Supplementary Material

Supplementary Table 1 Included study quality assessment judgment and support for the judgment

Entry	Judgment (Yes / No)	Support for judgment	
		Location in the article or "Quote"	Comment of author
Soleimani *et al*[29]			
Eligibility criteria specified	Yes	"We included patients aged 18 to 80 years old …"	Eligibility criteria were specified.
Random allocation	Yes	Randomization section in the article.	Subjects were randomly allocated.
Concealed allocation	Yes	Randomization section in the article.	Concealment was maintained.
Groups similar at baseline	Yes	Table 1 in the article.	Groups were similar at baseline.
Subject blinding	Yes	" … was a prospective randomized, double-blind, placebo controlled clinical trial."	Subjects were blinded and the procedures were informed.
Therapist blinding	Yes	" … was a prospective randomized, double-blind, placebo controlled clinical trial."	Therapist were blinded and the procedures were informed.
Assessor blinding	No	Not applicable.	No details of assessor blinding are provided.
Less than 15% dropouts	Yes	Figure 1 in the article.	Data from more than 85% of the

			subjects initially allocated to groups is available.
Intention-to-treat analysis	Yes	"The analyses were carried out based on the intention-to-treat principle."	Intention-to-treat analysis method was used.
Between-group statistical comparison	Yes	Statistical methods section in the article.	Between-group statistical analysis were performed, and results are reported.
Point measures and variability	Yes	Table 2 and table 3 in the article.	Data of point measure and measure of variability for at least one key outcome is reported.
Soleimani *et al*[30]			
Eligibility criteria specified	Yes	Trial Design and Study Participants section in the article.	Eligibility criteria were specified.
Random allocation	Yes	Randomization section in the article.	Subjects were randomly allocated.
Concealed allocation	Yes	Randomization section in the article.	Concealment was maintained.
Groups similar at baseline	Yes	Table 1 in the article.	Groups were similar at baseline.

Subject blinding	Yes	"It was a randomized, double-blinded, placebo-controlled clinical trial."	Subjects were blinded and the procedures were informed.
Therapist blinding	Yes	"It was a randomized, double-blinded, placebo-controlled clinical trial."	Therapist were blinded and the procedures were informed.
Assessor blinding	No	Not applicable.	No details of assessor blinding are provided.
Less than 15% dropouts	Yes	Figure 1 in the article.	Data from more than 85% of the subjects initially allocated to groups is available.
Intention-to-treat analysis	Yes	Not applicable.	As no drop-out was observed, the intention-to-treat analysis method was used as default method.
Between-group statistical comparison	Yes	Statistical Methods section in the article.	Between-group statistical analysis were performed, and results are reported.
Point measures and variability	Yes	Table 2 in the article.	Data of point measure and measure of

			variability for at least one key outcome is reported.
Tajabadi-Ebrahimi *et al*[31]			
Eligibility criteria specified	Yes	"Patients with T2DM, overweight (BMI ≥ 25) aged …"	Eligibility criteria were specified.
Random allocation	Yes	"Computer-generated random numbers were used for random assignment."	Subjects were randomly allocated.
Concealed allocation	Yes	"Randomization and allocation were concealed from the researcher …"	Concealment was maintained.
Groups similar at baseline	Yes	Table 1 in the article.	Groups were similar at baseline.
Subject blinding	Yes	"Placebos (starch) were similar in color, shape, size and package to the synbiotic capsules …"	Subjects were blinded and the procedures were informed.
Therapist blinding	Yes	" … study was a randomized double-blind placebo-controlled trial …"	Therapist were blinded and the procedures were informed.
Assessor blinding	No	Not applicable.	No details of assessor blinding are provided.
Less than 15% dropouts	Yes	Figure 1 in the article.	Data from more than 85% of the subjects initially

