

Combined Diet and Physical Activity Promotion Programs to Prevent Type 2 Diabetes Among People at Increased Risk

Results of Comparative Studies of More vs. Less Intensive Combined Diet & Physical Activity

Categorical Outcomes

Author, Year, PMID	Outcome Name	Outcome Description	Timepoint	Arm	Events	N Analyzed	Metric	Results	Between Arm Comparison	P value between arms
Ackermann 2014 24740868	Weight loss goal (>=9%)	Participants who achieved 5% or more weight loss	5 mo	More intense	32%	127	NR	NR	NR	NR
				Less intense	35%	135	NR	NR		
	Weight loss goal (>=5%)	Participants who achieved a 9% weight loss or more	5 mo	More intense	13%	127	NR	NR	NR	NR
				Less intense	13%	135	NR	NR		
Gagnon 2011 21489843	DM, incident	By 2h OGTT	12 mo	More intense	1	22	NR	NR	NR	NR
				Less intense	3	26	NR	NR		
	Normoglycemia	By 2h OGTT	12 mo	More intense	4	22	NR	NR	NR	NR
				Less intense	3	26	NR	NR		
	Weight loss goal	≥5% weight loss	12 mo	More intense	11	22	NR	NR	NR	NR
				Less intense	3	26	NR	NR		

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		≥7% weight loss		More intense	8	22	NR	NR	NR	NR
				Less intense	2	26	NR	NR		
		≥10% weight loss		More intense	6	22	NR	NR	NR	NR
				Less intense	1	26	NR	NR		
Katula 2001 21593290	DM, incident	NR	6 mo	More intense	2	151	NR	NR	NR	0.29
				Less intense	5	150	NR	NR		
		NR	12 mo	More intense	2	151	NR	NR	NR	0.12
				Less intense	7	150	NR	NR		
	Adverse events	NR	6 mo	More intense	7	151	NR	NR	NR	0.21
				Less intense	13	150	NR	NR		
		NR	12 mo	More intense	11	151	NR	NR	NR	0.46
				Less intense	15	150	NR	NR		
	Serious adverse events	NR	6 mo	More intense	5	151	NR	NR	NR	0.98
				Less intense	5	150	NR	NR		
NR		12 mo	More intense	3	151	NR	NR	NR	0.51	
			Less intense	5	150	NR	NR			
Kosaka 2005 15649575	DM incidence	Incidence rate of DM	4 y	More intense	3.0	102	NR	NR	NR	0.043
				Less intense	9.3	356	NR	NR		

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	Normoglycemia	Improvement in glucose tolerance from IGT to non-IGT	4 y	More intense	53.8%	102	NR	NR	NR	<0.001
				Less intense	33.9%	356	NR	NR		
Liao 2002 12196418	DM, incident	NR	24 mo	More intense	1	29	NR	NR	NR	NR
				Less intense	2	29	NR	NR		
	Normoglycemia	NR	24 mo	More intense	67%	29	NR	NR	NR	NR
				Less intense	30%	29	NR	NR		
Ma 2013 23229846	DM, incident	NR	1.25 y	More intense	1	79	NR	NR	NR	NR
				Less intense	0	81	NR	NR		
	Weight loss goal	7% weight loss	1.25 y	More intense	337%	79	NR	NR	NR	NR
				Less intense	36%	81	NR	NR		
			2 y	More intense	45%	79	NR	NR	NR	NR
				Less intense	30%	81	NR	NR		
Nilsen 2011 22117618	Weight loss goal	≥5% reduction	18 mo	More intense	28	93	NR	NR	NR	NR
				Less intense	36	89	NR	NR		
Saito 2011 21824948	DM, incident	DM by WHO criteria or beginning treatment	36 mo	More intense	35	311	Incidence	4.2/100 person-y	Adj HR 0.56 (0.36, 0.87) ¹	NR

¹ Adjusted for age, sex, BMI, FPG, 2h plasma glucose level, and parental history of diabetes at baseline

