Section: Orthopedics

Original Research Article

EVALUATION OF BODY MASS INDEX AND ITS CORRELATION WITH KNEE PAIN IN OSTEOARTHRITIS PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL

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Received : 25/07/2023
Received in revised form : 16/09/2023
Accepted : 28/09/2023

Keywords:
Body Mass Index (BMI), obesity, osteoarthritis in the knee, and the numerical pain rating scale (NPRS).

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DOI: 10.47009/jamp.2023.5.5.358

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (5); 1822-1825

Abstract

Background: A degenerative joint condition that primarily affects the elderly, knee osteoarthritis raises the chance of disability. Obesity, age, sex, work, trauma, and the patient's history of the condition are risk factors that influence the severity of osteoarthritis in the knee. One of the things that makes osteoarthritis worse is being overweight. **Materials and Methods:** A total of 56 patients with osteoarthritis and discomfort in the knee were chosen based on their radiological diagnostic of osteoarthritis knee. The Kallgren and Lawrence grading system and the numerical pain rating scale (NPRS) were used to assess osteoarthritis. **Result:** According to the current study's findings, 05 patients (8.92%), 21 patients (37.5%), 16 patients (28.57%), and 14 patients (25.0%) had osteoarthritis with a grade of 1 to 4. Additionally, a positive link between BMI and NPRS was revealed by the Pearson correlation coefficient (r=0.29, p=0.03). **Conclusion:** The results of this study demonstrate a substantial correlation between BMI and the degree of knee pain in patients with osteoarthritis; the higher the BMI, the more severe the knee pain. As a result, patients with higher BMI who experience knee pain should be encouraged to lose weight through an appropriate exercise strategy.

INTRODUCTION

Osteoarthritis (OA), which is degenerative in nature, is the most common form of arthritis in the knee. Age, articular cartilage obesity, weariness, trauma, congenital anomalies, and joint deformities brought on by a variety of reasons, including subchondral bone reactive hyperplasia, under joint margins, and damage deterioration, are all linked to knee osteoarthritis.[1] Slowly developing joint discomfort, stiffness, stiffness, edema, reduced mobility, and joint abnormalities are clinical signs of osteoarthritis in the knee. One of the most prevalent types of arthritis is osteoarthritis (OA), a well-known degenerative disease.[2] The etiology of knee osteoarthritis varies from patient to patient, making it a heterogeneous illness. Age, gender, alignment issues, genetics, obesity, and other factors are among the most frequent causes. It has been discovered that up to 50% of those over 50 have knee pain. Furthermore, acute and incapacitating knee pain affects 50% of these patients. Globally, obesity is becoming a global epidemic. The most significant risk factor for the onset of OA is obesity.[3,4] One modifiable risk factor that can reduce the likelihood and intensity of knee pain in adults with osteoarthritis is obesity.[5] Thus, the purpose of the current study was to assess the relationship between osteoarthritis patients' knee discomfort and a higher body mass index.

MATERIALS AND METHODS

The present study was carried out at the World College of Medical Sciences Research and Hospital in Jhajjar in the Department of Orthopaedics. This study included a total of 56 participants with osteoarthritis who complained knee pain. Age ≥ 34 years and radiographic evidence of knee OA with knee pain were prerequisites for study inclusion. History of knee injury, smoking, hormonal therapy (corticosteroids, hyaluronidase, prolotherapy injections), HLA B 27, and gout were all considered exclusion factors for the study. The Body Mass Index (BMI) is a measurement used to assess an adult's nutritional state. It is calculated by dividing the weight of an individual in kilograms by the square of their height in meters (kg/m2).[6] The WHO has classified BMI into the following categories.

ISSN (O): 2687-5365; ISSN (P):2753-6556

Knee osteoarthritis was assessed using the Kellgren and Lawrence technique.[7] To determine whether there is a relationship between BMI and the numerical pain rating scale (NPRS), simple linear regression analysis and the Pearson correlation coefficient were employed. P values less than 0.05 were regarded as statistically significant.

RESULTS

A sample of 56 patients was selected based on the findings of a study on knee osteoarthritis patients who visited the orthopedics department at WCMSRH, had therapy, and had radiological exams. The study comprised 56 patients in all, with ages ranging from 56.24 ±12.65 years. Of these, 22 patients (39.28%) were female, and 34 patients (60.71%) were male. The subjects were similar in terms of their BMI, weight, and age. The findings are shown as mean ± SD.

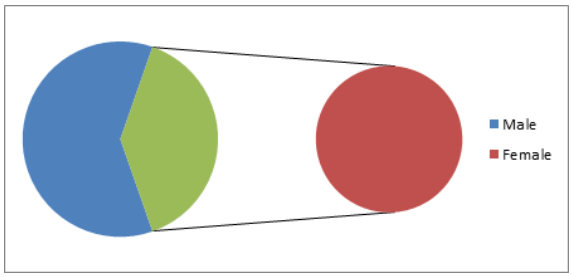

Figure 1: Shows the number of patients with knee osteoarthritis by gender.

Table 1: Shows the WHO Classification of BMI

BMI	Status Nutrisi
< 18.5	Underweight
18.5-24.9	Normal
25.0-29.9	Pre-Obese
30.0-34.9	Obesity Class 1
35.0-39.9	Obesity Class 2
> 40	Obesity Class 3

Table 2: Shows the demographic Parameters.

Variables	No. of patients
Age in years	56.24±12.65
Weight in kg	68.04±14.36
Height in metre	1.58±0.26
BMI	27.32±7.68

Table 3: Number of patients with knee osteoarthritis by gender.

