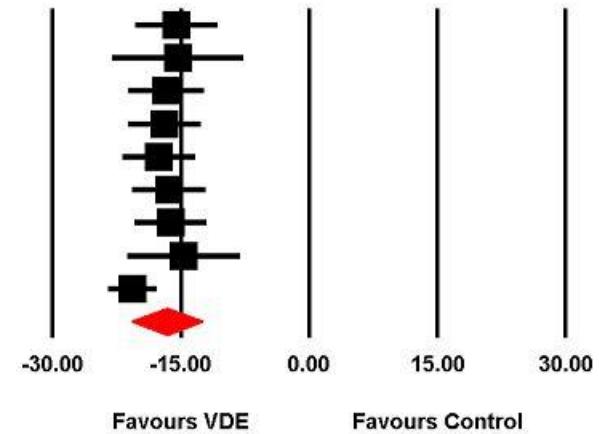
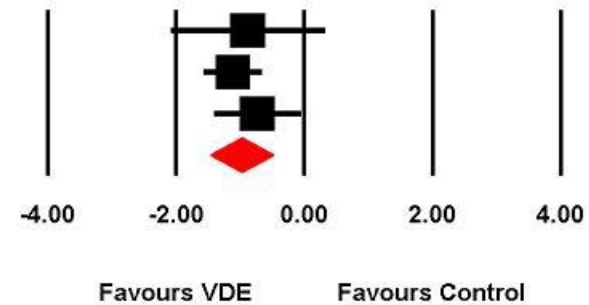


Study name**Statistics with study removed****Difference in means (95% CI) with study removed**

	Point	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Hoseini et al, 2019	-15.528	2.416	5.836	-20.263	-10.793	-6.428	0.000
Najafi Nazarabadi et al, 2022	-15.331	3.868	14.961	-22.912	-7.750	-3.964	0.000
Ruipeng et al, 2025	-16.765	2.219	4.925	-21.114	-12.415	-7.554	0.000
Sun et al, 2023	-16.954	2.125	4.516	-21.119	-12.789	-7.978	0.000
Farag et al, 2018	-17.610	2.130	4.536	-21.785	-13.436	-8.269	0.000
Kim et al, 2014	-16.398	2.170	4.708	-20.651	-12.146	-7.558	0.000
Dadrass et al, 2019	-16.184	2.112	4.460	-20.323	-12.045	-7.664	0.000
Hoseini et al, 2022	-14.686	3.318	11.009	-21.189	-8.183	-4.426	0.000
Sheikholeslami-Vatani et al, 2022	-20.657	1.418	2.011	-23.436	-17.878	-14.567	0.000
	-16.590	2.092	4.377	-20.690	-12.489	-7.930	0.000

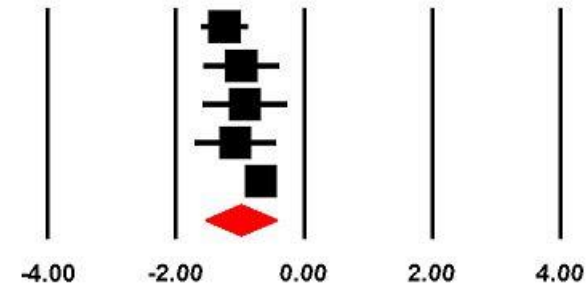
**(a)****Study name****Statistics with study removed****Difference in means (95% CI) with study removed**

	Point	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Ruipeng et al, 2025	0.880	0.606	0.367	-2.068	0.308	-1.452	0.146
Sun et al, 2023	-1.117	0.225	0.051	-1.558	-0.676	-4.966	0.000
Dadrass et al, 2019	0.732	0.341	0.116	-1.399	-0.064	-2.147	0.032
	-0.975	0.249	0.062	-1.464	-0.486	-3.908	0.000

**(b)**

Study name**Statistics with study removed****Difference in means (95% CI) with study removed**

Point	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Hoseini et al, 2019-1.243	0.182	0.033	-1.599	-0.886	-6.832	0.000
Sun et al, 2023 -0.978	0.297	0.088	-1.560	-0.396	-3.295	0.001
Kim et al, 2014 -0.923	0.329	0.108	-1.569	-0.278	-2.804	0.005
Dadrass et al, 20191.072	0.320	0.102	-1.699	-0.445	-3.351	0.001
Hoseini et al, 2022-0.671	0.116	0.014	-0.899	-0.443	-5.766	0.000
-0.985	0.285	0.081	-1.543	-0.427	-3.461	0.001

