

Supplemental Table S1. Descriptive dietary information by Metabolic Syndrome

		Metabolic syndrome (MetS) ¹		<i>p</i> value ²
		No (n = 2,160)	Yes (n = 1,484)	
Dietary intake at breakfast				
Macronutrients (g/breakfast)				
	Total carbohydrates	50.39 (36.86- 66.88)	46.36 (33.81- 61.68)	<0.001
	Simple carbohydrates	24.83 (16.37- 34.93)	21.01 (13.87- 30.36)	<0.001
	Fibre	3.38 (1.96- 5.55)	2.86 (1.66- 5.07)	<0.001
	Total proteins	12.62 (9.19- 16.20)	12.25 (9.12- 16.01)	0.196
	Animal protein	6.60 (3.30- 9.28)	6.60 (4.00- 9.57)	0.204
	Plant-based protein	6.02 (3.75- 8.10)	5.75 (3.30- 7.59)	0.001
	Fats	10.94 (6.06- 17.46)	10.62 (6.07- 16.59)	0.455
	Saturated fats	3.20 (1.64- 5.43)	3.26 (1.76- 5.55)	0.541
	Monounsaturated fats	4.25 (1.88- 7.27)	4.24 (1.81- 7.41)	0.964
	Polyunsaturated fats	1.25 (0.69- 2.41)	1.21 (0.64- 2.22)	0.048
Dietary intake at full day				
Macronutrient composition (%)				
	Proteins	18.31 (16.90- 19.95)	18.46 (17.01- 20.16)	0.057
	Carbohydrates	41.60 (37.91- 45.53)	41.41 (37.75- 45.08)	0.102
	Fats	36.91 (33.25- 40.53)	36.80 (33.52- 40.26)	0.850
Macronutrients (g/day)				
	Total carbohydrates	248.84 (218.59-282.88)	257.25 (225.79-291.05)	<0.001
	Simple carbohydrates	94.51 (77.51-112.45)	90.30 (74.30-109.13)	<0.001
	Fibre	36.29 (30.31- 43.83)	37.15 (30.54- 43.88)	0.244
	Total proteins	110.12 (96.63-124.71)	115.19 (102.24-131.02)	<0.001
	Animal proteins	66.26 (54.81- 79.41)	70.23 (59.16- 83.41)	<0.001
	Plant-based proteins	43.01 (36.88- 49.92)	44.76 (38.18- 52.01)	<0.001
	Fats	97.61 (83.00-114.85)	101.47 (86.73-119.05)	<0.001
	Saturated fats	25.61 (20.86- 31.88)	27.14 (22.04- 33.56)	<0.001
	Monounsaturated fats	44.25 (36.67- 52.77)	46.00 (38.59- 54.11)	<0.001
	Polyunsaturated fats	17.17 (13.54- 22.42)	17.65 (13.86- 22.51)	0.158

Data are expressed in median (p25-p75).

¹Metabolic Syndrome (MetS) was defined according to the National Cholesterol Education Program's Adult Treatment Panel III (ATP III) definition. It was considered present (Yes) when an individual fulfilled three or more of the following diagnostic criteria: waist circumference ≥ 102 cm in men and ≥ 88 cm in women; triglycerides ≥ 150 mg/dl (1.695 mmol/l); HDL-cholesterol < 40 mg/dl (0.9 mmol/l) in men and < 50 mg/dl (1.1 mmol/l) in women; blood pressure $\geq 130/85$ mmHg; and fasting glucose ≥ 100 mg/dl (≥ 6.1 mmol/l).

²p value: Wilcoxon rank test

³Breakfast size was calculated as: (energy from breakfast/total energy intake)*2,000kcal

Supplemental Table S2. Descriptive dietary information by quartiles of breakfast size (x2000kcal)