Gender	No. of patients (%)
Male	34 (60.71%)
Female	22 (39.28%)

[Table 2] shows the various characteristics of patients with osteoarthritis. The osteoarthritis patients' matching BMI, weight, and age were 1.58 ± 0.26 kg/m2, 68.04 ± 14.36 kg, and 56.24 ± 12.65 years.

Table 4: Number of patients with right, left and bilateral knee osteoarthritis

Variables	No. of patients (%)
Right	16 (28.57%)
Left	10 (17.85%)
Bilateral	30 (53.57%)

According to [Table 4], out of all patients with osteoarthritis, 30 (53.57%) have bilateral knee pain, 16 (28.57%) have right knee pain, and 10 (17.85%) have left knee pain. Additionally, table 5 shows that, according to Kellgren and Lawrence grading, 05 patients (8.92%), 21 patients (37.5%), 16 patients (28.57%), and 14 patients (25.0%) had osteoarthritis with severities ranging from grade 1 to 4. Table 4 makes it clear that the study's NPRS ranged from 2 to 9 (mean 5.76±1.62).

Table 5: Comparison of BMI and NPRS based on the Kellgren-Lawrence classification.

Grade	No. of patients	BMI(Mean±sd)	NPRS(Mean±sd)	P - value
Grade-1	05(8.92%)	25.02±11.24	4.12±1.07	0.01
Grade-2	21(37.5%)	25.92±11.25	5.26±1.54	0.02
Grade-3	16(28.57%)	28.38±12.52	6.68±1.92	0.01
Grade-4	14(25.0%)	28.86±12.54	6.98±2.04	0.04
Total	56(100.0%)	27.32±12.06	5.76±1.62	0.01

The NPRS score and BMI had a strong positive correlation (r=0.29, p=0.03), as [Table 6] depicts. Additionally, regression analysis demonstrates that the corresponding BMI can be used to significantly

ISSN (O): 2687-5365; ISSN (P):2753-6556

estimate NPRS (R2 = 0.67). According to this study, patients with osteoarthritis in their knees had abnormal BMI values that were higher than typical.

Table6: Pearson's correlation analysis between BMI and NPRS.

Variables	Pearson's correlation (r) with NPRS		
BMI	r	R2	P-value
	+0.29	0.67	0.03

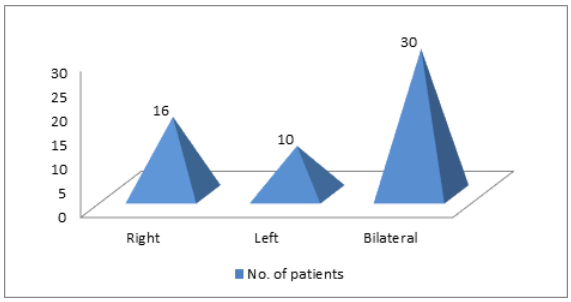

Figure 2: Shows the number of patients with right, left and bilateral knee osteoarthritis.

DISCUSSION

One of the most prominent degenerative diseases among the elderly is osteoarthritis. Numerous factors, including structural, environmental, and anatomical ones, influence the course and outcome of osteoarthritis. Furthermore, dietary habits, degree of physical activity, and knee injuries are some other factors that affect the course of osteoarthritis. The results of this study showed a strong relationship between osteoarthritis patients' BMI and their level of discomfort. When it comes to osteoarthritis and knee discomfort, the BMI appears to be the most easily adjustable component. According to earlier studies, approximately 50% of patients undergoing knee replacement surgery are overweight.[8] Berebaum F et al. found that patients with osteoarthritis may experience an inflammatory process as a result of high vertical loading forces over their knee joints.[9] Furthermore, in osteoarthritis, leptins have been linked to a persistent inflammatory condition of the knee joint. Additionally, leptons were discovered in adipose tissue in an abandoned number.[10] As a result, knee discomfort associated with osteoarthritis may be more severe in women, those who are obese, and those who have a tendency to be overweight. Any increase in body weight may raise the force transferred from knee joints into multiples. A single-leg stance can exert up to six times body weight through the knee joint. Additionally, it is visible from an overweight person's knee when they walk. A higher body mass index causes knee joint degradation over time and pain, which reduces physical activity. This created a conundrum for patients with osteoarthritis as they were unable to walk because of discomfort, which further increased their body weight and deteriorated their knee condition.[11] Additionally, previous research indicates that patients with osteoarthritis who have radiographic evidence of increased knee pain had more severe pain in patients with higher BMIs than in those with lower BMIs. The results of the study did, however, also imply that those with higher BMIs have more knee discomfort than people with lower BMIs.[12]According to the current study's findings, 57.14% of the overall changes in NPRS severity may be explained by BMI alone. This finding is in line with the findings of Matthew et al.'s earlier study, which found that individuals with pain had a higher BMI (31.2 kg/m2) than those without pain (28.24 kg/m2) ($p < 0.02$). Furthermore, it has been discovered that the severity of discomfort increases with each subsequent BMI category. In patients with osteoarthritis who have knee discomfort, this study found a favorable correlation between BMI and NPRS.

CONCLUSION

These results imply a substantial relationship between BMI and knee pain severity in people with osteoarthritis, with the higher the BMI, the more severe the knee pain. Preventing the arthritic progression and decreasing the level of pain, however, may be possible by lowering the BMI. Therefore, it is recommended that individuals with osteoarthritis who have knee pain and a higher BMI lose weight by engaging in an appropriate exercise regimen. If a person's BMI is too high for immediate and effective outcomes, they may want to think about bariatric treatment options.

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ISSN (O): 2687-5365; ISSN (P):2753-6556