

Evidence Analysis Library

Carbohydrate Restricted Dietary Approaches Systematic Review

Studies Examining the Effect of Carbohydrate (CHO) Restriction Compared to Higher CHO Diets in Adults with Overweight or Obesity and No Other Established Disease

Effect Size Table: Results of sub-group analysis of CHO restrictive intervention according to energy restriction, amount of CHO restriction, intervention duration and study quality. [mean difference 95% CI]

Green = Statistically significant

Blue = NS

Outcome or subgroup title	No. of studies	No. of participants	Effect size
<b>1.0. Body Weight (BW)</b>	19	1,350	-1.22 [-2.00, -0.45]
1.1. BW by Energy Restriction: Not Restricted	4	300	-1.24 [-2.28, -0.19]
1.2. BW by Energy Restriction: Restricted	11	804	-1.29 [-2.19, -0.39]
1.3. BW by Energy Restriction: Not Reported	4	246	-1.45 [-4.59, 1.69]
1.4. BW by Diet: MCD vs. HCD	12	782	-1.08 [-2.25, 0.09]
1.5. BW by Diet: MCD vs. MCD	5	381	-1.13 [-2.72, 0.45]
1.6. BW by Diet: LCD vs. MCD	2	187	-1.99 [-3.44, -0.54]
1.7. BW by Intervention Duration: <3 months	7	994	-0.81 [-2.17, 0.55]
1.8. BW by Intervention Duration: 3-6 months	8	615	-1.73 [-3.14, -0.32]
1.9. BW by Intervention Duration: ≥12 months	4	382	-1.17 [-2.97, 0.63]
1.10. BW by Study Quality: Some Concerns	8	558	-0.79 [-1.66, 0.07]
1.11. BW by Study Quality: High Risk	8	460	-1.25 [-2.81, 0.31]
1.12. BW by Study Quality: Low Risk	3	332	-2.07 [-3.03, -1.11]
<b>2.0. BMI</b>	10	1,676	-0.23 [-0.59, 0.13]
2.1. BMI by Energy Restriction: Not Restricted	2	218	-0.50 [-1.36, 0.35]
2.2. BMI by Energy Restriction: Restricted	4	1,136	-0.07 [-0.39, 0.24]
2.3. BMI by Energy Restriction: Not Reported	4	322	-0.36 [-1.54, 0.83]
2.4. BMI by Diet: MCD vs. HCD	6	393	-0.44 [-1.13, 0.26]
2.5. BMI by Diet: MCD vs. MCD	4	1,283	0.00 [-0.59, 0.13]
2.6. BW by Intervention Duration: <3 months	2	124	0.50 [0.21, 0.78]
2.7. BMI by Intervention Duration: 3-6 months	6	509	-0.42 [-0.91, 0.08]
2.8. BMI by Intervention Duration: ≥12 months	2	1,043	-0.32 [-0.91, 0.28]
2.9. BMI by Study Quality: Some Concerns	4	1,216	-0.15 [-0.50, 0.20]
2.10. BMI by Study Quality: High Risk	6	460	0.33 [-1.13, 0.47]
<b>3.0. Waist Circumference (WC)</b>	12	1,626	-0.84 [-1.39, -0.28]
3.1. WC by Energy Restriction: Not Restricted	2	79	-0.93 [-2.50, 0.64]
3.2. WC by Energy Restriction: Restricted	6	1,225	-0.75 [-1.61, 0.11]
3.3. WC by Energy Restriction: Not Reported	4	322	-1.65 [-4.28, 0.98]
3.4. WC by Diet: MCD vs. HCD	8	400	-0.61 [-1.37, 0.16]
3.5. WC by Diet: MCD vs. MCD	5	1,226	-1.32 [-2.25, -0.39]
3.7. WC by Intervention Duration: <3 months	5	251	-0.66 [-1.60, 0.29]
3.8. WC by Intervention Duration: 3-6 months	6	413	-1.62 [-2.95, -0.29]

