Reviewer's report

Title: The effects of air pollution on vitamin D status in healthy women

Version: 1 Date: 15 June 2010

Reviewer: William B. Grant

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Located some 165 km northwest of Tehran, in the Qazvin Province, it is at an altitude of about 1800 meters above sea level. The climate is cold but dry, due to its position south of the rugged Alborz range.


Major compulsory revisions

Comment 1. Summation: There is an increase in solar UVB doses from a difference in surface elevation. The amount seems to be between 20% per 1000 m at the elevation of the two cities. The elevation difference between the two cities is 640 m, implying a difference of 12%. This should translate directly to differences in serum 25(OH)D levels. It would indirectly affect the fraction of the populations below specified 25(OH)D levels. Changes in solar UVB doses with change in surface elevation should be factored into the analysis.

From Table 2: 25-OH-D (ng/ml) 11 (8-14) vs. 15.5 (8.5-26)

The ratio of the two locations is 1.41 plus uncertainty

12/41 = 0.29, so 30% of the difference has to be attributed to difference in solar UVB due to elevation difference.

However, ground level of UVB was significantly higher in Ghazvin as compared with Tehran (mean (SE), 0.31(0.07) and 0.16(0.03) W/m 2 respectively, P-value = 0.003).

Comment 2. Please discuss the role of housing type, hours spent out of doors, and sunscreen use affect the results. From Table 1, it appears as if these factors have significant impacts on serum 25(OH)D levels.

Minor essential revisions

Comment 3. Why aren’t serum 25(OH)D levels in the same ratio? What are other sources of vitamin D?
Comment 4. Effect of clothing?
High prevalence of hypovitaminosis D in Morocco: relationship to lifestyle, physical performance, bone markers, and bone mineral density.

High prevalence of low dietary calcium, high phytate consumption, and vitamin D deficiency in healthy south Indians.
Harinarayan CV, Ramalakshmi T, Prasad UV, Sudhakar D, Srinivasarao PV, Sarma KV, Kumar EG.

Minor essential revision
Comment 5. What is known about air pollution in Tehran – types, loads, etc.?

Conclusion: air pollution may play a role in differences in serum 25(OH)D levels, but the effects of other factors have not been carefully evaluated to determine their contributions.

Abstract supplied to the authors regarding UVB changes with respect to elevation.
Journal of Photochemistry and Photobiology B: Biology
Volume 39, Issue 2, June 1997, Pages 130-134

Increase in solar UV radiation with altitude
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Received 12 August 1996;
accepted 29 November 1996. ;

Abstract
Since 1981, broad-band measurements have been made at Jungfraujoch, Switzerland (3576 m above sea-level (a.s.l.)) and Innsbruck, Austria (577 m a.s.l.), where daily totals of erythemal effective irradiance, UVA irradiance and total irradiance have been compared. Under clear sky conditions, the observed increases in irradiance with altitude (altitude effect) of the daily totals of global irradiance are 8%±2% per 1000 m (total irradiance), 9%±2% per 1000 m (UVA irradiance) and 18%±2% per 1000 m (erythemal effective irradiance) during the summer. The altitude effect of the simultaneously measured erythemal effective irradiance between Innsbruck (577 m a.s.l.) and Hafelekarn (2300 m a.s.l.), horizontally separated by 2.5 km, shows a slight dependence on the solar
elevation: 15.1%±1.8% per 1000 m at 60° solar elevation and 18.6% ± 2.9% per 1000 m at 20° solar elevation. Simultaneously taken measurements of solar irradiance with high resolution spectrometers at Garmisch-Partenkirchen, Germany (730 m a.s.l.) and Wank (1730 m a.s.l.), horizontally separated by 5 km, show a clear wavelength dependence of the altitude effect of the global irradiance: 9% per 1000 m at 370 nm increasing to 11% per 1000 m at 320 nm and 24% per 1000 m at 300 nm. The altitude effect of direct irradiance is considerably higher than that of global irradiance at all measured wavelengths.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.