TABLE 2. Vitamin D and PCOS – Interventional Studies.

Author	Study Design	Participants	Country	Intervention	Duration	Main Results	25(OH)D Measurement	Reference
Thys-Jacobs et al	Single Arm	13 PCOS	USA	1500mg calcium carbonate daily and 50.000 IU Vitamin D_2 (ergocalciferol) weekly or biweekly	6 months	Restoration of menstrual cycles (7/13), improvement of acne (3/13) and pregnancy outcome (2/13)	Radioligand-binding assay	71
Rashidi et al	RCT	60 PCOS 3 groups (n=20)	Iran	**Group 1:** 1000mg calcium and 400 IU Vitamin D per day **Group 2:** 1000mg calcium and 400 IU Vitamin D and 1500mg metformin per day **Group 3:** 1500mg metformin per day	3 months treatment and 3 months follow up	Improvement of folliculogenesis and menstrual regularity in Group 2	Not provided	72
Firouzabadi et al	RCT	100 PCOS 2 groups (n=50)	Iran	**Group 1**: 1500mg metformin per day **Group 2:** 1500mg metformin/ day plus 1000mg calcium/day plus 100.000 IU Vitamin D_3/month	6 months	Improvement of menstrual abnormalities, follicle development and infertility in Group 2 (non-statistically significant)	RIA	73
Asadi et al	RCT	110 PCOS 2 groups (n=55)	Iran	**Group 1:** 300.000 IU cholecalciferol once **Group 2:** Placebo	2 months	Endometrial thickness (thicker) in Group 1 No significant difference in pregnancy outcome between the two groups	Not provided	74
Wehr et al	Single arm	46 PCOS	Austria	20.000 IU cholecalciferol per week	24 weeks	Decrease of fasting and stimulated glucose, C-peptide levels, TG, estradiol levels Improvement of menstrual frequency (50%) Increase of total clolesterol and LDL	Enzyme immunoassay	75
Selimoglu et al	Single arm	11 PCOS	Turkey	300.000 IU Vitamin D_3 orally, single dose	3 weeks	Decrease in HOMA-IR No significant change in DHEAS, total and free testosterone, androstendione	RIA	76
Pal et al	Single arm	12 PCOS	USA	Vitamin D_3 2000 IU daily and Vitamin D_2 50.000 IU monthly (modified to 50.000 IU weekly) and calcium 530mg/day	3 months	Reduction in total testosterone and androstendione levels Reduction in BP No change in IR parameters	RIA	77
Razavi et al	RCT	60 PCOS 2 groups (n=30)	Iran	**Group 1:** Vitamin D 200 IU, Vitamin K 90 μg, Calcium 500mg twice a day **Group 2:** Placebo	8 weeks	Reduction in serum free testosterone, DHEAS in Group 1	ELISA	78
Kotsa et al	Single arm	15 PCOS	Greece	1 μg alphacalcidol/day	3 months	Increase in first phase insulin secretion Increase in HDL and decrease in TG	RIA	79

AMH: anti-Mullerian hormone; APO-A1: apolipoprotein A1; BP: blood pressure; DHEAS: dehydroepiandrosterone sulfate; FG: Ferriman-Gallwey score; HDL: high-density lipoprotein; HOMA-IR: homeostasis model assessment–insulin resistance; IR: insulin resistance; LDL: low-density lipoprotein; PCOS: polycystic ovary syndrome; PTH: parathyroid hormone; QUICKI: quantitative insulin-sensitivity check index; RCT: randomized control trial; RIA: radioimmunoassay; sENG: soluble endoglin; sRAGE: soluble form of receptor for advanced glycation end-products; TG: triglycerides; TGF-β1: transforming growth factor beta 1; VLDL; very low-density lipoprotein.

TABLE 2. Vitamin D and PCOS – INTERVENTIONAL STUDIES.

Author	Study Design	Participants	Country	Intervention	Duration	Main Results	25(OH)D Measurement	Reference
Ardabili et al	RCT	50 PCOS 2 groups (n_1=24, n_2=26)	Iran	**Group 1:** 50.000 IU Vitamin D_3/20 days **Group 2:** Placebo orally	2 months	Reduction in TG, total cholesterol, VLDL, PTH in Group 1 No change in HOMA-IR, QUICKI, insulin levels No change in HDL-C, LDL-C, Apo-A1	Chemoluminescence Immunoassay	80 82
Raja-Khan et al	RCT	28PCOS (n_1=13, n_2=15)	USA	**Group1:** 12.000 Vitamin D_3/day **Group2:**	12 weeks	No change in HOMA-IR, QUICKI, insulin levels	RIA	81
Asemi et al	RCT	104 PCOS 4 groups (n=26)	Iran	**Group 1:** 1000 mg/day calcium plus Vitamin D placebo **Group 2:** 50.00 IU/week Vitamin D plus calcium placebo **Group 3:** 1000mg calcium/d plus 50.000 IU/week Vitamin D **Group 4:** calcium placebo plus Vitamin D placebo	8 weeks	Decrease in insulin levels, HOMA-IR, TG, VLDL and increase in QUICKI in Group 3	ELISA	83
Garg et al	RCT	32 PCOS 2 groups (n_1=15, n_2=17)	India	**Group 1:** Metformin (500mg ×2 for weeks and 500mg ×3 for 6 weeks) plus Vitamin D_3 (120.000 IU once monthly) **Group 2:** Metformin (500mg ×2 for weeks and 500mg ×3 for 6 weeks) plus placebo	6 months	No significant difference in HOMA-IR and insulin secretion	Chemiluminescence Immunoassay	84
Irani et al	RCT	16 PCOS 35 Controls	USA	50.000 IU of Vitamin D_3 orally once weekly	8 weeks	Increase in serum sRAGE levels and decrease in serum AMH levels in PCOS	Immunoassay	92
Irani et al	RCT	68 PCOS 2 groups (n_1=45, n_2=23)	USA	**Group 1:** 50.000 IU Vitamin D_3 orally once weekly **Group 2:** Placebo	8 weeks	Increase in serum sENG and decrease in TGF-β1 bioavailability (TGF-β1/sENG ratio) in Group 1 Decrease in FG score, TG, menstrual interval in Group1	Immunoassay	93

AMH: anti-Mullerian hormone; APO-A1: apolipoprotein A1; BP: blood pressure; DHEAS: dehydroepiandrosterone sulfate; FG: Ferriman-Gallwey score; HDL: high-density lipoprotein; HOMA-IR: homeostasis model assessment–insulin resistance; IR: insulin resistance; LDL: low-density lipoprotein; PCOS: polycystic ovary syndrome; PTH: parathyroid hormone; QUICKI: quantitative insulin-sensitivity check index; RCT: randomized control trial; RIA: radioimmunoassay; sENG: soluble endoglin; sRAGE: soluble form of receptor for advanced glycation end-products; TG: triglycerides; TGF-β1: transforming growth factor beta 1; VLDL; very low-density lipoprotein.