD)
1	12	24.1±1.32	3.57±1.20
2	40	25.8.00±2.02	5.04±1.36
3	30	27.56±3.43	6.45±1.32
4	33	28.66±4.24	6.8±1.22
Total	105	26.89±3.94	5.62±1.89
Pearson correlation between BMI and NPRS	**r**	**R2**	**P value**
	0.237	0.561	>0.001

DISCUSSION

OA is one of the commonest degenerative disorders prevalent in elderly population.The prognosis and development of OA depends on various factors including structural, environmental and anatomical. Moreover, some additional factors influence the outcome of OA via dietary intake, level of physical activity and injury to the knee.

Findings of the present study revealed that there was a significant correlation of BMI with the severity of pain in OA patients. The BMI seems to be the most easily modifiable factor found in OA with knee pain. Previous research suggests that knee replacement surgeries include more than 50% overweight conditions.[8] Berebaum F et al recorded that excessive vertical loading forces Over knee joint of patients suffering with OA can leads to inflammatory process.[9] Further, Leptins have been found associated with chronic inflammatory state of knee joint in OA. Moreover, leptons found in abandoned quantity in adipose tissue.[10] Therefore, female gender, obesity, tendency to body fat ratio may increase the severity of knee pain with OA.

Single leg stance exert up to six time body weight through knee joint, Further any increase in body weight may increase the transmitted force from knee joints into multiples. Moreover it can be evident from the knee of an overweight individual during walking. Increased BMI leads to progressive destruction of knee joints and induces pain which in turn results in decrease physical activity. In this way a dilemma developed in condition of as patients   are unable to move due to pain which in turn leads to further increase of body weight and worsen the condition of knee in OA patients.[4-7] Furthermore, prior study suggest that individuals with OA with radiological evidences of knee worsening have a severe pain in higher BMI in comparison of lower BMI patients. However, findings of that study also suggested that individual with higher BMI experience greater pain in knee compare to lower BMI.[5] Findings of the current study recorded that BMI alone may account for 56.1% of total variations of NPRS severity. This finding is consistent with the finding of the previous study of Matthew et al as they observed that pain subjects showed a higher BMI (30.4 kg/m2) in comparison of without pain indviduals (27.5 kg/m2) (p < 0.0001). Moreover, Severity of pain has been found increased with every successive BMI group. This study concluded that BMI is positively correlated with NPRS in OA patients with knee pain.

CONCLUSION

Findings of the current study show that BMI is significantly correlated with severity of pain of knee in OA patients as higher the BMI greater the pain of knee. However, decreasing the BMI may reverse the OA changes and decrease the severity of pain. Therefore, OA patients with knee and higher BMI should be advised to reduce weight via suitable exercise program. One can consider about bariatric treatment options if BMI is too high for early and quick results.

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