3.9. WC by Intervention Duration: ≥12 months	1	962	-0.74 [-1.76, -0.29]
3.10. WC by Study Quality: Some Concerns	5	1,188	-0.49 [-1.16, 0.18]
3.11. WC by Study Quality: High Risk	6	399	-1.50 [-3.51, 0.51]
3.12. WC by Study Quality: Low Risk	1	39	-1.80 [-3.15, -0.45]
<b>4.0. Fat Mass (FM)</b>			
4.1. FM by Energy Restriction: Not Restricted	2	120	-0.42 [-0.86, 0.03]
4.2. FM by Energy Restriction: Restricted	9	1,471	-0.05 [-0.16, 0.05]
4.3. FM by Energy Restriction: Not Reported	2	106	-0.64 [-1.81, 0.53]
4.4. FM by Diet: MCD vs. HCD	9	599	-0.17 [-0.38, 0.04]
4.5. FM by Diet: MCD vs. MCD	4	1,098	-0.18 [-0.40, 0.05]
4.6. FM by Intervention Duration: <3 months	4	193	-0.21 [-0.54, 0.11]
4.7. FM by Intervention Duration: 3-6 months	6	323	-0.35 [-0.75, 0.05]
4.8. FM by Intervention Duration: ≥12 months	3	1,181	-0.05 [-0.16, 0.07]
4.9. FM by Study Quality: Some Concerns	6	1,235	-0.06 [-0.17, 0.05]
4.10. FM by Study Quality: High Risk	5	285	-0.41 [-0.89, 0.07]
4.11. FM by Study Quality: Low Risk	2	177	-0.38 [-1.27, 0.50]
<b>5.0. Fat Free Mass (LB/FFM)</b>			
5.1. FFM by Energy Restriction: Not Restricted	1	39	-0.36 [-0.99, 0.28]
5.2. FFM by Energy Restriction: Restricted	8	1,369	-0.00 [-0.11, 0.10]
5.3. FFM by Energy Restriction: Not Reported	1	50	-0.85 [-1.43, -0.27]
5.4. FFM by Diet: MCD vs. HCD	7	416	-0.10 [-0.32, 0.12]
5.5. FFM by Diet: MCD vs. MCD	3	1,042	-0.02 [-0.14, 0.10]
5.6. FFM by Intervention Duration: <3 months	4	193	-0.09 [-0.37, 0.20]
5.7. FFM by Intervention Duration: 3-6 months	4	124	-0.28 [-0.71, 0.15]
5.8. FFM by Intervention Duration: ≥12 months	2	1,100	0.01 [-0.11, 0.12]
5.9. FFM by Study Quality: Some Concerns	5	1,154	-0.00 [-0.12, 0.11]
5.10. FFM by Study Quality: High Risk	3	127	-0.39 [-0.92, 0.14]
5.11. FFM by Study Quality: Low Risk	2	177	-0.06 [-0.40, 0.28]
<b>6.0. HbA1c</b>			
6.1. HbA1c by Prediabetes Status: Yes	2	1,090	-0.05 [-0.47, 0.37]
6.2. HbA1c by Prediabetes Status: No	3	236	-0.17 [-0.29, -0.04]
6.3. HbA1c by Energy Restriction: Not Restricted	1	40	-0.04 [-0.31, 0.23]
6.4. HbA1c by Energy Restriction: Restricted	2	1,003	-0.56 [-2.20, 1.07]
6.5. HbA1c by Energy Restriction: Not Reported	2	283	-0.18 [-0.32, -0.05]
6.6. HbA1c by Diet: MCD vs. HCD	1	40	-0.04 [-0.31, 0.23]
6.7. HbA1c by Diet: MCD vs. MCD	3	1,131	-0.08 [-0.49, 0.33]
6.8. HbA1c by Diet: LCD vs. MCD	1	155	-0.20 [-0.34, -0.06]
6.9. HbA1c by Intervention Duration: <3 months	1	40	-0.04 [-0.31, 0.23]
6.10. HbA1c by Intervention Duration: 3-6 months	3	324	-0.19 [-0.32, -0.05]
6.11. HbA1c by Intervention Duration: ≥12 months	1	962	0.0 [-4.23, 4.23]
6.12. HbA1c by Study Quality: Some Concerns	2	1,002	-0.04 [-0.31, 0.23]
6.13. HbA1c by Study Quality: High Risk	2	169	-0.08 [-0.49, 0.33]
6.14. HbA1c by Study Quality: Low Risk	1	155	-0.20 [-0.34, -0.06]

