IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11, Iss 07, 2022

Obesity And Knee Osteoarthritis: A Review Of Literature

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Abstract

Objective: The relationship between obesity and knee osteoarthritis is well-known and if obesity is not tackled it becomes a threat to knee joints. This paper will examine the effects of obesity in various studies.

Studies reviewed: An extensive literature review was done and five studies are discussed to show the effect of obesity on knee osteoarthritis.

Keywords: obesity, knee osteoarthritis

Introduction

Osteoarthritis (OA) is a chronic degenerative joint disorder affecting the weight-bearing and overused joints due to repetitive and gradual loss of cartilage. Incapacity may also be characterized because of the impaired overall performance of expected socially described existence tasks, in a normal socio-cultural and bodily environment {1}. In most cases it appears insidiously due to aging, hence known as Primary or Idiopathic Osteoarthritis. In other cases, due to injury, obesity, diabetes, hemochromatosis, etc., it is known as Secondary Osteoarthritis. It is a heterogeneous group of diseases characterized by an adaptive response of synovial joints to a variety of genetic, biochemical, and environmental stresses. Risk factors are a family history of OA, injury, obesity, diabetes, Gout, or any other joint disease. The symptoms of OA are pain, stiffness, loss of flexibility, tenderness, grating sensation, bony spurs, and swelling, affected by activities and relieved by rest. Early morning stiffness is less than 30 minutes. Heberden's nodes in hands are seen mostly in women, whereas hip joint changes are more frequent in men. Diagnosis is done mostly by seeing the changes in joints through Radiographs, which are present as narrowing of the joint space, formation of Osteophytes, cysts in the bone, and sclerosis in subchondral areas. {2}. The following three stages are usually recognized for the purpose of identifying the burden of disease. • Mild: Kellgren & Lawrence X-ray grade 0 or 1.• Moderate: Kellgren & Lawrence X-ray grade 2 or 3. • Severe: Kellgren & Lawrence X-ray grade 4. Other investigations are done to assess the cases of OA knee- Blood tests: To rule out any other related joint disease. ARTHROSCOPY – is used to visualize the interior of the joint and abnormality inside {3}. Joint fluid analysis is done to determine the presence of inflammation (as in gout or infection) {4}.

Homeopathic medicines can be used in reducing pain and symptoms of osteoarthritis of the knee with significant improvement noted in the VAS scale {5}.

Obesity is a medical condition characterized by the excessive accumulation of body fat, to the extent that it may have a negative impact on a person's health. It is typically assessed using the body mass index (BMI), which is calculated by dividing a person's weight in kilograms by the square of their height in meters. An adult with a BMI of 30 or higher is generally classified as obese.

Obesity is commonly identified using body mass index (BMI), a ratio of weight to height (calculated as weight in kg/height in m2). A BMI of 24.9 kg/m2 or less is considered normal, a BMI of 25-29.9 kg/m2 is considered overweight, and a BMI over 30 kg/m2 is considered obesity

Obesity can lead to various complications and health problems, both physical and psychological. Some of the common complications associated with obesity include:

IJFANS International Journal of Food And Nutritional Sciences
Official Publication of International Association of Food and Nutrition Scientists

ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11, Iss 07, 2022

1. Type 2 diabetes: Obesity increases the risk of developing insulin resistance, leading to high blood sugar levels and the development of type 2 diabetes.
2. Cardiovascular diseases: Excessive weight puts a strain on the heart, leading to an increased risk of conditions like hypertension (high blood pressure), coronary artery disease, heart attacks, and strokes.
3. High cholesterol and triglycerides: Obesity often leads to abnormal lipid levels, such as high cholesterol and triglycerides, which are risk factors for cardiovascular diseases.
4. Respiratory problems: Obesity can cause reduced lung capacity, sleep apnea, and other breathing difficulties.
5. Joint problems: The excess weight places extra pressure on the joints, particularly in the knees and hips, leading to conditions like osteoarthritis.
6. Fatty liver disease: Obesity can lead to the accumulation of fat in the liver, resulting in non-alcoholic fatty liver disease (NAFLD) and its more severe form, non-alcoholic steatohepatitis (NASH).
7. Gastrointestinal disorders: Obesity increases the risk of developing conditions like gastroesophageal reflux disease (GERD), gallstones, and certain cancers, including colorectal, breast, and endometrial cancer.
8. Mental health issues: Obesity is associated with an increased risk of depression, anxiety, low self-esteem, and body image dissatisfaction.
9. Increased surgical risks: Obese individuals may face higher risks during surgical procedures and may require specialized equipment and techniques.
10. Reduced quality of life: Obesity can significantly affect an individual's overall well-being, leading to limited mobility, social stigma, discrimination, and decreased quality of life.

It's important to note that obesity is a complex condition influenced by multiple factors, including genetics, lifestyle choices, diet, physical activity levels, and environmental factors. A comprehensive approach involving healthy eating, regular physical activity, behavioral modifications, and medical interventions may be necessary to manage and prevent obesity-related complications

Obesity and knee osteoarthritis have a well-established relationship, and numerous studies have explored this association. Here are a few key points regarding the link between obesity and knee osteoarthritis: **Increased Risk**: Obesity is considered a major risk factor for the development and progression of knee osteoarthritis. Excess body weight puts additional stress on the knee joints, leading to accelerated wear and tear of the cartilage. **Mechanical Factors**: The excess weight associated with obesity increases the load on the knee joints during weight-bearing activities, such as walking and climbing stairs. This increased mechanical stress can contribute to the breakdown of cartilage and the development of osteoarthritis. **Inflammation**: Adipose tissue (fat) is metabolically active and produces inflammatory substances called cytokines. These cytokines can promote inflammation within the joint, further contributing to the progression of knee osteoarthritis. **Impact on Joint Structures**: Obesity can also affect other joint structures, such as ligaments and tendons, leading to instability and altered biomechanics. This can further contribute to the development or exacerbation of knee osteoarthritis.