		Breakfast size (*2,000 kcal) ¹				p value ²
		Q1 (<222) (n=911)	Q2 (222-296.3) (n=911)	Q3 (296.4-384) (n=911)	Q4 (>384) (n=911)	
Dietary intake at breakfast						
Macronutrient intake (g/breakfast)						
	Total carbohydrates	27.64 (17.52- 36.63)	44.82 (37.75- 53.48)	56.13 (46.90- 66.63)	72.11 (57.76- 87.90)	<0.001
	Simple carbohydrates	15.69 (9.83- 22.26)	21.39 (14.94- 28.44)	26.68 (18.52- 35.52)	32.88 (22.83- 45.71)	<0.001
	Fibre	1.37 (0.20- 2.85)	2.73 (1.82- 4.53)	3.71 (2.45- 5.55)	5.30 (3.47- 7.82)	<0.001
	Total proteins	7.39 (4.89- 10.10)	11.71 (9.65- 13.77)	13.83 (11.63- 16.51)	17.07 (13.68- 21.21)	<0.001
	Animal proteins	4.96 (1.64- 6.60)	6.60 (4.14- 8.28)	6.64 (5.03- 9.67)	7.21 (4.81- 10.56)	<0.001
	Plant-based proteins	2.24 (0.92- 4.21)	5.24 (3.92- 6.60)	6.53 (5.15- 8.10)	8.92 (6.69- 12.46)	<0.001
	Fats	4.47 (1.69- 7.50)	10.04 (6.66- 13.31)	13.02 (9.08- 17.86)	20.49 (14.10- 28.03)	<0.001
	Saturated fats	1.60 (0.34- 3.03)	2.97 (1.72- 4.62)	3.75 (2.19- 5.74)	5.46 (3.22- 8.20)	<0.001
	Monounsaturated fats	1.40 (0.35- 2.70)	3.87 (2.17- 5.90)	5.31 (3.27- 7.75)	8.24 (5.26- 12.53)	<0.001
	Polyunsaturated fats	0.47 (0.14- 0.83)	1.11 (0.73- 1.54)	1.49 (1.01- 2.62)	2.64 (1.50- 5.45)	<0.001
Dietary intake at full day						
Macronutrient composition (%)						
	Proteins	18.82 (17.28- 20.48)	18.54 (17.12- 20.26)	18.28 (17.03- 19.85)	17.92 (16.38- 19.53)	<0.001
	Carbohydrates	39.73 (35.70- 43.59)	41.44 (38.30- 44.93)	41.94 (38.41- 45.72)	42.68 (39.00- 46.72)	<0.001
	Fats	37.01 (33.45- 41.09)	36.72 (33.76- 39.73)	36.78 (33.20- 40.44)	36.91 (33.17- 40.70)	0.220
Macronutrient intake (g/day)						
	Total carbohydrates	250.35(218.71-283.94)	254.56(225.51-287.14)	254.01(223.92-287.09)	248.61(215.52-287.17)	0,034
	Simple carbohydrates	86.37 (70.48-104.79)	91.73 (75.21-109.47)	94.11 (78.65-112.47)	98.92 (80.60-118.24)	<0.001
	Fibre	37.35 (30.49- 45.44)	38.29 (31.85- 44.78)	36.27 (30.47- 43.21)	35.21 (29.12- 42.29)	<0.001
	Total proteins	118.56(104.07-133.83)	115.56(101.11-130.78)	111.11 (98.59-124.08)	104.90 (92.41-118.98)	<0.001
	Animal proteins	73.49 (61.32- 87.66)	69.44 (58.27- 83.36)	66.90 (56.71- 78.34)	62.27 (50.27- 74.21)	<0.001
	Plant-based proteins	44.65 (38.29- 52.04)	45.04 (38.75- 51.46)	43.16 (36.95- 50.04)	41.83 (35.92- 49.10)	<0.001

Fats	103.86 (86.90-122.19)	100.06 (86.00-115.07)	98.20 (84.29-115.17)	96.67 (81.01-113.69)	<0.001
Saturated fats	27.71 (22.51- 35.12)	26.57 (21.82- 32.64)	26.26 (21.06- 32.02)	24.95 (20.08- 30.94)	<0.001
Monounsaturated fats	46.52 (38.66- 55.33)	45.19 (38.49- 53.40)	44.80 (37.82- 52.75)	43.08 (35.04- 52.46)	<0.001
Polyunsaturated fats	17.97 (14.01- 23.49)	17.29 (14.08- 21.98)	16.77 (13.44- 22.01)	17.45 (13.15- 22.37)	0.002

Data are expressed in median (p25-p75).