<b>7.0. Fasting Blood Glucose (FBG)</b>	15	1,955	-0.08 [-0.16, 0.00]
7.1. FBG by Prediabetes Status: Yes	3	1,146	-0.10 [-0.34, 0.13]
7.2. FBG by Prediabetes Status: No	12	809	-0.08 [-0.17, 0.00]
7.3. FBG by Energy Restriction: Not Restricted	3	216	-0.06 [-0.18, 0.06]
7.4. FBG by Energy Restriction: Restricted	8	1,350	-0.07 [-0.26, 0.12]
7.5. FBG by Energy Restriction: Not Reported	4	389	-0.14 [-0.31, 0.03]
7.6. FBG by Diet: MCD vs. HCD	8	437	-0.06 [-0.25, 0.12]
7.7. FBG by Diet: MCD vs. MCD	6	1,363	-0.08 [-0.19, 0.02]
7.8. FBG by Diet: LCD vs. MCD	1	155	-0.10 [-0.38, 0.02]
7.9. FBG by Intervention Duration: <3 months	5	233	-0.04 [-0.42, 0.34]
7.10. FBG by Intervention Duration: 3-6 months	8	705	-0.09 [-0.19, -0.00]
7.11. FBG by Intervention Duration: ≥12 months	2	1,017	-0.10 [-0.36, 0.16]
7.12. FBG by Study Quality: Some Concerns	6	1,293	-0.03 [-0.26, 0.20]
7.13. FBG by Study Quality: High Risk	7	468	-0.13 [-0.25, -0.01]
7.14. FBG by Study Quality: Low Risk	2	194	-0.06 [-0.28, 0.16]
<b>Blood Pressure</b>			
<b>8.0. Systolic Blood Pressure (SBP)</b>	9	594	-4.86 [-6.6, -3.11]
8.1. SBP by Energy Restriction: Not Restricted	3	216	-4.12 [-7.99, -0.26]
8.2. SBP by Energy Restriction: Restricted	3	144	-3.50 [-8.24, 1.25]
8.3. SBP by Energy Restriction: Not Reported	3	234	-4.50 [-8.58, -0.43]
8.4. SBP by Diet: MCD vs. HCD	4	193	-6.17 [-8.39, -3.95]
8.5. SBP by Diet: MCD vs. MCD	5	401	-2.75 [-5.57, 0.07]
8.6. SBP by Intervention Duration: <3 months	3	127	-5.33 [-8.47, -2.19]
8.7. SBP by Intervention Duration: 3-6 months	5	412	-3.04 [-6.16, 0.08]
8.8. SBP by Intervention Duration: ≥12 months	1	55	-4.60 [-10.94, 1.74]
8.9. SBP FM by Study Quality: Some Concerns	3	225	-4.68 [-8.98, -0.38]
8.10. SBP by Study Quality: High Risk	5	330	-4.11 [-7.33, -0.89]
8.11. SBP by Study Quality: Low Risk	1	39	-2.61 [-7.19, 1.97]
<b>9.0. Diastolic Blood Pressure (DBP)</b>			
9.1. DBP by Energy Restriction: Not Restricted	2	79	-3.19 [-7.40, 1.02]
9.2. DBP by Energy Restriction: Restricted	3	144	0.60 [-4.32, 3.12]
9.3. DBP by Energy Restriction: Not Reported	4	371	-1.29 [-3.55, 0.98]
9.4. DBP by Diet: MCD vs. HCD	4	193	-2.08 [-4.93, 0.76]
9.5. DBP by Diet: MCD vs. MCD	5	401	-1.08 [-3.32, 1.16]
9.5. DBP by Intervention Duration: <3 months	3	127	-3.43 [-6.96, 0.09]
9.6. DBP by Intervention Duration: 3-6 months	5	412	-1.07 [-3.25, 1.11]
9.7. DBP by Intervention Duration: ≥12 months	1	55	0.90 [-4.69, 6.49]
9.8. DBP by Study Quality: Some Concerns	3	225	0.80 [-3.62, 2.02]
9.9. DBP by Study Quality: High Risk	5	330	-1.53 [-4.02, 0.97]
9.10. DBP by Study Quality: Low Risk	1	39	-3.52 [-8.77, 1.73]
<b>10.0. Total Cholesterol (TC)</b>			
10.1. TC by Energy Restriction: Not Restricted	3	216	-0.08 [-0.33, 0.16]