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			Less intense	51	330	Incidence	5.8/100 person-y			
Weight loss goal	≥5% weight reduction	12 mo	More intense	99	311	NR	NR	NR	<0.001	
			Less intense	50	330	NR	NR			
		24 mo	More intense	102	311	NR	NR	NR	<0.001	
			Less intense	63	330	NR	NR			
		36 mo	More intense	99	311	NR	NR	NR	<0.001	
			Less intense	59	330	NR	NR			
Weinstock 2013 23843020	Weight loss goal	≥5% weight reduction	6 mo	More intense	37.3%	129	NR	NR	NR	NR
				Less intense	41.3%	128	NR	NR		
			12 mo	More intense	26.5%	129	NR	NR	NR	NR
				Less intense	34.8%	128	NR	NR		
			24mo	More intense	14.5%	129	NR	NR	NR	<0.05
				Less intense	15.2%	128	NR	NR		
		≥7% weight reduction	6 mo	More intense	39.2%	129	NR	NR	NR	NR
				Less intense	42.5%	128	NR	NR		
			12 mo	More intense	28.4%	129	NR	NR	NR	<0.05
				Less intense	36.2%	128	NR	NR		

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	24 mo	More intense	18.9%	129	NR	NR	NR	NR
		Less intense	25.0%	128	NR	NR		
≥10% weight reduction	6 mo	More intense	28.6%	129	NR	NR	NR	NR
		Less intense	52.2%	128	NR	NR		
	12 mo	More intense	22.2%	129	NR	NR	NR	NR
		Less intense	43.5%	128	NR	NR		
	24 mo	More intense	12.7%	129	NR	NR	NR	NR
		Less intense	26.1%	128	NR	NR		

Abbreviations

adj, adjusted

DM, diabetes

mo, month

OGTT, oral glucose tolerance test

NR, not reported

WHO, World Health Organization

y, year

Continuous Outcomes

Author, Year, PMID	Outcome Name	Outcome Description	Timepoint	Arm (N Analyzed)	Baseline	Final	Change	P value between-arms
Ackermann 2014 24740868	Weight loss, percent		5 mo	More intense	NR	NR	-2.9	0.19
				Less intense	NR	NR	-3.7	
				Combined arms	NR	NR	-3.3	
		12 mo	More intense	NR	NR	NR	0.23	
			Less intense	NR	NR	NR		
			Combined arms	NR	NR	-3.2		
Cole 2013 23589326	Weight loss, absolute (kg)		12 mo	More intense	84.7	NR	-1.5	NR
				Less intense	87.6	NR	-1.2	
	BMI		12 mo	More intense	30.3	NR	-0.5	NR
				Less intense	31.4	NR	-0.4	
	SBP		12 mo	More intense	143	NR	-10	NR
				Less intense	142	NR	-13	
	DBP		12 mo	More intense	83	NR	-4	NR
				Less intense	83	NR	-4	
	HbA1c		12 mo	More intense	5.9	NR	0.1	NR
				Less intense	5.8	NR	0.5	
	FBG		12 mo	More intense	108	NR	-5	NR

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				Less intense	110	NR	-8	
	Total Cholesterol		12 mo	More intense	191	NR	-14	NR
				Less intense	193	NR	-5	
	LDL-c		12 mo	More intense	114	NR	-15	NR
				Less intense	114	NR	-7	
	HDL-c		12 mo	More intense	52	NR	3	NR
				Less intense	53	NR	2	
	Triglycerides		12 mo	More intense	153	NR	-31	NR
				Less intense	160	NR	-18	
Dunbar 2010 No PMID	2h OTT	Change in 2h OTT in mmol/L	18 mo	More intense	5.89	NR	0.31	0.387 [Net diff: -0.2]
				Less intense	6.03	NR	0.11	
	SBP	Change in SBP in mmHg	18 mo	More intense	129.5	NR	1.94	0.433 [Net diff: 0.31]
				Less intense	130.6	NR	2.25	
	DBP	Change in DBP in Hg	18 mo	More intense	78	NR	0.26	0.865 [Net diff: -0.29]
				Less intense	79	NR	-0.03	
	FPG	Change in FPG in mmol/L	18 mo	More intense	5.29	NR	0.41	0.78 [Net diff: -0.03]
				Less intense	5.37	NR	0.38	
	HDL-c	Change in HDL in mmol/L	18 mo	More intense	1.46	NR	-0.03	0.255 [Net diff: 0.03]
				Less intense	1.38	NR	0.0	
	LDL-c	Change in LDL in mmol/L	18 mo	More intense	3.11	NR	-0.02	0.833 [Net diff: -0.09]

