

Supplementary Material

Supplementary Material 1. Full Search Strategy for All Databases

PubMed

("Obesity"[Mesh] OR "Overweight"[Mesh] OR "obes*"[tw] OR "overweight*"[tw] OR "excess* weight"[tw] OR "weight status"[tw] OR "increased body weight"[tw] OR "increased BMI"[tw] OR "high body mass index"[tw] OR "high BMI"[tw] OR "increased body mass index"[tw])

AND

("Fasting"[Mesh] OR "Intermittent Fasting"[Mesh] OR "Feeding Behavior"[Mesh] OR "Caloric Restriction"[Mesh] OR "Fasting"[tw] OR "Intermittent Fasting"[tw] OR "Feeding Behavior"[tw] OR "Caloric Restriction"[tw] OR "time-restricted Feeding"[tw] OR "intermittent energy restriction"[tw] OR "time-restricted eating"[tw] OR "time restricted eating"[tw] OR "time restricted feeding"[tw] OR "alternate day fasting"[tw] OR "alternate-day fasting"[tw] OR "modified alternate-day fasting"[tw] OR "periodic fasting"[tw] OR "fasting-mimicking diet"[tw] OR "calorie restriction"[tw] OR "caloric restriction"[tw] OR "restricted eating"[tw] OR "feeding window"[tw] OR "5:2 diet"[tw] OR "meal skipping"[tw] OR Ramadan[tw])

AND

("Brain-Derived Neurotrophic Factor"[Mesh] OR "BDNF"[tw] OR "brain-derived neurotrophic factor"[tw] OR "brain derived neurotrophic factor"[tw] OR "neurotrophic* factor"[tw] OR "neurotrophin*"[tw] OR "Cognition"[Mesh] OR "Cognition"[tw] OR "Cognition Disorders"[Mesh] OR "Cognitive function"[Mesh] OR "Neuropsychological Tests"[Mesh] OR "Memory"[Mesh] OR "Executive Function*"[Mesh] OR "Cognitive Reserve"[Mesh] OR "Cognitive Reserve"[tw] OR cognition[tw] OR "cognitive function*"[tw] OR "cognitive performance*"[tw] OR "executive function*"[tw] OR memory[tw] OR "neuropsychological test*"[tw] OR "cognitive impairment"[tw] OR "brain function*"[tw] OR "brain health"[tw] OR "cognitive decline"[tw] OR "mental performance*"[tw] OR "cognitive assessment*"[tw] OR "cognition"[tw] OR "cognitive function*"[tw] OR "attention"[tw] OR "neurocognitive"[tw] OR "neuroplasticity"[tw])

Scopus

("Obesity"[Mesh] OR "Overweight"[Mesh] OR "obes*"[tw] OR "overweight*"[tw] OR "excess* weight"[tw] OR "weight status"[tw] OR "increased body weight"[tw] OR "increased BMI"[tw] OR "high body mass index"[tw] OR "high BMI"[tw] OR "increased body mass index"[tw])

AND

("Fasting"[Mesh] OR "Intermittent Fasting"[Mesh] OR "Feeding Behavior"[Mesh] OR "Caloric Restriction"[Mesh] OR "Fasting"[tw] OR "Intermittent Fasting"[tw] OR "Feeding Behavior"[tw] OR "Caloric Restriction"[tw] OR "time-restricted Feeding"[tw] OR "intermittent energy restriction"[tw] OR "time-restricted eating"[tw] OR "time restricted eating"[tw] OR "time restricted feeding"[tw] OR "alternate day fasting"[tw] OR "alternate-day fasting"[tw] OR "modified alternate-day fasting"[tw] OR "periodic fasting"[tw] OR "fasting-mimicking diet"[tw])

OR "calorie restriction"[tw] OR "caloric restriction"[tw] OR "restricted eating"[tw] OR "feeding window"[tw] OR "5:2 diet"[tw] OR "meal skipping"[tw] OR Ramadan[tw])

AND

("Brain-Derived Neurotrophic Factor"[Mesh] OR "BDNF"[tw] OR "brain-derived neurotrophic factor"[tw] OR "brain derived neurotrophic factor"[tw] OR "neurotrophic* factor"[tw] OR "neurotrophin*"[tw] OR "Cognition"[Mesh] OR "Cognition"[tw] OR "Cognition Disorders"[Mesh] OR "Cognitive function"[Mesh] OR "Neuropsychological Tests"[Mesh] OR "Memory"[Mesh] OR "Executive Function*"[Mesh] OR "Cognitive Reserve"[Mesh] OR "Cognitive Reserve"[tw] OR cognition[tw] OR "cognitive function*"[tw] OR "cognitive performance*"[tw] OR "executive function*"[tw] OR memory[tw] OR "neuropsychological test*"[tw] OR "cognitive impairment"[tw] OR "brain function*"[tw] OR "brain health"[tw] OR "cognitive decline"[tw] OR "mental performance*"[tw] OR "cognitive assessment*"[tw] OR "cognition"[tw] OR "cognitive function*"[tw] OR "attention"[tw] OR "neurocognitive"[tw] OR "neuroplasticity"[tw])

