Low Middle-Income Country (LMIC) Setting: Is Low Vitamin D Associated With Fracture Risk in Children Younger Than 18 Years?

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Purpose: The purpose of this study was to assess the relationship between low vitamin D and fracture risk in children younger than age 18 years.

Methods: A matched case-control study was conducted, recruiting patients from Jinnah Postgraduate Medical Centre and controls from the National Institute of Child Health, Karachi, Pakistan. Patients included were children with lower or upper extremity fractures, while controls were pediatric outpatients with non-orthopaedic complaints, matched by age, gender, and nutritional status.

Results: In total, 287 patients were matched to 204 controls from April 2024 to January 2025. Serum 25(OH)D levels were significantly lower in the patients with fractures (20.1 vs 13.3 nmol/L), with an adjusted odds ratio (AOR) of 0.93 (95% CI: 0.88–0.99, $p = 0.031$). Dietary analysis showed no significant link between buffalo milk consumption and fracture risk. Single vitamin D supplementation lowered the fracture risk (AOR: 0.27, 95% CI: 0.12–0.58, $p<0.001$), while multivitamin use was associated with a higher fracture risk (AOR: 43.2, 95% CI: 13.3–140, $p<0.001$). Low serum calcium (AOR: 0.16, 95% CI: 0.09–0.29, $p<0.001$) and low serum creatinine (AOR: 0.02, 95% CI: 0.00–0.18, $p<0.001$) were associated with fractures.

Conclusion: Vitamin D deficiency is significantly associated with pediatric fractures in LMICs, and single-vitamin D supplementation reduces fracture risk.