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				Less intense	3.23	NR	-0.12	
Total cholesterol	Change in total cholesterol in mmol/L	18 mo	More intense	5.35	NR	-0.15	0.779 [Net diff: -0.07]	
				Less intense	5.42	NR	-0.22	
Triglycerides	Change in triglycerides in mmol/L	18 mo	More intense	1.79	NR	-0.19	0.801 [Net diff: 0.01]	
				Less intense	1.85	NR	-0.18	
Weight, absolute	Change in weight in kg	18 mo	More intense	88.5	NR	1.13	0.949 [Net diff: -0.01]	
				Less intense	89.7	NR	1.12	
BMI	Change in BMI in kg/m ²	18 mo	More intense	32.6	NR	0.4	0.988 [Net diff: 0.02]	
				Less intense	32.1	NR	0.43	
Gagnon 2011 21489843	2h OTT	Change in 2h OTT in mmol/L	12 mo	More intense	9.3	NR	-0.5	0.54
				Less intense	9.6	NR	-0.2	
	SBP	Change in SBP in mmHg	12 mo	More intense	125	NR	-6	0.03
				Less intense	121	NR	+4	
	DBP	Change in DBP in mmHg	12 mo	More intense	72	NR	-3	0.30
				Less intense	70	NR	0	NR
	FPG	Change in FPG in mmol/L	12 mo	More intense	22	NR	-0.5	0.31
				Less intense	26	NR	-0.3	

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HbA1c%	Change in HbA1c in %	12 mo	More intense	5.7	NR	0.0	0.02
			Less intense	5.7	NR	0.1	
HDL-c	Change in HDL-c in mmol/L	12 mo	More intense	1.1	NR	0.0	0.14
			Less intense	1.3	NR	0.0	
LDL-c	Change in LDL-c in mmol/L	12 mo	More intense	2.7	NR	-0.1	0.17
			Less intense	3.1	NR	-0.4	
Total cholesterol	Change in total cholesterol in mmol/L	12 mo	More intense	4.5	NR	-0.3	0.56
			Less intense	5.0	NR	-0.4	
Triglycerides	Change in triglycerides in mmol/L	12 mo	More intense	1.8	NR	-0.4	0.96
			Less intense	1.7	NR	-0.2	
Weight, absolute	Change in weight in kg	3 mo	More intense	91.4	NR	-2.5	NR
			Less intense	100.4	NR	-0.3	
		6 mo	More intense	91.4	NR	-3.7	NR
			Less intense	100.4	NR	-0.8	
		9 mo	More intense	91.4	NR	-3.8	NR
			Less intense	100.4	NR	-0.5	
		12 mo	More intense	91.4	NR	-4.9	<0.01
			Less intense	100.4	NR	-0.6	

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	BMI	Change in BMI in kg/m ²	12 mo	More intense	31.1	NR	-1.9	<0.01	
				Less intense	36.0	NR	-0.2		
Katula 2001 21593290	FPG	Change in FPG in mg/dL	6 mo	More intense	105.5	101.6	NR	NR	
				Less intense	105.9	106.9	NR		
				12 mo	More intense	105.5	101.1	NR	<0.001 [Net diff: -3.76]
					Less intense	105.9	104.1		
	Weight, absolute	Change in weight in kg	6 mo	More intense	94.4	87.1	NR	NR	
				Less intense	92.6	91.5	NR		
			12 mo	More intense	94.4	97.4	NR	<0.001 [Net diff: -5.73]	
				Less intense	92.6	90.93	NR		
	Weight, %	% change In weight	6 mo	More intense	NR	NR	-7.5	NR	
				Less intense	NR	NR	-1.1		
				12 mo	More intense	NR	NR	-7.2	<0.001 [Net diff: -6.11]
					Less intense	NR	NR	-1.3	
	BMI	Change in BMI in kg/m ²	6 mo	More intense	32.8	30.3	NR	NR	
				Less intense	32.4	31.9	NR		
				12 mo	More intense	32.8	30.5	NR	<0.001 [Net diff: -1.90]
					Less intense	32.4	31.9	NR	

