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Research Article

**PREVALENCE OF JOINT PAIN AND OSTEOARTHRITIS IN
OBESE PATIENTS**¹Dr. Kanwal Shahzadi, ²Dr. Muhammad Usman Ali, ³Dr. Zahid Gulzar.¹MBBS, Frontier Medical College Abbottabad. ²MBBS, Sharif Medical and Dental College Lahore Pakistan. ³MD, Osh State University Kyrgyzstan.

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Abstract:

Osteoarthritis is a degenerative joint disorder characterized by pain, decreased mobility and negative impact on life. It leads to articular damage and inflammation of joints. OA develops slowly over the period of time, which is highly present in adult population, causes pain, loss function and poor quality of life especially in obese patients. High body mass index is the risk factor for the development of OA.

The most noticeable effect of obesity on the musculoskeletal system is associated with joint disease commonly known as Osteoarthritis. The pathology of osteoarthritis is related to increase joint loading and irregular biomechanics with some hormonal dysregulation.

Current study concluded that joint pain and OA is prevalent among obese patients. Two main risk factors of developing osteoarthritis are ageing and obesity. Studies have reported that number of individuals over 60 years old exceeded from 7.2 million to 19.2 million from 1980-2010 and most probably it will reach up to 64 million in 2050 [24]. There has remarkable increase in population's overweight and obesity in last decades. It has found that knee OA is strongly linked with high metabolic and inflammatory conditions in obese patients [25]. Metabolic factors in which cytokines associated with adipose tissue including leptin, adiponectin and resistin enhances articular damage and increase local inflammatory process. OA is strongly linked with disorder of lipid and glucose metabolism coexistence for an obese patient to have OA.

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INTRODUCTION:

Osteoarthritis is a degenerative joint disorder characterized by pain, decreased mobility and negative impact on life [1]. It leads to articular damage and inflammation of joints. OA develops slowly over the period of time, which is highly present in adult population, causes pain, loss function and poor quality of life especially in obese patients [2]. High body mass index is the risk factor for the development of OA [3].

The most noticeable effect of obesity on the musculoskeletal system is associated with joint disease commonly known as Osteoarthritis. The pathology of osteoarthritis is related to increase joint loading and irregular biomechanics with some hormonal dysregulation [4].

Obesity is well recognized all over the world. WHO states that more than 1.4 billion adults are overweight, and of these more than 200 million men and 300 million women are obese [5]. Obesity is always linked with chronic diseases. However, musculoskeletal diseases in which joint degeneration and inflammatory conditions are major [6]. OA is clinical syndrome of joint pain and degeneration that affects more population than any other condition [7].

There is direct relation between prevalence of OA increasing age and BMI are directly related to each other [8]. Abnormal or excessive fat accumulation that impairs health is known as Obesity. In adults BMI greater than or equal to 30 ranges in obesity [9]. It is the greatest modifiable risk factor [10].

Studies have reported that people with BMI equal or greater than 30 were 6.8 times more prone to have knee OA than people with normal weight. Similarly a meta-analysis showed that odds ratio for having OA was 2.63 for obese subjects as compared to people who weighs normal [11]. Pain and limitation of activities of daily life also affect other aspects of life. OA is listing in second number in USA because of diabetes associated conditions [12]. Obese individuals have more risk of developing cardiovascular events and conditions like OA, which is linked with high metabolic and inflammatory environments [13].

Apart from mechanical overloading, cytokines associated with adipose tissue, including adiponectin, leptin and resistin also effect the onset and worsening of OA through direct degeneration of the joint and inflammation [14]

Studies shows that subjects who had bariatric surgery

they have improved quality of life and improvement in symptoms of OA. However there is direct relation between weight loss and improvement of OA symptoms [15]

Obesity is the major risk factor for developing osteoarthritis. An American study reported that prevalence of osteoarthritis is 22.9% in obese patient surgery [16]. Framingham MA states that overweight people in their thirties who did not have knee OA were at greater risk of developing the disease lately [17].

However it is still under debate that exactly how much excess weight influences OA. Literature showed that obese women had 4 times risk of knee OA as compared to non-obese; the risk was 5 times greater for obese men [18].

As overweight has direct relation with OA similarly weight loss has a greater influence on OA symptoms. Felson and colleagues observed that a small reduction in weight women with BMI 25 or more have remarkably lower risk of knee OA. As weight gain is directly associated with an increased risk of having OA in later stages of life, weight loss drop the risk of developing OA. Investigators claimed that if obese men having BMI greater than 30 and lost enough weight that he falls in the category of overweight that means BMI 26-29.9 and men with overweight lost enough wait to move in normal weight category that has BMI less than 26, the risk of developing knee OA would decrease by 21.5%. However, similar changes of weight loss in female category would decrease the risk of having OA by 33% [19]. Hence obesity is the greater modifiable risk factor.

Obesity related osteoarthritis pathology must have so many factors that contribute in structural joint damage that result from increased forces over joint, altered mechanical forces, decreased muscle strength and metabolic factors [20]. It doesn't only affect weight bearing joints in fact it also influences non-weight bearing joints like hand [21]. Obesity is known as low grade inflammatory condition that affects so many other organs [22]. The metabolic pathway which enhances joint destruction is still unknown. Literature shows a strong relation between obesity and metabolic factors that are prone to OA [23]

METHODS:

It was a cross-sectional study.

Inclusion criteria:

Obese people with BMI more than 35 referred for bariatric surgery.

