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Research Article

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Abstract:

Osteoarthritis has been known as one out of ten most crippling diseases in the developed world and an important cause of pain and disability [1]. It is calculated that by the year 2040 78 million adults age 18 years will have been diagnosed with arthritis [2]. It is also the most common rheumatologic disorder in Asia [3]. Whereas in Pakistan, the prevalence of osteoarthritis is 28% in urban areas and 25% in rural areas. Study by Sun et al also suggested a possible role of elevated serum uric acid in the multifactorial etiology of generalized OA.15 However, the study by Bagge,16 and Hart17 found that serum uric acid levels do not vary at different categories of knee osteoarthritis. Out of 309 only 140 participants were recruited in this study in which the mean age was 52 years and the mean age of the onset of disease was 49 years. Females were 73% (n=102) while males were 27% (n=38). Categorization of age at disease onset revealed 39% (n=55) had the disease diagnosed when they were less than 45 years while remaining 61% (n=85) had the disease after 45 years. When duration of disease was categorized 89% (n=125) had osteoarthritis for less than 5 years while remaining 11% (n=15) had the disease for more than 5 years. Current study found that there is a positive relation between obesity and osteoarthritis.

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INTRODUCTION:

Osteoarthritis has been known as one out of ten most crippling diseases in the developed world and an important cause of pain and disability [1]. It is calculated that by the year 2040 78 million adults age 18 years will have been diagnosed with arthritis [2]. It is also the most common rheumatologic disorder in Asia [3]. Whereas in Pakistan, the prevalence of osteoarthritis is 28% in urban areas and 25% in rural areas [4]. Weight bearing large joints such as hips and knee are the most effected by osteoarthritis [5]. Out of these both joints, the most common lower extremity arthritis is knee osteoarthritis. Women, older adults, obese and those who had traumatic injury on knee are more prone to develop symptomatic osteoarthritis. [6] [7] [8]. Clearly defined risk factors for osteoarthritis are advancing age, increased weight, female gender, genetic predisposition and mechanical stress [9]. Literature shows that number of risk factors is responsible of this destructive cascade of disorder [10] [11]. Out of all risk factors, obesity is the most common among all. The burden of knee arthritis is directly proportion to obesity [12]. Obesity is defined as increased BMI and studies have reported more knee pain in obese population [13-16]. Obesity is the leading cause in risk of developing knee oa by three folds and has also been shown to rapidly accelerate the progression of disease [17] [18] [19]. Central fat obesity has linked with increased production of interlukin-6, an inflammatory mediator [20]. This mediator has important link with knee osteoarthritis [21] [22]. Moreover, increased central fat have greater influence on gait and balance [23] [24]. A number of studies also confirm that BMI and weight are strongly associated with knee osteoarthritis especially in women [27]. Although a lot of importance has been placed on linking obesity with coronary heart disease & diabetes the health consequences of obesity with crippling knee pain has not been highlighted adequately, mainly due to the non-fatal nature of the disease. This has led to osteoarthritis becoming a public health concern mainly due to the magnitude of the problem & the reduced quality of life associated with it [28] [29].

A study conducted in China found that geography, age, sex, and BMI may be associated with KOA, but climbing stairs, time length of occupation service,

education level, smoking history and religious belief are not correlated with KOA. Study conducted by Sudo reported that high BMI, female sex, older age, and high BMD were significantly associated with an increased risk for radiographic knee osteoarthritis. Another study conducted in Germany on 1250 consecutive primary care patients has shown that factors associated with OA were physical limitation of lower limb, social network, BMI and duration of disease. Study conducted by Ouedraogao showed that the most common associated risk factors for development of osteoarthritis of the knee were obesity (42.4%), menopause in women (66.7%), history of OA (43.2%), and previous knee injury (19.5%). Study by Al Afraj in 2003 found an association between knee OA, generalized OA and the serum uric acid.

Study by Sun et al also suggested a possible role of elevated serum uric acid in the multifactorial etiology of generalized OA.¹⁵ However, the study by Bagge,¹⁶ and Hart¹⁷ found that serum uric acid levels do not vary at different categories of knee osteoarthritis

METHODOLOGY:**Study design:**

It was a cross-sectional study.

Study population:

The study sample was 309

Sampling technique:

Consecutive sampling technique

Inclusion criteria:

Obese patients complaining knee pain.

Questionnaire:

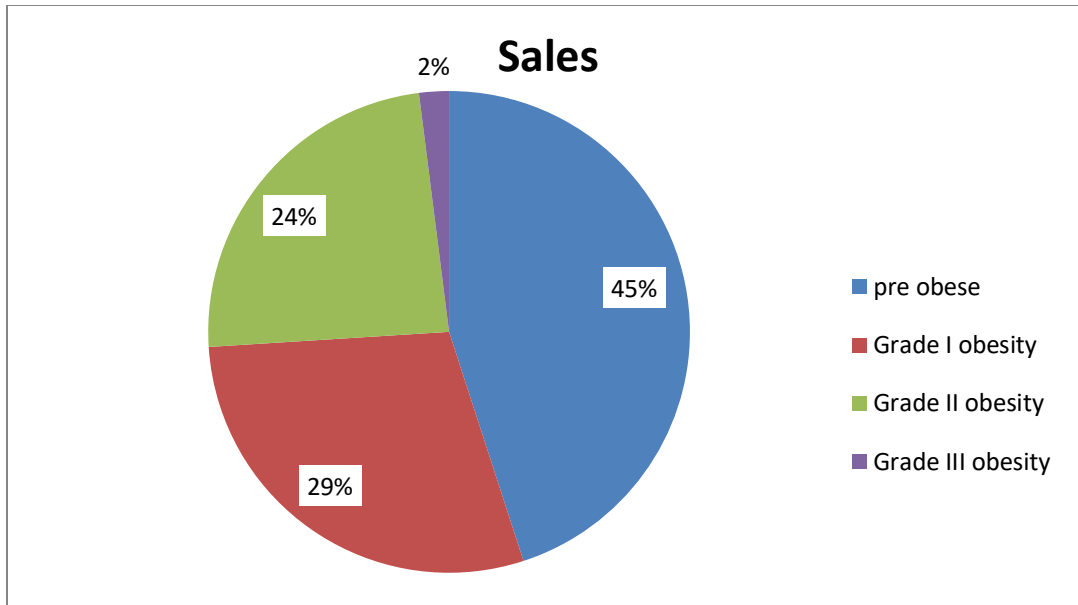
A simple questionnaire was filled by the participants, which include age, gender, duration of disease, age at the onset of disease and BMI variables. BMI was classified according to the WHO criteria for obesity as defined below:

Pre-obesity: 25-29.99

Grade I obesity: 30-34.99

Grade II obesity: 35-39.99

Grade III obesity: >40



SPSS version 21 was used for analysis. Mean and standard deviation was taken out for numerical variables. Frequencies and percentages were taken out for categorical variables. Chi Square as test of significance was applied for finding association between BMI and X-ray findings. Pooled t test was applied for finding difference in mean age based on X-ray findings. P value less than 0.05 was taken as significant.

RESULTS:

Out of 309 only 140 participants were recruited in this study in which the mean age was 52 years and the mean age of the onset of disease was 49 years. Females were 73% (n=102) while males were 27% (n=38). Categorization of age at disease onset revealed 39% (n=55) had the disease diagnosed when

they were less than 45 years while remaining 61% (n=85) had the disease after 45 years. When duration of disease was categorized 89% (n=125) had osteoarthritis for less than 5 years while remaining 11% (n=15) had the disease for more than 5 years.

x-ray findings had reported that joint space narrowing was present in 63% patients while 37% had joint space narrowing and osteophytes as well. Significant association was found in obesity grades linked with X-ray findings of osteoarthritis. No significant association was observed when gender, duration of disease and age of disease onset were associated with findings on X-rays. There was no difference in the mean age of patients when categorized into two groups of joint space narrowing and joint space narrowing with Osteophytes.

Table 1: Association of Obesity Grades with type of Osteoarthritis

	Joint space narrowing		Joint space narrowing+ osteophytes		P value
	N	%	N	%	
Pre obese	40	63.5	23	36.5	0.013
Grade I obesity	31	75.6	10	24.4	
Grade II obesity	16	48.5	17	61.5	
Grade III obesity	0	0	3	100	

Table 2: Association of gender, disease duration and age of onset of disease with type of Osteoarthritis

		Joint space narrowing		Joint space narrowing + osteophytes		P value
		n	%	n	%	
Gender	Males	22	58	16	42	0.329
	Females	65	64	37	36	
Age at disease onset	<45 years	30	54.5	25	43.5	0.095
	>45 years	57	67	28	33	
Disease duration	< 5 years	77	61.6	48	38.4	0.467
	≥ 5 years	10	66.7	5	33.3	

DISCUSSION:

Obesity is an important modifiable risk factor for developing knee osteoarthritis as it can cause altered knee joint loading patterns & knee joint mal alignment [31]. In addition, adipose tissue is a rich source of adipokines that mediate synovial tissue inflammation & increase in cartilage matrix synthesis & degradation [38, 39]. A number of studies have shown a strong correlation between increased BMI and knee osteoarthritis in all populations. Osteoarthritis tends to be more progressive in the obese. Statistically significant relationships have been found even between small increases in BMI and the prevalence of osteoarthritis. An increased BMI has been shown to have a strong association with osteoarthritis of weight bearing joints (hip and knee), as well as the non-weight bearing joints (hands). A study done in 2012 by Patil on 102 patients with osteoarthritis reported that 55.9% people out of these were obese. A similar study done in Jordan in 2013 showed an association of increased BMI with knee osteoarthritis. The mean BMI in these patients who had radiographic knee osteoarthritis was 29.5(±5.6). Studies indicate that a BMI>30 at the baseline of the follow-up had a 7-fold risk of developing knee osteoarthritis as compared to those with a BMI defined by a BMI ranging from 35-40 (WHO). A study conducted by Sharma on the elderly population showed that the prevalence of osteoarthritis was 51.4% in patients with BMI < 25, whereas it increased to 100% in patients with BMI > 40. By contrast the mean age of the sample was 52 years (±7.8) & the mean age at onset of disease was 49 years (± 7.6) in our study. A study conducted by Umair Khalid in Bahawalpur Pakistan showed that obesity was a significant risk factor for osteoarthritis in our population also with 93.3% of the obese

patients having knee osteoarthritis. As obesity proceeds knee osteoarthritis weight loss regimens may help in delaying the development of disease and weight reduction was shown to be an effective primary and secondary strategy of disease prevention.

Current study found that there is a positive relation between obesity and osteoarthritis.

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