10.2. TC by Energy Restriction: Restricted	7	388	-0.11 [-0.43, 0.21]
10.3. TC by Energy Restriction: Not Reported	4	389	-0.11 [-0.43, 0.22]
10.4. TC by Diet: MCD vs. HCD	8	437	-0.21 [-0.57, 0.14]
10.5. TC by Diet: MCD vs. MCD	5	401	-0.10 [-0.21, 0.02]
10.6. TC by Diet: LCD vs. MCD	1	155	0.20 [-0.08, 0.48]
10.7. TC by Intervention Duration: <3 months	5	233	-0.34 [-0.73, 0.04]
10.8. TC by Intervention Duration: 3-6 months	8	705	-0.03 [-0.21, 0.16]
10.9. TC by Intervention Duration: ≥12 months	1	55	-0.10 [-0.25, 0.06]
10.10. TC by Study Quality: Some Concerns	5	331	-0.29 [-0.73, 0.15]
10.11. TC by Study Quality: High Risk	7	468	-0.10 [-0.34, 0.14]
10.12. TC by Study Quality: Low Risk	2	194	0.06 [-0.27, 0.38]
<b>11.0. LDL-Cholesterol (LDL-C)</b>			
11.1. LDL-C by Energy Restriction: Not Restricted	3	216	-0.17 [-0.46, 0.13]
11.2. LDL-C by Energy Restriction: Restricted	7	388	0.04 [-0.23, 0.32]
11.3. LDL-C by Energy Restriction: Not Reported	3	333	-0.04 [-0.24, 0.17]
11.4. LDL-C by Diet: MCD vs. HCD	8	437	-0.04 [-0.36, 0.26]
11.5. LDL-C by Diet: MCD vs. MCD	4	345	-0.05 [-0.16, 0.06]
11.6. LDL-C by Diet: LCD vs. MCD	1	155	0.10 [-0.12, 0.31]
11.7. LDL-C by Intervention Duration: <3 months	5	233	-0.22 [-0.45, 0.02]
11.8. LDL-C by Intervention Duration: 3-6 months	7	649	0.01 [-0.13, 0.15]
11.9. LDL-C by Intervention Duration: ≥12 months	1	55	0.60 [0.23, 0.97]
11.10. LDL-C by Study Quality: Some Concerns	5	331	-0.15 [-0.44, 0.13]
11.11. LDL-C by Study Quality: High Risk	7	412	0.04 [-0.24, 0.31]
11.12. LDL-C by Study Quality: Low Risk	2	194	0.01 [-0.22, 0.24]
<b>12.0. HDL-C (HDL)</b>			
12.1. HDL by Energy Restriction: Not Restricted	3	216	0.00 [-0.05, 0.06]
12.2. HDL by Energy Restriction: Restricted	7	388	-0.06 [-0.16, 0.04]
12.3. HDL by Energy Restriction: Not Reported	4	389	-0.02 [-0.08, 0.04]
12.4. HDL by Diet: MCD vs. HCD	8	437	-0.03 [-0.08, 0.03]
12.5. HDL by Diet: MCD vs. MCD	5	401	-0.01 [-0.07, 0.05]
12.6. HDL FM by diet: LCD vs. MCD	1	155	0.00 [-0.14, 0.14]
12.7. HDL by Intervention Duration: <3 months	5	233	-0.01 [-0.12, 0.10]
12.8. HDL by Intervention Duration: 3-6 months	8	705	-0.02 [-0.06, 0.02]
12.9. HDL by Intervention Duration: ≥12 months	1	55	0.00 [-0.16, 0.16]
12.10. HDL by Study Quality: Some Concerns	5	331	-0.01 [-0.09, 0.06]
12.11. HDL by Study Quality: High Risk	7	468	-0.04 [-0.09, 0.02]
12.12. HDL by Study Quality: Low Risk	2	194	-0.02 [-0.08, 0.12]
<b>13.0. Triglycerides (TG)</b>			
13.1. TG by Energy Restriction: Not Restricted	3	216	-0.11 [-0.25, -0.08]
13.2. TG by Energy Restriction: Restricted	7	388	-0.17 [-0.31, -0.03]
13.3. TG by Energy Restriction: Not Reported	3	234	-0.51 [-0.79, -0.23]
13.4. TG by Diet: MCD vs. HCD	8	437	-0.27 [-0.47, -0.07]
13.5. TG by Diet: MCD vs. MCD	5	401	-0.12 [-0.20, -0.05]

