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Title: Role of vitamin D in asthma severity and control in children

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Body: In addition to its role in bone physiology and autoimmune disease, recent data suggest a potential role of vitamin D in asthma since it has immunomodulatory properties. The aim of this study is to determine the relationship between serum vitamin D levels and the severity and control of asthma in children. We measured vitamin D levels in serum collected from 38 asthmatic children in winter and summer, compared to those of 30 healthy children. The mean age is 9.8 years and Sex-ratio was 2.16. Asthma was mild persistent in 60.5% of cases, moderate in 36.8% of children, and severe in 2.7%. The average vitamin D level was significantly lower in asthmatics in summer despite abundant sun exposure (20.74 ng/ml vs 26.77 ng/ml $p = 0.001$) and levels of vitamin D were significantly lower in winter than in summer in both groups (in asthmatics 17.37ng/ml vs 20.74ng/ml; $p=0.036$ and 18.97ng/ml vs 26.77ng/ml; $p<0.001$ in controls). Subjects with well-controlled asthma had higher serum levels of vitamin D than children with partially controlled or non-controlled asthma in summer (24.28ng/ml vs 13.9ng/ml; $p<0.001$) but not in winter (17.28ng /ml vs 17.67ng/ml). In the same way, children with more severe asthma had lower serum vitamin D levels than children with mild asthma in winter (12.07ng/ml vs 20.80ng/ml; $p<0,001$) and in summer (13.8ng/ml vs 25.26ng/ml; $p<0,001$). Our study indicates that vitamin D deficiency is more common among children with asthma and lower vitamin D levels are associated with a greater disease severity and probably with worse disease control. Randomized interventional trials on vitamin D supplementation will be needed to confirm its role in treatment and eventually in prevention of asthma.