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TITLE: Coastal climate is associated with elevated solar irradiance and higher 25(OH)D level

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ABSTRACT:

There is evidence that populations living close to the coast have improved health and wellbeing. Coastal environments are linked to promotion of physical activity through provision of safe, opportune, aesthetic and accessible spaces for recreation. Exposure to coastal environments may also reduce stress and induce positive mood. We hypothesised that coastal climate may influence the vitamin D status of residents and thus partly explain benefits to health. Ecological and cross-sectional analyses were designed to elucidate the connection between coastal residence and vitamin D status. We divided residential data, from developed land use areas and the Lower Super Output Areas or Data Zones (Scotland) of the 1958 Birth Cohort participants, into the following coastal bands: < 1 km, 1?5 km, 5?20 km, 20?50 km and over 50 km. In the ecological analysis we used a multiple regression model to describe the relationship between UVvitd and coastal proximity adjusted for latitude. Subsequently, using the residential information of the participants of the 1958 Birth Cohort we developed a multiple regression model to understand the relationship between serum 25(OH)D (a marker of vitamin D status) and coastal proximity adjusted for several factors related to vitamin D status (e.g. diet, outdoor activity). We found that coastal proximity was associated with solar irradiance; on average a 99.6 (96.1?103.3) J/m2/day regression coefficient was recorded for settlements < 1 km from the coast compared with those at > 50 km. This relationship was modified by latitude with settlements at a lower latitude exhibiting a greater effect. Individuals living closer to the coast in England had higher vitamin D levels than those inland, particularly in autumn. Geographic location may influence biochemistry and health outcomes due to environmental factors. This can provide benefits in terms of vitamin D status but may also pose a risk due to higher skin cancer risk. We provide further evidence in support of the claim that coastal environments can provide opportunities for health and wellbeing.

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