			allocated to groups is available.
Intention-to-treat analysis	Yes	"The intention-to-treat (ITT) analysis of the primary study end-point was done …"	Intention-to-treat analysis method was used.
Between-group statistical comparison	Yes	Statistical methods section in the article.	Between-group statistical analysis were performed, and results are reported.
Point measures and variability	Yes	Table 3 and table 4 in the article.	Data of point measure and measure of variability for at least one key outcome is reported.
Raygan *et al*[32]			
Eligibility criteria specified	Yes	"Inclusion criteria were as follows: patients with …"	Eligibility criteria were specified.
Random allocation	Yes	"Randomization was conducted using computer-generated random numbers."	Subjects were randomly allocated.
Concealed allocation	Yes	"Randomization and allocation were concealed from the investigators …"	Concealment was maintained.
Groups similar at baseline	Yes	Table 1 in the article.	Groups were similar at baseline.

Subject blinding	Yes	"Color, shape, size, and package of placebos and probiotics capsules were identical …"	Subjects were blinded and the procedures were informed.
Therapist blinding	Yes	"This study was a randomized, double-blind, placebo-controlled trial …"	Therapist were blinded and the procedures were informed.
Assessor blinding	No	Not applicable.	No details of assessor blinding are provided.
Less than 15% dropouts	Yes	Figure 1 in the article.	Data from more than 85% of the subjects initially allocated to groups is available.
Intention-to-treat analysis	Yes	"The analyses were repeated using intention-to-treat (ITT) protocol."	Intention-to-treat analysis method was used.
Between-group statistical comparison	Yes	Statistical methods and sample size section in the article.	Between-group statistical analysis were performed, and results are reported.
Point measures and variability	Yes	Table 3 in the article.	Data of point measure and measure of variability for at least one key

			outcome is reported.
Farrokhian *et al*[33]			
Eligibility criteria specified	Yes	"Overweight (BMI = 25–29.9 kg/m2) and obese individuals …"	Eligibility criteria were specified.
Random allocation	Yes	Randomization section in the article.	Subjects were randomly allocated.
Concealed allocation	Yes	Randomization section in the article.	Concealment was maintained.
Groups similar at baseline	Yes	Table 1 in the article.	Groups were similar at baseline.
Subject blinding	Yes	"Placebos (starch) were similar in color, shape, size, and …"	Subjects were blinded and the procedures were informed.
Therapist blinding	Yes	"The current study was a randomized, double-blind, placebo-controlled trial …"	Therapist were blinded and the procedures were informed.
Assessor blinding	No	Not applicable.	No details of assessor blinding are provided.
Less than 15% dropouts	Yes	Figure 1 in the article.	Data from more than 85% of the subjects initially allocated to groups is available.

Intention-to-treat analysis	Yes	"The intention-to-treat (ITT) analysis of the primary study end-point was conducted …"	Intention-to-treat analysis method was used.
Between-group statistical comparison	Yes	Statistical methods section in the article.	Between-group statistical analysis were performed, and results are reported.
Point measures and variability	Yes	Table 3 and table 4 in the article.	Data of point measure and measure of variability for at least one key outcome is reported.

The quality of included studies was evaluated using PEDro scale. PEDro: physiotherapy evidence database.