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Kosaka 2005 15649575	Weight, absolute	Change in weight in kg	4 y	More intense	NR	NR	-2.18	NR		
				Less intense	NR	NR	-0.39			
Liao 2002 12196418	2h OTT	Change in 2h OTT in mmol/L	6 mo	More intense	9.2	8.5	-13.4	0.1		
				Less intense	9.1	9.0	-2.8			
			24 mo	More intense	9.2	8.6	-10.9	0.1		
				Less intense	9.	9.1	0.4			
			FPG	Change in FPG in mmol/L	6 mo	More intense	5.3	5.4	0.04	0.2
						Less intense	5.4	5.6	0.09	
	24 mo	More intense			5.3	5.4	-0.04	0.87		
		Less intense			5.4	5.6	0.07			
	Weight, absolute	Change in weight in kg	6 mo	More intense	66.1	NR	-2.7	0.0007		
				Less intense	69.7	NR	-0.9			
			24 mo	More intense	66.1	NR	-1.8	0.0022		
				Less intense	69.7	NR	0.7			
Weight, %			% change in weight	6 mo	More intense	30.1	NR	-1.4	0.023	
					Less intense	31.2	NR	-0.3		
	24 mo	More intense		30.1	NR	-0.8	0.014			
		Less intense		31.2	NR	0.7				
BMI	Change in BMI in kg/m ²	6 mo	More intense	25.6	NR	-1.1	0.0006			
			Less intense	26.6	NR	-0.4				

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			24 mo	More intense	25.6	NR	-0.7	0.0023
Ma 2013 23229846	SBP	Change in SBP in mmHg	1.25 y	Less intense	26.6	NR	0.2	
				More intense	119.8	NR	-1.2	0.45
	DBP	Change in DBP in mmHg	1.25 y	Less intense	118.2	NR	-0.4	
				More intense	74.4	NR	-1.9	0.30
	FPG	Change in FPG in mg/dL	1.25 y	Less intense	73.9	NR	-1.1	
				More intense	100.5	NR	-4.2	0.20
	HDL-c	Change in in HDL-c in mg/dL	1.25 y	Less intense	100.1	NR	-2.7	
				More intense	45.4	NR	4.4	0.06
	LDL-c	Change in LDL-c in mg/dL	1.25 y	Less intense	46.2	NR	2.6	
				More intense	112.0	NR	4.5	0.85
	Total cholesterol	Change in total cholesterol in mg/dL	1.25 y	Less intense	104.6	NR	5.2	
				More intense	192.3	NR	3.9	0.98
	Triglycerides	Change in triglycerides in mg/dL	1.25 y	Less intense	174.8	NR	-31.2	0.75
				More intense	174.5	NR	-28.8	
Weight, absolute	Change in weight in kg	0.25 y	More intense	95.3	NR	-5.4	0.09	

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			Less intense	93.6	NR	-4.5	
		0.5 y	More intense	95.3	NR	-6.6	<0.001
			Less intense	93.6	NR	-4.3	
		1.25 y	More intense	95.3	NR	-6.3	0.04
			Less intense	93.6	NR	-4.5	
		2 y	More intense	95.3	NR	-5.4	NR
			Less intense	93.6	NR	-4.5	
Weight, %	% change in weight	0.25 y	More intense		NR	-5.8	0.09
			Less intense		NR	-4.9	
		0.5 y	More intense		NR	-7.2	0.001
			Less intense		NR	-4.7	
		1.25 y	More intense		NR	-6.6	0.07
			Less intense		NR	-5.0	
		2 y	More intense		NR	-5.8	NR
			Less intense		NR	-4.9	
BMI	Change in BMI in kg/m ²	0.25 y	More intense	32.4	29.9	-1.9	0.07
			Less intense	31.8	30.2	-1.6	
		0.5 y	More intense	32.4	29.4	-2.4	<0.001
			Less intense	31.8	30.2	-1.5	
		1.25 y	More intense	32.4	29.6	-2.2	0.03
			Less intense	31.8	30.2	-1.6	
		2 y	More intense	32.4	NR	-1.9	NR