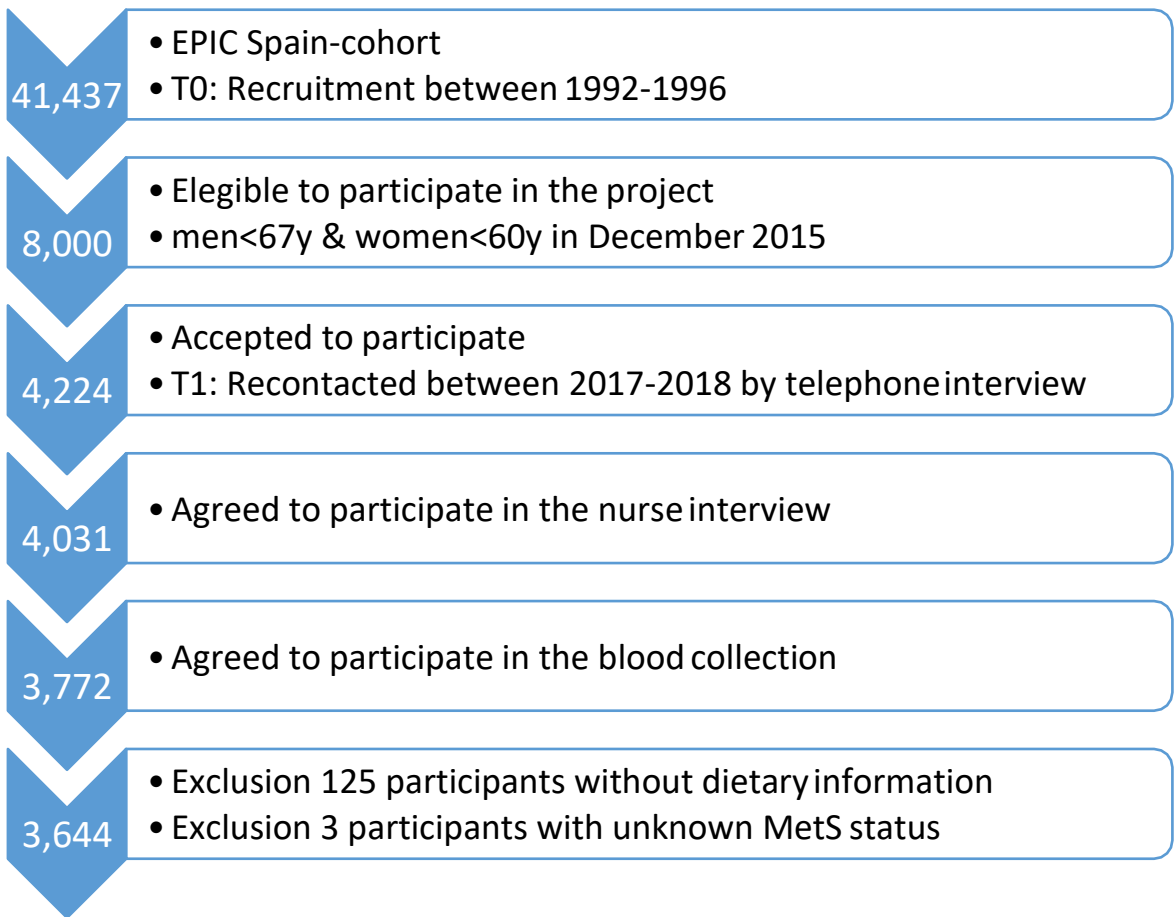
¹Breakfast size was calculated as: (energy from breakfast/total energy intake)*2000kcal

²p value: Wilcoxon rank test

Supplemental Table S3. Odds ratio (95%CI) for chrono-nutrition variables included in the logistic regression model for Metabolic Syndrome.

Breakfast time (h)		
	≤9:00	1.00 (referent)
	>9:00	1.34 (1.14-1.57)
Number of eating occasions		
	≤3	0.80 (0.55-1.17)
	4-5	1.00 (referent)
	>5	1.23 (1.06-1.42)

Model: adjusted for centre, sex, age, educational level, recreational physical activity, number of eating occasions (≤3, 4-5, >5), breakfast time (≤9:00, >9:00 h), and breakfast size



Supplemental Figure S1. Flowchart Data collection