(TITLE-ABS-KEY(obes* OR overweight* OR "excess* weight" OR "weight status" OR "increased body weight" OR "increased BMI" OR "high body mass index" OR "high BMI" OR "increased body mass index"))

AND

(TITLE-ABS-KEY(fasting OR "intermittent fasting" OR "feeding behavior" OR "caloric restriction" OR "time-restricted feeding" OR "intermittent energy restriction" OR "time-restricted eating" OR "alternate day fasting" OR "alternate-day fasting" OR "modified alternate-day fasting" OR "periodic fasting" OR "fasting-mimicking diet" OR "restricted eating" OR "feeding window" OR "5:2 diet" OR "meal skipping" OR Ramadan))

AND

(TITLE-ABS-KEY(bdnf OR "brain-derived neurotrophic factor" OR "neurotrophic* factor" OR neurotrophin* OR cognition OR "cognitive function*" OR "cognitive performance*" OR "executive function*" OR memory OR "neuropsychological test*" OR "cognitive impairment" OR "brain function*" OR "brain health" OR "cognitive decline" OR "mental performance*" OR "cognitive assessment*" OR attention OR neurocognitive OR neuroplasticity OR "cognitive reserve"))

Embase

('obesity'/exp OR 'overweight'/exp OR obes*:ti,ab OR overweight*:ti,ab OR "excess* weight":ti,ab OR "weight status":ti,ab OR "increased body weight":ti,ab OR "increased BMI":ti,ab OR "high body mass index":ti,ab OR "high BMI":ti,ab OR "increased body mass index":ti,ab)

AND

('fasting'/exp OR 'intermittent fasting'/exp OR 'feeding behavior'/exp OR 'caloric restriction'/exp OR fasting:ti,ab OR "intermittent fasting":ti,ab OR "feeding behavior":ti,ab OR "caloric restriction":ti,ab OR "time-restricted feeding":ti,ab OR "intermittent energy restriction":ti,ab OR

"time-restricted eating":ti,ab OR "alternate day fasting":ti,ab OR "modified alternate-day fasting":ti,ab OR "periodic fasting":ti,ab OR "fasting-mimicking diet":ti,ab OR "restricted eating":ti,ab OR "feeding window":ti,ab OR "5:2 diet":ti,ab OR "meal skipping":ti,ab OR ramadan:ti,ab)

AND

('brain derived neurotrophic factor'/exp OR 'cognition'/exp OR 'cognition disorder'/exp OR 'neuropsychological test'/exp OR 'memory'/exp OR 'executive function'/exp OR 'cognitive reserve'/exp OR bdnf:ti,ab OR "brain-derived neurotrophic factor":ti,ab OR "neurotrophic* factor":ti,ab OR "neurotrophin*":ti,ab OR cognition:ti,ab OR "cognitive function*":ti,ab OR "cognitive performance*":ti,ab OR "executive function*":ti,ab OR memory:ti,ab OR "neuropsychological test*":ti,ab OR "cognitive impairment":ti,ab OR "brain function*":ti,ab OR "brain health":ti,ab OR "cognitive decline":ti,ab OR "mental performance*":ti,ab OR "cognitive assessment*":ti,ab OR attention:ti,ab OR neurocognitive:ti,ab OR neuroplasticity:ti,ab OR "cognitive reserve":ti,ab)

Cochrane Library

([mh "Obesity"] OR [mh "Overweight"] OR obese:ti,ab,kw OR obesity:ti,ab,kw OR overweight:ti,ab,kw OR "excess weight":ti,ab,kw OR "weight status":ti,ab,kw OR "increased body weight":ti,ab,kw OR "increased BMI":ti,ab,kw OR "high body mass index":ti,ab,kw OR "high BMI":ti,ab OR "increased body mass index":ti,ab)