13.6. TG by Intervention Duration: <3 months	5	233	-0.14 [-0.26, -0.02]
13.7. TG by Intervention Duration: 3-6 months	7	550	-0.21 [-0.37, -0.05]
13.8. TG by Intervention duration: ≥12 months	1	55	-0.30 [-0.73, 0.13]
13.9. TG by Study Quality: Some Concerns	5	331	-0.12 [-0.22, -0.02]
13.10. TG by Study Quality: High Risk	7	468	-0.28 [-0.47, -0.09]
13.11. TG by Study Quality: Low Risk	1	39	-0.11 [-0.24, 0.02]
<b>14.0. C-reactive Protein (CRP)</b>			
14.1. CRP by Energy Restriction: Not Restricted	2	176	-0.08 [-0.38, 0.21]
14.2. CRP by Energy Restriction: Restricted	3	193	0.25 [-0.15, 0.65]
14.3. CRP by Energy Restriction: Not Reported	1	155	-0.08 [-0.39, 0.24]
14.4. CRP by Diet: MCD vs. HCD	3	193	0.25 [-0.15, 0.65]
14.5. CRP by Diet: MCD vs. MCD	2	176	-0.08 [-0.38, 0.21]
14.6. CRP by Diet: LCD vs. MCD	1	155	-0.08 [-0.39, 0.24]
14.7. CRP by Intervention Duration: <3 months	1	39	-0.33 [-0.97, 0.31]
14.8. CRP by Intervention Duration: 3-6 months	4	430	0.08 [-0.19, 0.34]
14.9. CRP by Intervention Duration: ≥12 months	1	55	0.08 [-0.45, 0.61]
14.10. CRP by Study Quality: Some Concerns	1	137	-0.02 [-0.35, 0.32]
14.11. CRP by Study Quality: High Risk	3	193	0.25 [-0.15, 0.65]
14.12. CRP by Study Quality: Low Risk	2	194	-0.13 [-0.41, 0.16]
<b>15.0. Quality of Life</b>			
	1	32	NA
<b>16.0. Type 2 Diabetes Incidence</b>			
	1	962	NA

**Abbreviations:** HCD=high carbohydrate diet; LCD=low carbohydrate diet; MCD=moderate carbohydrate diet; NS=not significant; OB=obese; OW=overweight