Supplementary Table 2 Result of sensitivity analysis

Study excluded	I^2 value	Mean difference estimate	95% CI	p-value
Glucose level				
Overall	0%	-23.86	-34.92 to -12.80	< 0.001
Raygan *et al*[32]	0%	-24.52	-38.18 to -10.86	< 0.001
Soleimani *et al*[29]	0%	-21.72	-35.05 to -8.40	0.001
Soleimani *et al*[30]	0%	-27.14	-39.91 to -14.37	< 0.001
Tajabadi-Ebrahimi *et al*[31]	0%	-22.29	-33.92 to -10.66	< 0.001
Insulin level				
Overall	64%	-5.02	-7.67 to -2.37	< 0.001
Raygan *et al*[32]	51%	-5.99	-8.67 to -3.32	< 0.001
Soleimani *et al*[29]	18%	-3.87	-5.84 to -1.90	< 0.001
Soleimani *et al*[30]	75%	-4.84	-8.46 to -1.21	0.009
Tajabadi-Ebrahimi *et al*[31]	74%	-5.43	-9.19 to -1.67	0.005
HOMA-IR score				
Overall	78%	-1.82	-3.29 to -0.35	0.015
Raygan *et al*[32]	81%	-2.30	-4.19 to -0.41	0.017
Soleimani *et al*[29]	24%	-1.04	-1.91 to -0.18	0.017
Soleimani *et al*[30]	85%	-1.70	-3.57 to 0.16	0.074
Tajabadi-Ebrahimi *et al*[31]	82%	-2.20	-4.28 to -0.13	0.037
QUICKI score				
Overall	85%	0.02	0.01 to 0.04	0.002
Raygan *et al*[32]	88%	0.03	0.01 to 0.04	0.006
Soleimani *et al*[29]	3%	0.01	0.01 to 0.02	< 0.001
Soleimani *et al*[30]	90%	0.02	0.00 to 0.04	0.024
Tajabadi-Ebrahimi *et al*[31]	88%	0.03	0.01 to 0.05	0.012
Total antioxidant capacity level				
Overall	0%	92.55	40.87 to 144.22	< 0.001
Farrokhian *et al*[33]	0%	115.16	54.68 to 175.64	< 0.001

Raygan *et al*[32]	15%	90.61	33.26 to 147.96	0.002
Soleimani *et al*[29]	13%	87.11	24.09 to 150.13	0.007
Soleimani *et al*[30]	0%	78.19	19.90 to 136.48	0.009
Glutathione level				
Overall	53%	40.55	-3.32 to 84.42	0.070
Farrokhian *et al*[33]	19%	59.79	17.60 to 101.98	0.005
Raygan *et al*[32]	68%	40.48	-20.89 to 101.84	0.196
Soleimani *et al*[29]	68%	44.93	-13.21 to 103.06	0.130
Soleimani *et al*[30]	0%	18.17	-15.25 to 51.58	0.287
Malondialdehyde level				
Overall	27%	-0.48	-0.70 to -0.25	< 0.001
Farrokhian *et al*[33]	51%	-0.46	-0.75 to -0.18	0.001
Raygan *et al*[32]	42%	-0.52	-0.78 to -0.27	< 0.001
Soleimani *et al*[29]	0%	-0.42	-0.65 to -0.18	< 0.001
Soleimani *et al*[30]	48%	-0.52	-0.80 to -0.24	< 0.001
high sensitivity C-reactive protein level				
Overall	59%	-2.24	-3.48 to -1.00	< 0.001
Farrokhian *et al*[33]	69%	-2.05	-3.54 to -0.55	0.007
Raygan *et al*[32]	0%	-2.91	-3.87 to -1.95	< 0.001
Soleimani *et al*[29]	73%	-2.29	-3.92 to -0.65	0.006
Soleimani *et al*[30]	43%	-1.81	-3.12 to -0.49	0.007
Nitric oxide level				
Overall	56%	6.45	2.09 to 10.81	0.004
Farrokhian *et al*[33]	0%	5.24	2.15 to 8.34	< 0.001
Raygan *et al*[32]	69%	5.62	-1.93 to 13.17	0.145
Soleimani *et al*[29]	62%	7.29	2.67 to 11.90	0.002
Soleimani *et al*[30]	58%	7.56	2.80 to 12.31	0.002
Total cholesterol level				
Overall	0%	-3.43	-10.46 to 3.61	0.340
Raygan *et al*[32]	0%	-1.63	-9.96 to 6.70	0.701
Soleimani *et al*[29]	0%	-5.60	-14.25 to 3.06	0.205