Nilsen 2011 22117618	SBP	Change in SBP in mmHg	18 mo	Less intense	31.8	NR	-1.6	
				More intense	144	143	NR	NR
	DBP	Change in DBP in mmHg	18 mo	Less intense	144	147	NR	
				More intense	88	91	NR	NR
	FPG	Change in FPG in mmol/L	18 mo	Less intense	90	91	NR	
				More intense	5.6	5.8	NR	NR
	HbA1c	Change in HbA1c in %	18 mo	Less intense	5.5	5.6	NR	
				More intense	5.6	5.6	NR	NR
	HDL-c	Change in HDL-c in mmol/L	18 mo	Less intense	1.18	1.23	NR	
				More intense	1.28	1.25	NR	NR
	Total cholesterol	Change in total cholesterol in mmol/L	18 mo	Less intense	5.5	5.3	NR	
				More intense	5.4	5.2	NR	NR
	Triglycerides	Change in triglycerides in mmol/L	18 mo	Less intense	1.9	1.6	NR	
				More intense	1.8	1.5	NR	NR
	Weight, absolute	Change in weight in kg	18 mo	Less intense	111.7	108.7	NR	
				More intense	110.5	108.0	NR	NR

	BMI	Change in BMI in kg/m ²	18 mo	More intense	37.0	36.2	NR	NR
				Less intense	35.8	34.8	NR	
Saito 2011 21824948	2h OTT	Change in 2h OTT in mg/dL	12 mo	More intense	30	NR	-6	0.001
				Less intense	31	NR	2	
	SBP	Change in SBP in mmHg	12 mo	More intense	16	NR	-4	0.31
				Less intense	16	NR	-3	
	DBP	Change in DBP in mmHg	12 mo	More intense	81	NR	-2	0.15
				Less intense	81	NR	-1	
	FPG	Change in FPG in mg/dL	12 mo	More intense	8	NR	-3	0.02
				Less intense	8	NR	-1	
	HbA1c	Change in HbA1c in %	12 mo	More intense	5.4	NR	0.0	0.18
				Less intense	5.4	NR	0.0	
	HDL-c	Change in HDL in mg/dL	12 mo	More intense	52	NR	3	0.22
				Less intense	53	NR	2	
	Total cholesterol	Change in total cholesterol in mg/dL	12 mo	More intense	213	NR	-3	0.03
				Less intense	214	NR	1	
	Triglycerides	Change in triglycerides in mg/dL	12 mo	More intense	127	NR	-8	0.30

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				Less intense	124	NR	-3	
	Weight, absolute	Change in weight in kg	12 mo	More intense	74.1	NR	-2.5	<0.001
				Less intense	74.8	NR	-1.1	
	BMI	Change in BMI in kg ²	12 mo	More intense	2.6	NR	-0.9	<0.001
				Less intense	2.6	NR	-0.4	
Weinstock 2013 23843020	Weight, absolute	Mean weight loss in kg	6 mo	More intense	105.8	NR	-4.3	NR
				Less intense	109.4	NR	-4.5	
			12 mo	More intense	105.8	NR	-4.6	NR
				Less intense	109.4	NR	-4.9	
			24 mo	More intense	105.8	NR	-2.2	NR
				Less intense	109.4	NR	-6.2	
	BMI	Change in BMI in kg ²	12 mo	More intense	38.9	NR	-1.7	NR
				Less intense	39.7	NR	-1.7	
			24 mo	More intense	38.9	NR	-1.8	NR
				Less intense	39.7	NR	-2.1	

Abbreviations

BMI, body mass index

DBP, diastolic blood pressure

FPG, fasting plasma glucose

HDL-c, high density lipoprotein cholesterol

LDL-c, low-density lipoprotein cholesterol

mo, month
NR, not reported
OGTT, oral glucose tolerance test
SBP, systolic blood pressure
y, year