AND

([mh "Fasting"] OR [mh "Intermittent Fasting"] OR [mh "Feeding Behavior"] OR [mh "Caloric Restriction"] OR fasting:ti,ab,kw OR "intermittent fasting":ti,ab,kw OR "feeding behavior":ti,ab,kw OR "caloric restriction":ti,ab,kw OR "time-restricted feeding":ti,ab,kw OR "intermittent energy restriction":ti,ab,kw OR "time-restricted eating":ti,ab,kw OR "alternate day fasting":ti,ab,kw OR "alternate-day fasting":ti,ab,kw OR "modified alternate-day fasting":ti,ab,kw OR "periodic fasting":ti,ab,kw OR "fasting-mimicking diet":ti,ab,kw OR "restricted eating":ti,ab,kw OR "feeding window":ti,ab,kw OR "5:2 diet":ti,ab,kw OR "meal skipping":ti,ab,kw OR Ramadan:ti,ab,kw)

AND

([mh "Brain-Derived Neurotrophic Factor"] OR [mh "Cognition"] OR [mh "Cognition Disorders"] OR [mh "Neuropsychological Tests"] OR [mh "Memory"] OR [mh "Executive Function"] OR [mh "Cognitive Reserve"] OR bdnf:ti,ab,kw OR "brain-derived neurotrophic factor":ti,ab,kw OR "neurotrophic factor":ti,ab,kw OR neurotrophin:ti,ab,kw OR cognition:ti,ab,kw OR "cognitive function":ti,ab,kw OR "cognitive performance":ti,ab,kw OR "executive function":ti,ab,kw OR memory:ti,ab,kw OR "neuropsychological test":ti,ab,kw OR "cognitive impairment":ti,ab,kw OR "brain function":ti,ab,kw OR "brain health":ti,ab,kw OR "cognitive decline":ti,ab,kw OR "mental performance":ti,ab,kw OR "cognitive assessment":ti,ab,kw OR attention:ti,ab,kw OR neurocognitive:ti,ab,kw OR neuroplasticity:ti,ab,kw OR "cognitive reserve":ti,ab,kw)

Web of Science

TS=(obese OR obesity OR overweight* OR "excess weight" OR "weight status" OR "increased body weight" OR "increased BMI" OR "high body mass index" OR "high BMI" OR "increased body mass index")

AND

TS=(fasting OR "intermittent fasting" OR "feeding behavior" OR "caloric restriction" OR "time-restricted feeding" OR "intermittent energy restriction" OR "time-restricted eating" OR "alternate day fasting" OR "alternate-day fasting" OR "modified alternate-day fasting" OR "periodic fasting" OR "fasting-mimicking diet" OR "restricted eating" OR "feeding window" OR "5:2 diet" OR "meal skipping" OR Ramadan)

AND

TS=(bdnf OR "brain-derived neurotrophic factor" OR "neurotrophic factor" OR neurotrophin* OR cognition OR "cognitive function" OR "cognitive performance" OR "executive function" OR memory OR "neuropsychological test" OR "cognitive impairment" OR "brain function" OR "brain health" OR "cognitive decline" OR "mental performance*" OR "cognitive assessment*" OR attention OR neurocognitive OR neuroplasticity OR "cognitive reserve")

Supplementary Table 2. Numerical Outcomes for Primary and Secondary Endpoints in Included Studies

First Author, Year	Outcome	Intervention Group		Control Group		p-value
		Baseline (mean)	End of the study (mean)	Baseline (mean)	End of the study (mean)	
Harvie, 2011	BDNF in serum (pg/mL)	9539	9214	9898	9528	0.870
	Body weight (kg)	81.5	75.8	84.4	79.9	0.260
	BMI (kg/m ²)	30.7	NI	30.5	NI	0.770
	HOMA-IR	1.5	1.1	1.6	1.3	0.040
Catenacci, 2016	BDNF in plasma (pg/mL)	20934.6	25738.0	25738.0	18317.8	0.002
	BMI (kg/m ²)	35.8	33.6	39.5	37.8	0.207
	Body weight (kg)	94.8	89.1	114.0	109.0	0.559
	Insulin (μU/mL)	13.3	13.7	19.3	17.2	0.642
	Glucose (mg/dl)	88.4	91.0	91.6	93.3	0.680
	LDL (mg/dL)	100.0	77.4	104.5	87.6	0.412
Schübel, 2018	BDNF in serum (pg/mL)	2100	1900	Control 1: 2200 Control 2: 2100	Control 1: 2100 Control 2: 2000	0.220
	Body weight (kg)	96.4	NI	Control 1: 92.5 Control 2: 93.3	NI	-