Soleimani *et al*[30]	0%	-2.89	-10.50 to 4.71	0.456
Tajabadi-Ebrahimi *et al*[31]	0%	-3.82	-11.84 to 4.19	0.350
Triglycerides level				
Overall	0%	-4.26	-15.26 to 6.74	0.448
Raygan *et al*[32]	0%	-4.14	-16.03 to 7.75	0.495
Soleimani *et al*[29]	0%	-9.92	-25.15 to 5.32	0.202
Soleimani *et al*[30]	0%	-2.21	-14.54 to 10.11	0.725
Tajabadi-Ebrahimi *et al*[31]	0%	-2.80	-14.90 to 9.31	0.651
Low-density lipoprotein level				
Overall	0%	-4.62	-10.66 to 1.42	0.134
Raygan *et al*[32]	0%	-2.58	-10.01 to 4.85	0.496
Soleimani *et al*[29]	0%	-5.90	-12.95 to 1.16	0.101
Soleimani *et al*[30]	0%	-4.84	-11.30 to 1.62	0.142
Tajabadi-Ebrahimi *et al*[31]	0%	-4.93	-12.00 to 2.15	0.172
Very low-density lipoprotein level				
Overall	0%	-0.83	-3.03 to 1.37	0.461
Raygan *et al*[32]	0%	-0.80	-3.18 to 1.58	0.510
Soleimani *et al*[29]	0%	-1.95	-4.99 to 1.10	0.210
Soleimani *et al*[30]	0%	-0.43	-2.90 to 2.05	0.736
Tajabadi-Ebrahimi *et al*[31]	0%	-0.54	-2.96 to 1.89	0.664
High-density lipoprotein level				
Overall	28%	1.83	0.29 to 3.36	0.020
Raygan *et al*[32]	52%	1.83	0.06 to 3.60	0.042
Soleimani *et al*[29]	50%	2.04	0.16 to 3.92	0.034
Soleimani *et al*[30]	0%	2.35	0.67 to 4.02	0.006
Tajabadi-Ebrahimi *et al*[31]	0%	1.02	-0.78 to 2.82	0.265
Total cholesterol : High-density lipoprotein ratio				
Overall	0%	-0.25	-0.45 to -0.04	0.020
Raygan *et al*[32]	0%	-0.29	-0.57 to 0.00	0.050
Soleimani *et al*[30]	0%	-0.25	-0.47 to -0.04	0.020
Tajabadi-Ebrahimi *et al*[31]	0%	-0.19	-0.47 to 0.10	0.193

HOMA-IR: Homeostatic model assessment for insulin resistance; HOMA-B: Homeostasis model assessment of β-cell function; QUICKI: Quantitative insulin-sensitivity check index.

Supplementary Table 3 Result of sub-group analysis

Parameters	**Triple probiotics alone therapy**		**Triple probiotics with prebiotics therapy**		***P* value***
	MD	**I^2 value**	**MD**	**I^2 value**	
Glucose level	-25.45	0%	-20.84	25%	0.70
Insulin level	-5.34	87%	-4.73	0%	0.86
HOMA-IR score	-2.18	91%	-1.39	46%	0.67
QUICKI score	0.03	94%	0.02	30%	0.48
TAC level	102.68	0%	81.75	55%	0.69
GSH level	37.35	0%	47.18	84%	0.86
MDA level	-0.54	74%	-0.45	0%	0.72
hs-CRP level	-1.28	15%	-3.13	0%	0.02
NO level	5.79	4%	7.22	77%	0.78
TC level	-3.18	0%	-3.84	0%	0.93
TG level	0.31	0%	-11.79	0%	0.30
LDL level	-5.30	0%	-3.58	0%	0.78
VLDL level	0.08	0%	-2.31	0%	0.30
HDL level	1.57	0%	2.17	75%	0.70

*Significance between sub-groups. MD: Mean difference; HOMA-IR: Homeostatic model assessment for insulin resistance; QUICKI: Quantitative insulin-sensitivity check index; TAC: Total antioxidant capacity; GSH: Glutathione; MDA: Malondialdehyde; hs-CRP: High sensitivity C-reactive protein; NO: Nitric oxide; TC:

Total cholesterol; TG: Triglycerides; LDL: Low density lipoprotein; VLDL: Very low density lipoprotein; HDL: High density lipoprotein.