

Editorial

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Embracing Vitality: Addressing the Dual Challenge of Obesity and Vitamin D Deficiency through Integrated Interventions in Sri Lanka

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Key points

- Sri Lanka is confronting the dual challenge of rising prevalence of overweight and obesity coupled with alarming levels of Vitamin D deficiency both of which aggravate the risk of non-communicable diseases.
- The coexistence of obesity and Vitamin D deficiency contributes to various health complications, including metabolic disorders, cardiovascular diseases, and compromised musculoskeletal health.
- The rapidly ageing population combined with lifestyle factors like unhealthy, diet and sedentary behaviour further compound these issues.
- Addressing these challenges requires a comprehensive approach that integrates lifestyle modifications and targeted interventions to manage these complex interconnected conditions effectively.

BACKGROUND

Sri Lanka faces a growing community health challenge with the rising prevalence of non-communicable diseases (NCDs). NCDs, such as cardiovascular diseases, diabetes, chronic respiratory conditions, and cancers, now account for over 80% of total deaths in the country (1). While overweight and obesity prevalence is increasing, (2, 3) concurrently, Sri Lanka is grappling with widespread Vitamin D deficiency (4). These conditions, though distinct, are interconnected and exacerbate the risk of non-communicable diseases (NCDs) (5-7). Obesity is on the rise due to lifestyle changes, including but not limited to unhealthy dietary habits, sedentary

behaviours, and urbanization (3, 8-10). Concomitantly, micronutrient deficiencies continue to burden community health, with Vitamin D deficiency being particularly alarming. Studies reveal that approximately 90% of the population suffers from inadequate Vitamin D levels, with 60% being deficient and 30% insufficient (4, 11, 12). Despite abundant sunshine, sedentary indoor lifestyles, inadequate dietary intake of Vitamin D, and limited awareness may be contributing to this critical issue.

Sri Lanka stands out as one of the fastest-ageing populations among low- and middle-income countries (LMICs), a trend driven by a unique combination of demographic factors. Since the



1960s, Sri Lanka has maintained a lower fertility rate compared to the LMIC average, coupled with steadily increasing life expectancy. These factors have accelerated the demographic transition, with a growing proportion of the population entering older age (>64 years) with an increase in the median age of the population (13). This demographic shift has profound implications for the country's health landscape, directly fuelling an epidemiologic transition characterised by a rise in non-communicable diseases (NCDs). As the population ages, particularly with a significant proportion being females and widows (13), the prevalence of chronic bone diseases such as osteoporosis, osteomalacia, arthritis, and fractures is expected to rise. This demographic trend emphasises the vulnerability of older women to these conditions due to hormonal changes, nutritional deficiencies, and reduced physical activity, further compounded by the challenges of ageing, poverty, and social isolation. The ageing population, with its increasing vulnerability to chronic diseases, magnifies the demand for healthcare resources and challenges the sustainability of existing healthcare systems (1). This epidemiologic transition highlights the urgent need for targeted interventions focusing on NCD prevention and management, particularly through lifestyle modifications such as balanced nutrition, regular physical activity, and stress management. By addressing these factors, Sri Lanka can better navigate the challenges of this dual transition and ensure a healthier future for its population.

Vitality is defined as the "innate power to heal and to be resilient" by Tewani et al., while Logan et al. describe it as being at the higher level of the wellness paradigm. These perspectives collectively frame vitality as an individual's ability to recover and maintain health despite challenges and as a state characterised by aliveness, energy, and motivation—representing the best version of oneself (14, 15). This concept is thought to be influenced by factors such as body weight, body mass index (BMI), and levels of essential nutrients like Vitamin B12 and Vitamin D, all of which play crucial roles in supporting physical and mental well-being, energy metabolism, and overall resilience (14).

Concurrent Obesity and Vitamin D Deficiency: A Looming Catastrophe

Sri Lanka stands at the crossroads of a significant public health crisis as the nation faces the double burden of obesity and Vitamin D deficiency. These interconnected challenges not only elevate the risk of non-communicable diseases (NCDs) (5, 7) but also threaten to strain the healthcare system and compromise the quality of life across all age groups. These two conditions, though distinct, often coexist and exacerbate one another, creating a vicious cycle that amplifies health risks.