	BMI (kg/m ²)	32.0	NI	Control 1: 31.2 Control 2: 31.1	NI	-
	Insulin (μU/mL)	11.6	10.8	Control 1: 12.6 Control 2: 12.7	Control 1: 9.7 Control 2: 11.7	0.190
	Glucose (mg/dl)	92.7	89.9	Control 1: 93.9 Control 2: 93.5	Control 1: 87.2 Control 2: 89.0	0.040
	HOMA-IR	2.7	2.4	Control 1: 3.0 Control 2: 3.0	Control 1: 2.1 Control 2: 2.6	0.110
Bartholomew, 2021	BDNF in plasma (pg/mL)	2630	3330	2660	3300	0.580
	Body weight (kg)	103.0	101.3	99.7	99.9	0.060
	Glucose (mg/dl)	91.7	84.5	90.2	88.1	0.040
	HOMA-IR	2.3	1.6	2.8	2.7	0.004
	LDL (mg/dL)	123.9	124.1	127.5	130.0	0.590
Irani, 2024	BDNF in serum (pg/mL)	669.4	2109.0	642.2	779.6	0.001
	BMI (kg/m ²)	30.78	29.08	31.80	30.38	0.009
	Body weight	80.43	76.01	83.46	79.73	0.010

Keawtep, 2024	BDNF in plasma (pg/mL)	IF1: 3200	IF1: 4390	Control 1: 4010	Control 1: 4670	0.004
		IF2: 3790	IF2: 4720	Control 2: 3360	Control 2: 2890	
	TMT B-A (cognitive test)	IF1: 60.3	IF1: 56.92	Control 1: 53.5	Control 1: 48.73	0.002
		IF2: 58.4	IF2: 40.40	Control 2: 58.65	Control 2: 73.17	
	SCWT (cognitive test)	IF1: -0.9	IF1: 1.28	Control 1: 2.7	Control 1: 0.61	-0.053
		IF2: -2.7	IF2: -0.61	Control 2: 4.9	Control 2: 4.85	
	MoCA (cognitive test)	IF1: 24.7	IF1: 26.10	Control 1: 25	Control 1: 25.9	0.687
		IF2: 24.5	IF2: 25.85	Control 2: 23.9	Control 2: 25.01	
	Logical Memory test (cognitive test)	IF1: 22.3	IF1: 27.09	Control 1: 21.9	Control 1: 27.50	0.007
		IF2: 21.5	IF2: 27.41	Control 2: 21.1	Control 2: 22.49	
	Digit Span Test (cognitive test)	IF1: 14.4	IF1: 14.52	Control 1: 15.7	Control 1: 15.88	0.216
		IF2: 13.5	IF2: 14.99	Control 2: 13.7	Control 2: 13.80	
	Verbal Fluency Test (cognitive test)	IF1: 21	IF1: 23.87	Control 1: 22.7	Control 1: 24.92	0.539
		IF2: 21.6	IF2: 24.45	Control 2: 21	Control 2: 22.55	
	Body weight (kg)	IF1: 69.4	IF1: 67.04	Control 1: 74.8	Control 1: 73.12	0.001
		IF2: 71.3	IF2: 68.72			

				Control 2: 71.3	Control 2: 72.49	
	BMI (kg/m ²)	IF1: 28.3 IF2: 29.7	IF1: 27.31 IF2: 28.67	Control 1: 29.06 Control 2: 29.2	Control 1: 28.40 Control 2: 29.68	0.001
	Insulin (μU/mL)	IF1: 12.83 IF2: 13.08	IF1: 9.33 IF2: 6.57	Control 1: 14.25 Control 2: 12.95	Control 1: 7.33 Control 2: 10.75	0.001
	Glucose (mg/dl)	IF1: 99.87 IF2: 101.35	IF1: 97.63 IF2: 101.29	Control 1: 115.87 Control 2: 110.6	Control 1: 115.11 Control 2: 110.55	0.688
	HOMA-IR	IF1: 3.15 IF2: 3.27	IF1: 2.23 IF2: 1.66	Control 1: 3.94 Control 2: 3.47	Control 1: 2.06 Control 2: 3.08	0.003
	TG (mg/dl)	IF1: 144.48 IF2: 147.52	IF1: 130.1 IF2: 129.2	Control 1: 155.09 Control 2: 135.70	Control 1: 132.6 Control 2: 147.91	0.095
	Total Cholesterol (mg/dl)	IF1: 225.39 IF2: 210.26	IF1: 213.9 IF2: 199.4	Control 1: 217.65 Control 2: 213.52	Control 1: 212.4 Control 2: 221.57	0.006

BDNF = brain-derived neurotrophic factor; BMI = body mass index; HOMA = homeostatic model assessment (usually refers to HOMA-IR for insulin resistance); LDL = low-density lipoprotein; NI = not indicated; TMT B-A = Trail Making Test, Part B minus Part A; SCWT = Stroop Color Word Test; MoCA = Montreal Cognitive Assessment; TG = triglycerides.