

Vitamin D deficiency common in navies of global north, especially submariners

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Vitamin D deficiency is common among serving military personnel of navies in the global north, especially submariners, finds a systematic review of the available evidence, published online in *Occupational &*

Environmental Medicine.

Countermeasures, such as periodic vitamin D assessment and [dietary supplements](#), should now be considered, say the researchers. Vitamin D has an essential role in musculoskeletal health and in helping to control infections and tamp down inflammation in the body, so is key to ensuring the physical fitness of active-duty naval [military personnel](#).

They are at particular risk of vitamin D deficiency because of their protective military clothing, shift work patterns, and field duty in high-latitude (polar) regions and on board submarines. But just how common vitamin D deficiency/insufficiency is in active naval [personnel](#) around the world isn't known.

To find out, the researchers systematically reviewed the findings of relevant research involving active naval military personnel and marines published in English up to June 2022.

Vitamin D deficiency is formally defined as less than 20 ng/ml or less than 50 nmol/l; insufficiency as 20-30 ng/ml or 50-75 nmol/l; and sufficiency as above 30 ng/ml or 75 nmol/l or more.

Out of an initial haul of 48, 13 studies were included in the review, some of which dated back to 1975. Most (7) involved US naval personnel; 2 involved the UK Navy. The remaining 4 concerned the naval forces of Israel, France, the Netherlands, and Portugal.

Nine studies focused on submariners, including a total of 305 men whose patrols lasted between 30 and 92 days. Eight studies included only men.

The average vitamin D level among submariners before deployment ranged between 13.7 and 42.7 ng/ml; after submarine patrol, the average ranged between 7.9 and 30 ng/ml.

Only one study charted individual changes in vitamin D before and after patrol among submariners. It showed that the prevalence of deficiency rose from 13% to 30%, insufficiency from 27% to 40%, and sufficiency halved from 60% to 30%. Overall, the prevalence of vitamin D deficiency in serving military naval personnel was significant: between 29% and 37%.

Although this is the first worldwide overview of vitamin D status in active-duty naval military personnel to be published, the researchers nevertheless acknowledge various limitations to their findings.

Chief among these was the lack of individual vitamin D level information that would have permitted formal assessment of deficiency, insufficiency, and sufficiency among serving naval personnel for all the studies included in the review.

Most studies included only submariners, potentially limiting the wider applicability of the findings to all active-duty naval military personnel. Variations in the potentially influential factors included in the studies, such as latitude, season, [skin color](#) and vitamin D [dietary intake](#), precluded a pooled data analysis.

However, the researchers suggest, "It seems appropriate to implement a vitamin D food fortification policy in the Navy, assess vitamin D levels periodically, implement a vitamin D supplementation policy for vitamin D-deficient cases to ensure adequate levels before deployment, and provide a [vitamin](#) D-rich diet while on board."

They also outline future areas of research to inform policy, including studying submarine patrols of less than 30 days and the long-term effects of repeated submersions on bone health.

More information: Vitamin D status in active duty Navy military

personnel: a systematic review, *Occupational and Environmental Medicine* (2023). [DOI: 10.1136/oemed-2022-108710](https://doi.org/10.1136/oemed-2022-108710)

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