Supplementary Figure.

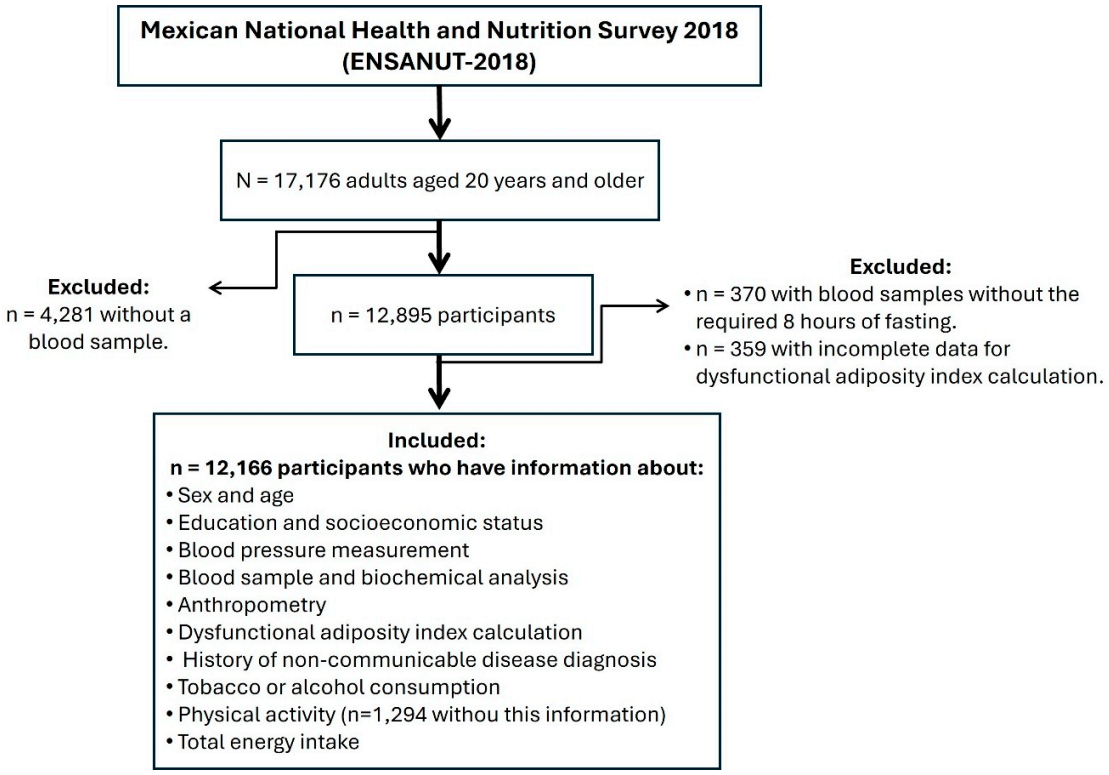

Figure S1. Sample selection. The ENSANUT-2018 Mexican survey employed a cross-sectional, probabilistic design to ensure representativeness across the country's 32 states.

Table S1. Sociodemographic and clinical characteristics of participants in the Mexican National Health and Nutrition Survey 2018 (ENSANUT 2018) stratified by blood sample collection.

	ENSANUT 2018			
	Total (n = 17,176)	Without blood samples (n=4,281)	Blood sample collected (n=12895)	p-value
Sex, n (%)				
Men	7,251 (43.0)	2,041 (46.6)	5,480 (41.9)	
Women	9,655 (57.0)	2,240 (53.4)	7,415 (58.1)	<0.001
Age group, n (%)				
20-39 years	6,790 (39.4)	1,791 (43.9)	4,999 (38.1)	
40-59 years	6,279 (37.5)	1,422 (33.2)	4,857 (38.7)	
≥ 60 years	4,107 (23.1)	1,068 (22.8)	3,039 (23.2)	<0.001
Place of residence, n (%)				
Rural	5,813 (21.1)	1,326 (18.7)	8,408 (21.9)	
Urban	11,363 (78.9)	2,955 (81.3)	4,487 (78.1)	<0.001
Region, n (%)				
North	3,897 (20.7)	1,258 (27.5)	2,639 (18.7)	
Center	6,340 (31.7)	1,700 (31.3)	4,640 (31.8)	
Mexico City and State	565 (17.1)	96 (11.6)	469 (18.7)	
South	6,374 (30.5)	1,227 (29.6)	5,147 (30.7)	<0.001
Socioeconomic level, n (%) *				
Low	5,743 (33.6)	1,409 (32.4)	4,334 (34.0)	
Half	5,697(33.3)	1,450 (34.1)	4,247 (33.1)	
High	5,736 (33.1)	1,422 (33.6)	4,314 (32.9)	0.504
Education level, n (%)				
Without schooling	1,340 (6.6)	306 (6.4)	1,034 (6.7)	
Elementary or junior high school	10,271 (54.3)	2,431 (51.8)	7,840 (55.0)	<0.001
High school	3,365 (23.5)	900 (24.5)	2,465 (23.3)	
University or higher	2,200 (15.6)	644 (17.3)	1,556 (15.0)	