Clinical evaluation:

Visual analogue scale was explained to patients and western Ontario McMaster Universities (WOMAC) questionnaire. Anthropometric data were collected which contains age, gender, race, height, and weight (by dividing weight by squared height BMI was also calculated)

Radiological Assessment:

Patients were undergone radiographs for knee and hip (AP & Lateral view). These were classified according to Kellgren and Lawrence classification. Self-reported joint pain and diagnosis of OA were primary outcomes.

Statistical Analysis:

- Descriptive analysis was performed for all variables.

- Data was presented as mean and standard deviation for continuous variables and relative frequency for categorical variables.
- Independent t-test with Mann-Whitney u test was used for comparison between two continuous variables.
- Binary logistic regression was used to evaluate the association between dependent variables and the risk factors such as age gender height, weight and BMI.
- Chi-square test was used for categorical variables.
- Level of significance was 0.05
- IBM SPSS Statistics software version 22 was used.

RESULTS:**Descriptive analysis:**

140 patients were included in the study.

	Mean ± SD Or absolute frequency
Age	39.7 ± 11.5
Height	1.63 ± 0.09
Weight	123.8 ± 28.5
BMI	46.6 ± 8.9
Gender	
Male	21 (14.9%)
Female	120 (85.1%)

Prevalence of musculoskeletal pain in obese patients was very high. Only 9.9% had no complaints. Rest of 90% (127) reported pain in more than one joint. Lumbar followed by knee was the most common site of pain. Of these 127 patients with pain 77.9% had low back pain, 25.9% dorsal pain, 25.9% cervical pain, 73.2% knee pain, 48.1% hip pain and 42.5% had pain in hands. Only 11.8% complained pain in a single joint. Moment VAS had a mean of 39.9±34.6. Last three days's VAS was 52.4±34.1. Mean of total VAS was 52.4±34.1. Mean total WOMAC was 36.3±21.2.

103 patients had radiographs remaining 38 patients could not attend the scheduled examination. Those radiographs were classified according to the Kellgren-Lawrence scheme by three authors. There was no disagreement. In these 130 patients, 77.7% had one or more joint pain with OA (K&L ≥2). Prevalence of OA was 63% and hip OA was 40.8%.

There was no association between prevalence of OA and gender. In knee OA there were 56 females and 9 males whereas in hip OA there were 38 females and

only 4 males.

Binary logistic regression for risk factors of knee or hip OA has shown that age is directly related with the risk factors. There is direct relation of age with WOMAC total.

DISCUSSION:

Current study concluded that joint pain and OA is prevalent among obese patients. Two main risk factors of developing osteoarthritis are ageing and obesity. Studies have reported that number of individuals over 60 years old exceeded from 7.2 million to 19.2 million from 1980-2010 and most probably it will reach up to 64 million in 2050 [24]. There has remarkable increase in population's overweight and obesity in last decades. It has found that knee OA is strongly linked with high metabolic and inflammatory conditions in obese patients [25]. Metabolic factors in which cytokines associated with adipose tissue including leptin, adiponectin and resistin enhances articular damage and increase local inflammatory process. OA is strongly linked with disorder of lipid and glucose metabolism coexistence for an obese patient to have OA.

This study has concluded that there is direct relation between age obesity and osteoarthritis. No association was found between gender and OA. That could be due to low sample of males because majority was female. There is significant increase in prevalence of OA in women after menopause, estrogen is strongly linked with articular cartilage, and its deficiency also affects other tissue such as synovium, subchondral bone, muscle, ligament and capsule [26].

As OA is chronic disease, its prevalence measurement would indicate the risk for susceptible individuals. Prevalence studies are usually done for public health and to evaluate the initial steps to assess comorbidity and control the programs. Literature concludes that obesity is the major factor in which contributes to incidence and progression of OA, with the strongest relation to knee OA. Obesity do have complications in knee replacement therapy or arthroplasty.

The current evidence points to obesity-related OA as both a problem of excessive joint loading and hormonal and cytokine dysregulation. Determining the metabolic mechanisms of obesity-related joint changes offers another potential approach towards the goal of disease-modifying therapy in OA, through the development of therapeutic strategies to counteract dysregulation of proinflammatory adipokine production and downstream events. Further work is required to determine the relative contributions of metabolic and mechanical factors in the pathogenesis of knee OA [27].

Messier et al reported that 1:4 ratio of loss of body weight to decrease the load on knee joint, indicating that 1kg weight loss will reduce 4kg mechanical loading on knee joint per step during performing their activities of daily life [28] another study concluded that weight loss results in reduction of inflammatory markers such as c-reactive protein, tumor necrosis factor and interleukin-6 which are directly linked with impaired physical activity [29]

Literature shows that a slight decrease in BMI improve the symptoms of OA Improvements in SF-36 physical function score were smaller in patients who were obese, however, BMI >30 kg/m² was not a significant predictor of change in physical function from pre-surgery to follow up. A Canadian prospective observational study of 520 primary joint arthroplasties evaluating the effects of obesity on patterns of recovery from total knee and hip arthroplasty found that severe obesity is an

independent risk factor for slow recovery over three years for both total knee and total hip arthroplasty. In this study, baseline pain and functional scores were similar regardless of BMI classification. Severe obesity was a significant risk factor for worse pain and functional recovery at six months but no longer at three years following total hip and knee arthroplasty [30]

CONCLUSION:

The prevalence of joint pain in current study is 90.1% where as 63.1% knee and 40.8% hip osteoarthritis respectively in obese patients.

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