The combination of obesity and Vitamin D deficiency leads to a host of health issues, including metabolic disorders, cardiovascular diseases, and weakened musculoskeletal health (7). Excess body fat not only increases the risk of chronic illnesses but also reduces the bioavailability of Vitamin D, worsening its deficiency, and available evidence shows an inverse relationship between Vitamin D levels and body mass index (BMI) and waist circumference (WC) (16). This burden is further compounded by Sri Lanka's rapidly ageing population, which faces heightened vulnerability to both conditions. The elderly, particularly the older females following menopause are at increased risk of frailty, falls, and fractures, as well as NCDs (17), making this demographic particularly susceptible to the compounded effects of obesity and Vitamin D deficiency.

Local data indicates a rising trend in overweight and obesity among Sri Lankan adults. According to the 2015 STEPS survey conducted in Sri Lanka, the prevalence of overweight and obesity in the 18–69 years age group was reported as 23.4% and 5.9%, while a study among adults of an urban population revealed these indicators to be 39.6%, and 37% respectively (18), while in a study conducted among adult males in the central province, it was established as 31.8% and 12.3% (2, 3, 8). STEPS 2021 study indicated a drastic increment from 2015, and the overweight and obesity prevalences were 39.4% and 11% respectively (19). Central obesity was alarmingly high, with prevalence rates of 17.1% (8) and 58.1% (18), the latter based on Asian-specific cut-off values. This highlights a growing public health concern that necessitates targeted interventions to address unhealthy weight gain and its associated health risks. The overall prevalence of overweight among children

in Sri Lanka has been reported as 2.2% (2). The same survey highlighted variations based on locality, with overweight prevalence among urban school children ranging from 3–5%, compared to 1.7% among rural children. Additionally, studies have shown that the prevalence of overweight and obesity among school children aged 8 to 12 years in the Colombo metropolitan area is significantly higher, at 14–15% (2). Childhood overweight and obesity lead to the development of adulthood NCDs, hence active ageing has to be started from childhood onwards.

In a population-based study conducted in Colombo, Vitamin D deficiency was found to be as high as 93% (12), while another study reported a prevalence of 90.2% (11). These findings are a growing concern about widespread Vitamin D insufficiency in Sri Lanka, which may have serious implications for public health, particularly concerning bone health and other associated health conditions. A study in 2008 in the Kandy district revealed lower 25-hydroxy-vitamin D levels among females than males aged 30-60 years (20), indicating the vulnerability of women in this regard.

Numerous studies have established a correlation between obesity and vitamin D deficiency, though the exact causal relationship remains unclear (6, 16). One potential explanation for the inverse association between vitamin D plasma levels and Body Mass Index (BMI) is the dilution of vitamin D in a larger body volume (5).

Osteosarcopaenic Obesity and the Role of Vitamin D

Osteosarcopaenic obesity is a distinct clinical syndrome in which individuals with obesity experience concurrent reductions in bone density (osteopaenia or osteoporosis) and muscle mass (sarcopaenia). This condition represents a significant public health concern as it predisposes individuals to an increased risk of fractures, functional impairments, and metabolic disorders. The pathophysiology of osteosarcopaenic obesity is complex, involving intricate interactions between adipose tissue, skeletal muscle, and bone. Vitamin D, known for its roles in calcium homeostasis and bone metabolism, also influences

muscle function and glucose regulation, making it a pivotal factor in the interconnected mechanisms underlying this condition (16, 21, 22).

Vitamin D deficiency is highly prevalent in individuals with osteosarcopaenic obesity and has been implicated in its pathogenesis through various mechanisms: Bone Health—Vitamin D facilitates calcium absorption and bone remodelling. Deficiency can lead to impaired mineralisation, contributing to osteoporosis; Muscle Health—Vitamin D affects muscle strength and function, with its deficiency linked to reduced muscle mass and sarcopaenia; and Adipose Tissue—altered adipokine secretion and chronic low-grade inflammation in obesity may exacerbate Vitamin D deficiency by impairing its metabolism (7, 21).

Supplementation with Vitamin D: Issues in Efficacy and Sustainability

Elevated serum vitamin D levels in mid to late life were linked to a lower likelihood of adverse body composition outcomes, particularly osteosarcopaenic obesity, highlighting the potential health advantages of sustaining adequate vitamin D levels (23). While observational studies and preclinical research highlight a strong association between Vitamin D deficiency and osteosarcopaenic obesity, the clinical evidence remains inconclusive. Given the interplay between Vitamin D and musculoskeletal and metabolic health, optimising Vitamin D levels remains a reasonable strategy for individuals with osteosarcopaenic obesity (21, 23). However, while, studies have shown that supplementing baseline obese individuals with vitamin D₃ leads to a significant increase in vitamin D₃ and its active form, 25OHD₃ the rise in 25OHD₃ levels does not reach the normal range (5). While Vitamin D is a promising factor in the pathogenesis and potential treatment of osteosarcopaenic obesity, current clinical evidence does not unequivocally support its supplementation as a standalone therapy (21). Hence, a comprehensive approach, integrating lifestyle modifications and targeted interventions, is essential for managing this multifaceted condition effectively.

