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Vitamin D deficiency in knee osteoarthritis patients and its association with obesity in Saudi Arabia

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Background: Vitamin D deficiency is a common problem worldwide and a high prevalence has been found in Saudi Arabia. Vitamin D influences cartilage and bone metabolism and its deficiency may influence the knee joint cartilage and lead to development and progression of knee osteoarthritis (KOA). Conflicting results have been reported about the association between vitamin D deficiency and knee osteoarthritis, while the association between low vitamin D and high body mass index (BMI) was consistent in the published literature. Vitamin D deficiency may be one of the factors that account for increased pain in knee osteoarthritis.

Objective: The study aimed to determine serum 25 - hydroxyvitamin D (25-OHD) levels in patients with symptomatic KOA compared with controls and to evaluate the association of serum 25-OHD levels with obesity and KOA.

Methods: A total of 94 patients with symptomatic knee OA and 68 controls were studied. All patients met the American College of Rheumatology (ACR) criteria for diagnosis of knee OA. The clinical status of patients with knee OA was evaluated. Knee pain was evaluated using the VAS and WOMAC pain subscale, and the physical function evaluation consisted of the timed chair stand and 10-meter walking tests. BMI was assessed for all patients. Serum 25-OHD was measured for OA and controls; concentrations <20 ng/ml were considered as deficient levels. The radiological features of knee OA were graded on a five-point scale (0-4) for Kellgren and Lawrence (K/L) classification.

Results: The study included 94 patients with symptomatic knee OA (mean age 52.77 ± 11.78), 33 women (35.1%) and 61 men (64.9%). It included 68 controls (mean age 49.56 ± 9.429), 29 women (42.6%) and 39 men (57.4%). Serum 25-OHD deficiency was observed in 65.6% of patients compared with 63.3% in controls ($P=0.497$), with mean serum 25-OHD level (18.12 ± 9.4 ng/ml) lower than controls (19.24 ± 9.3 ng/ml) ($P=0.502$), but the difference was not statistically significant. Among KOA patients, 71.4% had BMI ≥ 30 (obese). A high BMI (≥ 30) was observed in 80.6% of patients with low 25-OHD level versus 19.4% in patients with normal 25-OHD level with statistically significant difference ($P=0.43$). Most of the patients (75.9%) had radiological evidence of KOA K/L grade 1-2, while only 24.1% had a K/L grade ≥ 3 . Vitamin D deficiency was significantly correlated with high BMI (obesity). High BMI (obesity) was significantly correlated with aging, greater knee pain (high VAS and WOMAC) and a slow walking speed. BMI also significantly associated with radiological severity of KOA.

Conclusion: These findings indicate a significant association between vitamin D deficiency and high BMI, which in turn is associated with greater knee pain, poor physical function, and severe radiological evidence of KOA.

Recommendation: These findings reveal the importance of measuring and monitoring vitamin D levels in patients with symptomatic knee osteoarthritis, particularly the obese patients.

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