Pediatrics & Therapeutics
ISSN: 2161-0665
OPEN ACCESS Freely available online
Opinion Article

Effectiveness of Vitamin D Supplementation in Preventing Rickets in Children in Different Climates

Olivia Martin*

Department of pediatric Endocrinology, University of Sydney, Sydney, Australia

DESCRIPTION

Rickets, a disorder characterized by impaired bone mineralization in children, remains a global pediatric health concern despite being largely preventable. The primary cause is vitamin D deficiency, which leads to inadequate calcium and phosphate absorption essential for bone development. Vitamin D deficiency and consequent rickets can lead to skeletal deformities, growth retardation and long-term morbidity. Vitamin D supplementation has been widely endorsed as a preventive strategy; however, its effectiveness varies notably across different climates due to environmental and lifestyle factors influencing endogenous vitamin D synthesis. Vitamin D is unique among vitamins as it is synthesized in the skin following exposure to UltraViolet B (UVB) radiation from sunlight. Therefore, geographical location and climate exert a profound impact on vitamin D status in populations. In high-income countries with varying climates from sunny Australia to temperate Canada and northern Europe differences in sunlight availability, seasonal variation and cultural behaviours influence the risk of vitamin D deficiency and rickets in children.

In regions with abundant year-round sunlight, such as much of Australia and Southern California, endogenous vitamin D production tends to be sufficient for most children, reducing reliance on supplementation. However, even in these climates, factors such as excessive sun avoidance, use of sunscreens, indoor lifestyles and skin pigmentation can limit vitamin D synthesis. In contrast, high-latitude countries like the United Kingdom, Canada and Scandinavian nations experience limited UVB exposure for extended periods during fall and winter months, increasing the risk of deficiency. The evidence supporting vitamin D supplementation to prevent rickets is robust. Numerous clinical guidelines from pediatric and endocrinology societies in high-income countries recommend universal supplementation for infants and young children, particularly those who are exclusively breastfed or have limited sun exposure. The World Health Organization and American Academy of pediatrics suggest daily doses ranging from 400 to 1000 IU for infants and children to maintain adequate serum 25-hydroxyvitamin D levels.

Despite these recommendations, the implementation and effectiveness of supplementation programs vary. In sunny climates, the question arises whether universal supplementation is necessary or if targeted supplementation based on risk factors suffices. Some argue that routine supplementation in such regions may be less critical, but emerging data show that even in high sunlight areas, vitamin D deficiency-related rickets cases still occur, highlighting the need for vigilance. In contrast, in northern climates, supplementation is widely accepted as essential. National programs in countries like Canada and the UK incorporate vitamin D supplementation into infant health protocols and public health campaigns. These programs have contributed to a marked decline in rickets incidence. Still, cases persist among certain high-risk groups, including children with darker skin, those from immigrant populations and children with limited outdoor activity.

A complicating factor is the variability in adherence to supplementation regimens. Compliance can be influenced by socioeconomic status, caregiver knowledge and cultural beliefs. In some immigrant communities residing in northern countries, low vitamin D status and rickets remain prevalent due to factors such as traditional clothing limiting sun exposure and dietary insufficiency. Furthermore, the optimal dosage of vitamin D supplementation may differ by climate and population. While standard doses may suffice in sunny climates, higher doses or year-round supplementation might be necessary in areas with prolonged low UVB exposure. However, excessive supplementation risks vitamin D toxicity, so balance is crucial.

Another consideration is the emerging understanding that vitamin D's role extends beyond bone health to include immune function and chronic disease prevention. This broadens the scope of supplementation discussions but also complicates decisions on dosage and target serum levels. In summary, vitamin D supplementation is a cornerstone in preventing pediatric rickets across diverse climates, but its implementation must be customised. A one-size-fits-all approach is inadequate given the interplay of environmental, genetic, cultural and behavioural factors influencing vitamin D status.

Correspondence to: Olivia Martin, Department of Pediatric Endocrinology, University of Sydney, Sydney, Australia, E-mail: olivia.martin@sydney.edu.au

Received: 03-Feb-2025, Manuscript No. PTCR-25-38025; **Editor assigned:** 05-Feb-2025, Pre QC No. PTCR-25-38025 (PQ); **Reviewed:** 19-Feb-2025, QC No. PTCR-25-38025; **Revised:** 27-Feb-2025, Manuscript No. PTCR-25-38025 (R); **Published:** 06-Mar-2025, DOI: 10.35841/2161-0665.25.15.603

Citation: Martin O (2025). Effectiveness of Vitamin D Supplementation in Preventing Rickets in Children in Different Climates. Pediatr Ther. 15:603

CONCLUSION

Vitamin D supplementation remains an effective and necessary intervention to prevent rickets in children globally. However, its application requires nuanced consideration of climatic differences, sun exposure patterns and population-specific risk factors. In high-income countries, sunny regions may benefit from targeted supplementation strategies focusing on at-risk groups, while northern and low-sunlight regions should maintain universal supplementation policies, especially during months with limited UVB radiation. Healthcare providers should emphasize education on the importance of vitamin D, encourage adherence to supplementation and consider periodic screening in high-risk populations. Public health policies must adapt to local climatic realities and cultural contexts to optimize outcomes. Ultimately, preventing rickets through vitamin D supplementation not only safeguards bone health but also contributes to the overall well-being of children. Ongoing research to refine dosing guidelines and improve implementation strategies will be vital as climate patterns shift and lifestyles evolve. By tailoring vitamin D supplementation to the climatic and societal context, high-income countries can continue to reduce the burden of pediatric rickets and promote healthy childhood development worldwide.