Dear Editor,

The significance of vitamin D requirements for bone and muscle health is well recognised and has been repeatedly discussed in the literature. However, many readers might not be aware of the role of vitamin D in the immune system and the growing evidence that vitamin D plays a crucial role in COVID-19 infection (1, 2). This letter briefly describes observational and intervention studies on the relationship between vitamin D and COVID-19 infection and provides some insights into the local situation in Malaysia.

Recently, Pereira et al. (3) conducted a systematic review of 27 observational studies that investigated the relationship between vitamin D deficiency and the severity of COVID-19 infection. The 27 studies were conducted worldwide, including Europe (n = 15), the Mediterranean (n = 2), the USA (n = 3), the Western Pacific (n = 3), South Asia (n = 2) and Indonesia (n = 2). They found that patients with severe COVID-19 had markedly low vitamin D levels and the fatality rate was high in vitamin D-deficient groups, but vitamin D deficiency was not associated with a higher risk of COVID-19 infection. It is important to note that the geographical distribution was important because COVID-19 fatalities were found to be highly correlated to latitude, which is linked to vitamin D deficiency (4). While not necessarily causative, because respiratory tract infections can lower vitamin D levels (5), these studies point towards a strong relationship between vitamin D levels and the severity of COVID-19 infection.

Several randomised controlled trials (RCTs) have been conducted to investigate whether vitamin D supplementation can improve clinical outcomes in COVID-19 infections. A group of Spanish researchers treated 50 randomised patients with high doses of calcifediol plus standard care, while 26 others received only standard care. They showed that calcifediol-treated patients with COVID-19 infection required significantly less intensive care unit (ICU) treatment in hospitalised patients (6). A clinical trial conducted in India supplemented 60,000 IU of cholecalciferol in 16 COVID-19 patients, while 20 other patients received a placebo. All the patients in the trial were vitamin D deficient (defined as 25(OH)D level < 20 ng/mL). After administering the vitamin D supplementation for a week, the investigators found that it improved various COVID-19 severity markers (7). Also, two French studies (8, 9) that used a quasi-experimental study design found that vitamin D supplementation improved survival.

However, not all trials have shown improvement in COVID-19-infected patients with vitamin D supplementation. A Brazilian RCT (10) published in JAMA did not demonstrate the same effect as the other trials mentioned here. However, as detailed by the editor of JAMA (11), several limitations would limit the generalisability of their findings.

One may next ask, how prevalent is vitamin D deficiency in Malaysia? A local longitudinal study called MyHeARTs found that 78.9% of 1361 sampled 13-year-old Malaysian adolescents...
had vitamin D deficiency (12, 13). Another study of 57 pregnant women sampled from the Kuala Lumpur area found that 91% were vitamin D deficient (14). This was echoed by another larger study, where 42.4% of 535 pregnant women were found to be vitamin D deficient (15). It has also been shown that urban women in Malaysia had significantly lower vitamin D levels compared to rural women (16), while a slightly dated but still relevant study showed that approximately 68% of Malay adults in Kuala Lumpur had insufficient vitamin D levels \((n = 380)\) (17). Overarchingly, these studies have repeatedly indicated that many Malaysians do not have the recommended level of vitamin D.

It is well known that adequate exposure to sunlight together with a healthy diet is the best way to increase circulating vitamin D levels. However, because of our lifestyles in the new norm, this might not be a feasible option for everyone. Therefore, vitamin D supplementation for individuals who are deficient has been suggested by some authors as a method to increase circulating vitamin D and consequently improve innate and adaptive immunity (1). However, it should be noted that vitamin D supplementation should only be part of general measures in the fight against COVID-19. It does not, in any way, negate the need for other measures, such as a healthy diet, adequate sleep and physical exercise, avoiding and relieving stress and other proven preventative measures, including physical distancing, hand washing and wearing face masks.

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Conflict of Interest

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