

## Prevalence of vitamin D deficiency in patients with spinal cord injury at admission to hospital: a single centre study in the UK

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Previous studies reported the prevalence of vitamin D deficiency in chronic spinal cord injured patients<sup>(1)</sup>. Vitamin D deficiency has been implicated as an etiologic factor responsible for osteoporosis and various skeletal and extra-skeletal issues in spinal cord injured patients<sup>(2)</sup>. However, few data were available regarding vitamin D status in patients with acute spinal cord injury or immediately assessed at hospital admission. This retrospective study aimed to evaluate vitamin D status (indicated by serum 25(OH)D concentration) in spinal cord injured patients at admission to a UK spinal cord injury centre during January–December 2017 and to assess the characteristics of vitamin D deficiency in this patient group.

Patients with serum 25(OH)D concentration records at admission were recruited. Vitamin D status was categorised as severe deficiency, deficiency, insufficiency and sufficiency, defined by serum 25(OH)D < 25 nmol/L, 25–50 nmol/L, 51–75 nmol/L, and >75 nmol/L respectively that most studies with spinal cord injured patients adopted<sup>(1)</sup>. Various categorical and blood test parameters were retrieved from the patients' profiles. Data were presented as percentage or mean ± SD. Pearson Chi-Square, correlation, single linear regression, Mann Whitney U test and Kruskal Wallis were used to analyse the data.

Among 196 eligible patients, 74% were males vs 26% females, 92% were white Caucasians vs 8% non-white, 57% were traumatic vs 43% non-traumatic, and 42% were complete vs 58% incomplete spinal cord injury. The age was 50.5 ± 18.6 y (18–90 y). The body mass index was 25.7 ± 5.9 kg/m<sup>2</sup> (16–46 kg/m<sup>2</sup>). The results found that 57% of the patients had vitamin D deficiency (serum 25(OH)D < 50 nmol/L), and 24% were severe vitamin D deficiency (serum 25(OH)D < 25 nmol/L), similar to the prevalence of severe vitamin D deficiency in the general population in the UK (23%)<sup>(3)</sup>. However male patients, patients admitted in wintertime (December–May), and patients with hyponatremia (serum sodium < 135 mEq/L) or caused by non-traumatic conditions had significant worse vitamin D status than their counterparts (28% males vs 11.8% females, P = 0.019; 30.2% in winter vs 12.9% in summer, P = 0.007; 32.1% non-traumatic vs 17.6% traumatic, P = 0.025; 38.9% low serum sodium vs 18.8% normal serum sodium, P = 0.010). There was a significant inverse association of serum 25(OH)D concentration with body mass index (r = -0.311, P = 0.002), serum total cholesterol (r = -0.168, P = 0.037) and creatinine concentrations (r = -0.162, P = 0.024) that were also significant predictors to serum 25(OH)D concentration.

The overall severe vitamin D deficiency in patients with spinal cord injury at admission to hospital is similar to the general population, however patients in some subgroups had worse vitamin D status. Strategies for systematic screening and efficacy of vitamin D supplementation in patients with spinal cord injury need to be implemented and further investigated in order to prevent the vitamin D deficiency-related chronic complications including osteoporosis, bone fractures and cardiovascular disease.

### References

1. Flueck JL & Perret C (2017) *Spinal Cord* **55**(5), 428–434.
2. Waliullah S, Kumar D, Kumar D *et al.* (2021) *Cureus* **13**(3), e13791.
3. Calame W, Street L & Hulshof T (2020) *Nutrients*, **12**(6), 1868–1881.