

Osteoarthritis of knees and obesity in Eastern Saudi Arabia

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ABSTRACT

Objective: To find out the prevalence and relation between osteoarthritis of knees and obesity in Al-Ahsa region, Kingdom of Saudi Arabia (KSA).

Methods: The study included 243 male and female patients diagnosed with osteoarthritis of knees between June 2001 to March 2003. All patients were recruited from the Physical Therapy Department, King Fahd Hofuf Hospital, Hofuf, KSA. The clinical diagnosis was supported by plain x-rays of knees, and of other joint if needed. The weight and height of all patients were taken using one standard weight and height scale, and body mass index was also calculated and recorded.

Results: More than 90.53% of the patients referred with osteoarthritis of the knees were obese or overweight. The mean body weight of all patients was 84.61 kg and the mean height was 1.59 meters. Osteoarthritis of the knees was more common in obese female than male patients with a female to male ratio of 2.37:1.

Conclusion: Obesity is a disease. The aim of all health professionals and others in the community should be directed to the prevention of this disease and its risk to develop multiple complications.

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Current estimations suggest that 40 million Americans of all ages are affected by osteoarthritis (OA) and that 70-90% of Americans older than 75 years have at least one that involved joint.^{1,2} The prevalence of OA based on radiographic evidence range from 30-90%.²

The exact etiology of OA is unknown. Multiple factors (such as, heredity, trauma, and obesity) interact to cause this disorder. Primary and secondary prevention should be emphasized in the management of patients with OA. Maintaining appropriate body weight may be the single most important factor in preventing OA from occurring in weight-bearing joints.³ A relationship has been shown between weight loss and a reduction in the risk of developing OA.⁴

Osteoarthritis is the most common joint disorder with symptoms in the knees, hands, hips, back, and neck. It is unclear exactly how excess weight influences OA. Clearly, being overweight increases the load placed on the joints such as the knee, which increases stress and could possibly hasten the breakdown of cartilage.⁵ For example, it is estimated that a force of nearly 3-6 times of one's body weight is exerted across the knee while walking; an increase in body weight increases the force by this amount.⁶

Obesity increases the development and progression of knee OA (KOA). Felson and colleagues⁷ noted that among women with a baseline body mass index (BMI) >25, weight loss was associated with a significantly lower risk of KOA. For a woman of normal height,

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for every 11 lb weight loss (approximately 2 BMI units), the risk of KOA dropped >50%. Conversely, a comparable weight gain was associated with an increased risk of later developing KOA (odds ratio 1.28 for a 2 BMI weight gain). The investigators concluded that in elderly persons, if obese men (such as, BMI>30) lost enough weight to fall into the overweight category (BMI 26-29.9) and men in the overweight category lost enough weight to move into the normal weight category (BMI<26), KOA would decrease by 21.5%. Similar changes in weight category by women would result in a 33% decrease in KOA. A handful of studies have indicated that weight loss substantially reduced reports of pain as well. Thus, weight loss potentially offers an important modifiable factor in the behavioral treatment of KOA.

There were limited studies on the prevalence of OA of knees in obese patients in Saudi Arabia. Clinically from experience, we noticed that most of patients referred to the Physical Therapy Department in King Fahad Hofuf Hospital, Hofuf, KSA for OA of knees were obese women. This observation was an encouraging step to compare the findings in this area of Saudi Arabia with other studies in this field. The aim of this study was to find out the prevalence and relation between osteoarthritis of knees and obesity in Al-Ahsa region.

Methods. The study included 243 Saudi male and female subjects comprehensively assessed by the authors as with OA of knees between June 2001 to March 2003 (21 months). Subjects were divided into 2 groups on the basis of gender. All of them were recruited from the Physical Therapy Department of King Fahd Hofuf Hospital, Hofuf, KSA.

The clinical diagnosis was supported by plain x-rays of knees, and of other joint if needed. The weight and height of all these patients were taken using one standard weight and height scale, BMI was also calculated and recorded.

The patients consist of 72 males and 171 females. All of the subjects were volunteers. Their age was ranged from 20-80 years, for female 20-80 years whereas male 31-76 years. The highest percentage of male age interval was in the age groups 41-50 years and 51-60 years representing 34.72% and 37.50% respectively. Whereas the highest percentage of female age interval was in the age groups 31-40 years (25.73%), 41-50 years (42.1%) and 51-60 years (25.15%).

The mean height was 159.82 cm (male: 168.75 m, female: 156.06 cm) and the mean weight was 84.61 kgs (male: 83.73 kgs, female: 84.98 kgs). The body mass index (kg/m²) was 33.57.

Results. Two hundred and forty-three subjects participated in this investigation. Seventy-two were males and 171 were females with KOA.

More than 90% of the patients referred to the Physiotherapy Department for osteoarthritis of knees were obese or overweight (**Table 1**). The mean body weight of all patients was 84.61 kgs and mean height was 1.59 meters. Osteoarthritis of knees was more common in obese female (73.09%) than male (41.65%) patients with a female to male ratio of 2.37:1. While the KOA was significantly high in overweight males (43.05%) than females (19.88%). The result are presented in **Table 1**.

Table 2 shows a very high percentage of bilateral KOA involvement (male: 63.88%, female: 71.34%) than unilateral affected: right (male: 19.44%, female: 12.86%) and left (male: 16.66%, female: 15.78%).

Discussion. The study strengthens the association between overweight and obesity at different ages and an increased risk of KOA in men and women. Being overweight or obese is a clear risk factor for developing KOA. Population-based studies have consistently shown a link between overweight or obesity and

Table 1 - Body mass index distribution in subjects with osteoarthritis of knees.

Obesity classification	Percentage(%)		
	Male	Female	Male and female
Normal	(15.27)	(7.02)	(9.465021)
Overweight	(43.05)	(19.88)	(26.74897)
Obesity I	(29.16)	(28.65)	(28.80658)
Obesity II	(11.11)	(25.73)	(21.39918)
Extreme obesity III	(1.38)	(18.71)	(13.58025)
Obesity	(41.65)	(73.09)	(63.78601)
Overweight and obesity	(84.7)	(92.97)	(90.53498)

Table 2 - Knee involved.

Side	Percentage (%)	
	Male	Female
Unilateral	(63.88)	(71.34)
Right	(19.44)	(12.86)
Left	(16.66)	(15.78)

KOA.^{3,6,8-10} No data was found in the literature showing the relations between the osteoarthritis of knees in overweight and obese subjects in Al-Hasa of Saudi Arabia.

There is association between KOA and obesity for each gender group. In this study, the association between obesity and severe KOA is stronger in women (73.09%) than in men (41.65%), in agreement with the Framingham⁸ study as well as studies of Cooper et al¹¹ and Manninen et al.¹²

Results showed that the association between obesity and KOA increased at increased levels of BMI. This finding also arose in a study by Felson.⁶ He estimated that persons in the highest quintile of body weight have up to 10 times the risk of KOA than those in the lowest quintile.

It has been found that there was a significant evidence of a differential association between obesity and bilateral KOA. This result suggest that the additional mechanical stress resulting from obesity is the principal reason for the association between obesity and OA knees. This is in agreement with Creamer and Hochberg¹³ who reported being overweight increases the load placed on the joints such as the knees, which increases stress and could possibly hasten the breakdown of cartilage. Finally, the association between obesity and KOA was stronger when clinical symptoms of KOA were used as outcomes as opposed to x-ray evidence.

In conclusion, based on the available evidence, there is a high positive association between overweight and obesity and the development of KOA. Obesity is an important risk factor for KOA.

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