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Determination of ultraviolet exposure and vitamin D status in a group of female adolescents in Greece

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The health benefits of solar ultraviolet (UV) and vitamin D in reducing the risk of cancer and several other diseases have been well documented in recent years. The major source of vitamin D in humans is UV-induced dermal synthesis of cholecalciferol, whereas food sources are believed to play a lesser role. Despite the fact that, in most geographical places, a relatively small amount of UV irradiation is capable to maintain sufficient vitamin D, insufficient and deficient vitamin D levels are reported in many cases mainly due to skin pigmentation, age, attire, sunscreen usage, working environment, outdoor physical activity, and sun exposure behavior.
The main objective of this study was to measure the UV exposure and vitamin D status in a group of female adolescents and determine their relationship. The study was conducted at Thermi, North Greece (40.5oN, 23oE). The participants of the study were 6 female and same- aged (15-16) adolescents attending the same high school. For the first time in Greece, the adolescents were wearing state-of-the-art electronic dosimeters (Scienterra Ltd, New Zealand) during their everyday activities for a period of seven months (mid-March to mid-October 2016) and recorded in 1-minute intervals. Blood samples to determine serum 25(OH)D3 concentration were taken at the beginning and the end of the measuring period. All adolescents kept diary logbooks providing information about their location and attire. The dosimeters were inter-compared every 2 weeks to examine their stability. Moreover, they were compared and calibrated against a state-of-the-art UV broadband meter (YES Inc.). This instrument, located closely to the area of living of these students, was also used to estimate the fraction of their UV exposure relative to the ambient UV conditions.
According to results, the adolescents were exposed to a very low fraction of the ambient UV dose (close to 1%). Variations from this average ratio were observed due to different clothing, type of outdoor activities and change of day life activities during weekends. In all (expect one) case, vitamin D status was improved at the end of the measuring period.