

LETTER TO THE EDITOR

## Vitamin D supplementation for depression in women with polycystic ovary syndrome: killing two birds with one stone?

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Dear Editor,

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder to affect females of reproductive age. It is characterized by oligomenorrhea and androgen excess symptoms, which in turn reduce quality of life and depress mood. Women with PCOS experience higher rates of depression and anxiety than women without PCOS (Barry et al. 2011). The prevalence of depression in women with PCOS ranges from 34 to 64 % due to differences in study population and methodology (Deeks et al. 2011).

Vitamin D deficiency is prevalent in women with PCOS, with 67–85 % of women with PCOS having serum concentrations of  $25[\text{OH}]D < 20 \text{ ng/ml}$  (Thomson et al. 2012). Vitamin D deficiency may exacerbate symptoms of PCOS, with observational studies showing lower  $25[\text{OH}]D$  levels were associated with insulin resistance, ovulatory and menstrual irregularities, lower pregnancy success, hirsutism, hyperandrogenism, obesity, and elevated cardiovascular disease risk factors (Hahn et al. 2006, Li et al. 2011, Wehr et al. 2009). In addition, Naqvi et al. evaluated predictors of depression in women with PCOS and found vitamin D deficiency was associated with depression in PCOS women (Naqvi et al. 2014).

Vitamin D supplementation may improve glucose metabolism and menstrual frequency in PCOS women (Wehr et al. 2011). In vitamin D-deficient women with PCOS, appropriate vitamin D3 supplementation seems to improve follicular development and ovarian health as reflected by normalization of serum anti-Müllerian hormone (Irani et al. 2014). Meantime,

some studies have found that vitamin D supplementation seems to ameliorate depressive symptoms (Hogberg et al. 2012, Jorde et al. 2008). To the best of our knowledge, there is currently no research in the literature exploring the effects of vitamin D supplementation on depression in women with PCOS.

In our hospital, a 24-year-old woman with vitamin D deficiency was diagnosed with PCOS according to the criteria of Rotterdam 2003. In the meantime, she was considered moderate depression according to Beck Depression Inventory-II (BDI). After discussing the treatment possibilities with her doctor, she agreed to receive vitamin D supplementation (vitamin D<sub>3</sub>, 1200 IU/day) only. Six months later, serum  $25[\text{OH}]D$  level significantly increased from 15.6 ng/ml at baseline to 42.8 ng/ml. Improvement of menstrual frequency and reduction in homeostasis model assessment of insulin resistance (HOMA-IR) were noted following 6-month supplementation. Furthermore, we observed a significant decrease of BDI score after vitamin D treatment, and the patient's depressive symptoms have been relieved significantly.

We hypothesize that vitamin D supplementation might have dual therapeutic effects for PCOS women with depression, not only ameliorating reproductive and metabolic abnormalities but also improving depressive symptoms. Therefore, more extensive studies including randomized controlled trial (RCT) are required on this subject, which may provide a new proposal for the treatment of depression in women with PCOS.

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