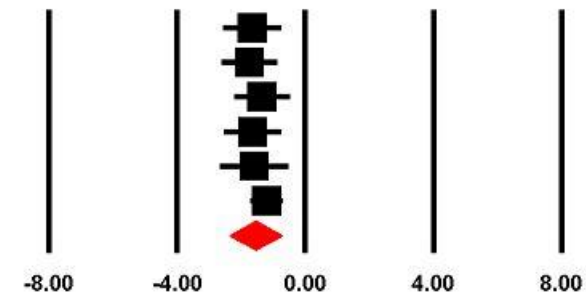
**(c)**

Favours VDE

Favours Control

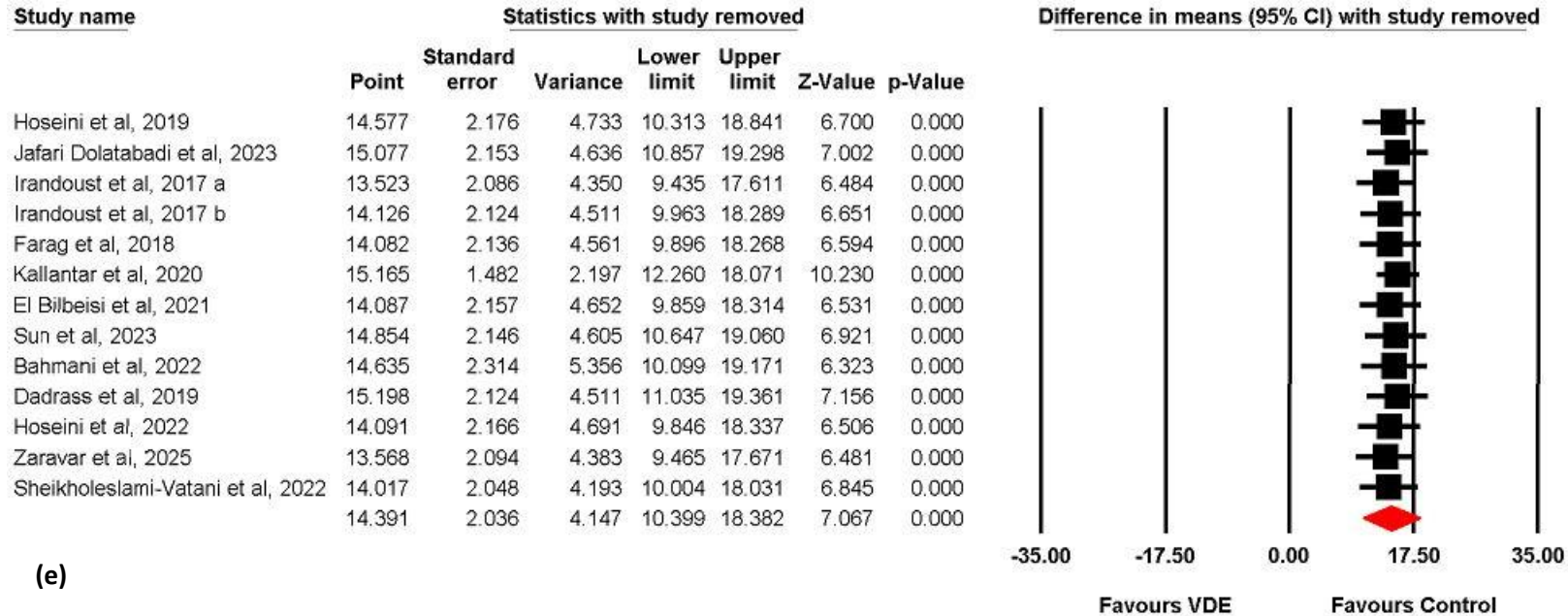
Study name**Statistics with study removed****Difference in means (95% CI) with study removed**

	Point	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Hoseini et al, 2019	-1.658	0.453	0.205	-2.546	-0.770	-3.661	0.000
Sun et al, 2023	-1.741	0.430	0.185	-2.583	-0.898	-4.050	0.000
Kim et al, 2014	-1.346	0.433	0.187	-2.195	-0.498	-3.110	0.002
Dadrass et al, 2019	-1.637	0.447	0.200	-2.513	-0.762	-3.665	0.000
Sheikholeslami-Vatani et al, 2022	-1.591	0.536	0.288	-2.642	-0.541	-2.968	0.003
Hoseini et al, 2022	-1.197	0.247	0.061	-1.681	-0.713	-4.846	0.000
	-1.540	0.409	0.168	-2.342	-0.737	-3.760	0.000

**(d)**

Favours VDE

Favours Control



Supplementary figure 1. Sensitivity analyses of FBG (fast blood glucose) (a), HbA1c(b), HOMA-IR(c), insulin (d), serum vitamin D (e)