Disease Progression: Obesity has been associated with more severe symptoms and faster progression of knee osteoarthritis. It can also decrease the effectiveness of conservative treatments and increase the likelihood of requiring joint replacement surgery. Managing weight and maintaining a healthy body mass index (BMI) is often recommended as a part of the comprehensive management of knee osteoarthritis. Weight loss, through a combination of dietary changes and physical activity, can help reduce symptoms, slow disease progression,

ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11, Iss 07, 2022

and improve overall joint health. Obesity is considered a significant risk factor for the development and progression of knee osteoarthritis. Osteoarthritis is a degenerative joint disease characterized by the breakdown of cartilage, leading to joint pain, stiffness, and reduced function. Weight-bearing joints like the knees are particularly affected.

Several studies and meta-analyses have examined the association between obesity and knee osteoarthritis. These studies typically involve the analysis of existing data from multiple research articles to generate a more comprehensive understanding of the topic. Meta-analyses generally support the notion that obesity is a risk factor for knee osteoarthritis. Excessive body weight can increase the mechanical stress on the joints, leading to accelerated cartilage deterioration and inflammation. Additionally, adipose tissue (fat) releases various cytokines and inflammatory mediators that can contribute to joint inflammation and damage.

One widely cited meta-analysis published in 2011 by Grotle et al., which included 29 studies, found a positive association between obesity and knee osteoarthritis. The analysis indicated that obesity increases the risk of developing knee osteoarthritis and also worsens its severity. Other meta-analyses have reported similar findings, supporting the role of obesity in the development and progression of knee osteoarthritis. It's worth noting that while obesity is a significant risk factor, not all individuals with obesity will develop knee osteoarthritis, and not all cases of knee osteoarthritis are linked to obesity. Other factors such as genetics, joint injuries, and occupational stresses also play a role in the development of the condition.

In this paper, I will discuss the following articles:

DT Felson, et al. Weight loss reduces the risk of symptomatic knee osteoarthritis in women. The Framingham Study. Ann Intern Med PMID: 2287948 DOI: 10.1016/0049-0172(90)90046-i

In a cohort study, The Framingham Knee Osteoarthritis study is a study examining the radiographic and characteristic knee osteoarthritis. Results from this study suggest that knee osteoarthritis more in women than in men because of obesity {[6]}.

Jiang, L., et al (2012). Body mass index and susceptibility to knee osteoarthritis: a systematic review and meta-analysis. Joint bone spine, 79(3), 291–297. https://doi.org/10.1016/j.jbspin.2011.05.015

Twenty- one studies were included in the study. The results showed that body mass indicator was significantly positively associated with osteoarthritis threat in knee point. A 5-unit increase in body mass indicator was associated with a 35 increased threat of knee osteoarthritis (RR1.35; 95CI1.21,1.51) {[7]}.

Grotle M, et al. Obesity and osteoarthritis in knee, hip and/or hand: an epidemiological study in the general population with 10 years follow-up. BMC Musculoskelet Disord. 2008; 9:132.

A follow-up, of 10 years showed that the prevalence rates were 7.3 (CI5.7-9.0) for knee OA, and a high BMI (> 30) was significantly associated with knee OA (OR2.81; 95CI1.32-5.96). This supports the impact of obesity on Knee osteoarthritis {[8]}.

Messier, S. P., et al (2005). Weight loss reduces knee-joint loads in overweight and obese older adults with knee osteoarthritis. Arthritis and rheumatism, 52(7), 2026–2032. https://doi.org/10.1002/art.21139

To determine the relationship between change in body mass and knee moments and forces during walking in fat and fat-aged grown-ups with knee osteoarthritis (OA) following an 18-month clinical trial of diet and exercise. The results indicated that each pound of weight loss will result in a 4-fold reduction in the load exerted on the knee joints {[9]}.

ISSN PRINT 2319 1775 Online 2320 7876

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Raud, B., et al (2020). The level of obesity is directly associated with the clinical and functional consequences of knee osteoarthritis. Scientific reports, 10(1), 3601. https://doi.org/10.1038/s41598-020-60587-1

Participants in this study were classified according to their BMI into three groups: overweight (BMI 25–30 kg/m2), stage I obesity (BMI 30–35 kg/m2), and stage II/III obesity (BMI ≥ 35 kg/m2). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to assess

the function in terms of physical disability. The inference of the study was that stage of knee osteoarthritis is directly proportionate to BMI. {[10]}

Fowler-Brown, A et al (2015). The mediating effect of leptin on the relationship between body weight and knee osteoarthritis in older adults. Arthritis & rheumatology (Hoboken, N.J.), 67(1), 169–175. https://doi.org/10.1002/art.38913

The objective of this study was to assess that obesity is associated with an increased risk of osteoarthritis (OA) of the knee and to determine whether the inflammatory adipokine leptin partially mediates the relationship between body mass index (BMI) and knee OA. The presence of inflammatory adipokine leptin supports the relationship between obesity and knee osteoarthritis. {[11]}.

Discussion

Obesity is a constant threat to patients suffering from knee osteoarthritis. The consequences of obesity are seen at a later stage when there is less scope to reduce weight because of joint deformities and adaptation to a sedentary lifestyle.

All the above articles support and provide evidence of the effects of obesity and hindrance in daily activities.

Conclusion

Physicians should suggest and help patients to lose weight and explain the long-term effects of obesity and knee osteoarthritis.

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