A Sustainable Solution: Integration of Active Ageing, Lifestyle Modification, and Reorientation of Health Services

Mitigating this crisis requires a shift toward active ageing and lifestyle modification. Active ageing emphasises maintaining physical, mental, and social well-being throughout life, enabling individuals to contribute meaningfully to society while minimising health-related dependency. Integrated nutrition and exercise lifestyle modification interventions have proven sustainable solutions to most of the NCDs including obesity, metabolic syndrome, cancers, and Vitamin D deficiency-related NCDs such as obesity, Type 2 diabetes mellitus, Osteoporosis, chronic obstructive pulmonary disease, rheumatoid arthritis, and inflammatory bowel disease (7, 24).

Nutrition for Vitality

Embracing vitality involves fostering habits that promote health and prevent disease. A balanced diet rich in essential nutrients, particularly Vitamin D-rich foods and fortified products, is a cornerstone of this strategy. Encouraging the consumption of Vitamin D-rich foods, such as oily fish, egg yolks, and fortified products, alongside calcium to support bone health. Consuming a variety of fruits, vegetables, lean proteins, healthy fats, and whole grains not only mitigates micronutrient deficiencies but also reduces NCD risk factors like obesity and hypertension. Reducing the intake of processed foods and sugary beverages also will help to combat obesity (2, 25). Consuming a variety of food items or groups over a specified period (usually 24 hours), defined as high dietary diversity seems to be associated with obesity in Sri Lanka (26). Even though intermittent fasting may have a positive effect on mitigating obesity, improving Vitamin D deficiency, and overall vitality and well-being of a person (14), further research is needed on this aspect.

Physical Activity for Vitality

Regular physical activity is equally crucial. Advocating for regular exercise, including cardio (aerobic) activities, muscle strengthening training, and flexibility and balance exercises are important

aspects in this regard. Promoting outdoor activities like walking and gardening to enhance physical fitness and natural Vitamin D synthesis through sunlight exposure. Encouraging individuals to engage in at least 150 minutes of moderate aerobic exercise weekly can significantly improve cardiovascular health, enhance bone strength, and boost immune function (2, 25).

Sleep Hygiene for Vitality

Additionally, addressing sleep hygiene is vital for maintaining overall health. Adequate sleep—ideally 7–9 hours per night—regulates hormones, reduces stress, and improves cognitive and physical performance (27, 28).

Building Awareness and Policy Support

Implementing public health campaigns to raise awareness about the double burden of obesity and Vitamin D deficiency and advocate for policies that facilitate urban planning with parks and recreational spaces, promote workplace wellness programmes, and incentivise the fortification of foods with Vitamin D would be beneficial to mitigate these challenges.

Reorientation Healthcare: The Role of Community Engagement and Healthcare Systems (29)

Healthcare systems must take a proactive role in addressing these challenges. Regular screenings for obesity and Vitamin D deficiency, coupled with tailored interventions, can prevent complications. Community-based programmes can foster a culture of health by providing resources and support for lifestyle modifications and must be supported by public health initiatives, policies, and community-based programmes that promote awareness and accessibility. Educational campaigns on the importance of outdoor activities for natural Vitamin D synthesis, workplace wellness programmes, and urban planning that encourages walking and cycling are integral to achieving these goals.

CONCLUSION

Sri Lanka's journey toward embracing vitality and mitigating the dual challenge of obesity and Vitamin D deficiency hinges on the integration of active ageing, sustainable lifestyle modifications as well as community engagement and health systems approaches.

By prioritising proper nutrition, regular exercise, and adequate sleep, among other strategies the nation can reduce NCD prevalence, improve the quality of life, and pave the way for a healthier future that embraces vitality. Consequently, through collaborative efforts by individuals, communities, and policymakers, Sri Lanka can turn the tide on this looming health catastrophe and build a resilient, thriving population. While evidence indicates some benefit with supplementation with Vitamin D, lack of robust clinical evidence necessitates caution in advocating high-dose supplementation without clear indications. Hence, Future research should prioritise research investigating synergistic interventions, including dietary changes, physical activity, and Vitamin D optimisation.

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