Smoking, n (%) *				
Never smoked	10,444 (61.6)	2,476 (59.8)	7,968 (62.2)	
Ex-smoker	3,601 (20.7)	876 (20.4)	2,725 (20.8)	0.001
Currently smokes	2,788 (17.6)	757 (19.8)	2,031 (17.0)	
Alcohol consumption, n (%) *				
Does not consume alcohol	9, 943 (59.6)	2,373 (58.2)	7,570 (59.9)	
Non-excessive alcohol consumption	2,994 (17.5)	733 (17.9)	2,261 (17.3)	0.494
Excessive alcohol consumption	3,944 (23.0)	1,016 (23.9)	2,928 (22.7)	
Physical activity, n (%) *				
Inactive	2,624 (17.1)	691 (18.5)	1,933 (16.7)	
Moderately active	1,666 (11.4)	425 (11.8)	1,241 (11.3)	
Active	10,821 (71.5)	2,538 (69.7)	8,283 (72.0)	0.003
Previous diagnoses, n (%) *				
Type 2 diabetes	2,063 (12.6)	456 (10.8)	1,607 (13.1)	0.014
High blood pressure	3,694 (21.5)	870 (19.9)	2,824 (21.9)	0.101
Dyslipidaemia	3,821 (23.4)	868 (21.9)	2953 (23.9)	0.006
Cardiovascular disease	635 (3.6)	136 (3.4)	499 (3.7)	0.122

* For definitions, see the Methods section.

Table S2. Association* of the dysfunctional adiposity index with the presence of metabolic disorders in the Mexican adult population of the ENSANUT 2018 study, after adjustment for continuous BMI and waist circumference.

Continue variables	**Type 2 diabetes**	**Hypertension**	**Hypercholesterolemia**	**Cardiovascular disease**
Dysfunctional adiposity index	1.17 (1.13 – 1.21)	1.03 (1.00 – 1.07)	1.15 (1.10 – 1.20)	1.06 (0.99 – 1.13)
Body mass index (kg/m^2)	1.00 (0.97 – 1.03)	1.08 (1.05 – 1.11)	1.05 (1.03 – 1.08)	1.03 (0.98 – 1.07)
Waist circumference (cm^2)	1.03 (1.02 – 1.04)	1.01 (1.00 – 1.02)	1.00 (0.99 – 1.01)	1.00 (0.99 – 1.02)

Results expressed as odds ratios (95% confidence intervals).

We also assessed multicollinearity using variance inflation factors (VIFs) and examined potential nonlinearity by adding quadratic terms and evaluating their statistical significance using Wald tests. The VIF values were 1.05 for DAI, 3.48 for BMI, and 3.58 for waist circumference, with a mean VIF of 2.05. These values do not suggest substantial multicollinearity according to commonly used criteria. However, VIF values alone do not establish numerical stability; therefore, the findings from the additional models were also examined in relation to the associations observed in the primary analyses. The addition of quadratic terms provided no statistically significant evidence of nonlinearity for type 2 diabetes, hypertension, or cardiovascular disease ($p > 0.05$). In contrast, the quadratic term for hypercholesterolemia was statistically significant ($p < 0.001$), suggesting a departure from linearity for this outcome.

Table S3. Association* of the dysfunctional adiposity index with the presence of metabolic disorders in the Mexican adult population of the ENSANUT 2018 study.

	Type 2 diabetes	Hypertension	Hypercholesterolemia	Cardiovascular disease
Normal BMI + Normal DAI	1	1	1	1
Normal BMI + Elevated DAI	4.18 (2.27, 7.70)	1.53 (0.97, 2.41)	3.37 (1.95, 5.82)	1.07 (0.52, 2.20)
Overweight BMI + Normal DAI	1.29 (0.61, 2.75)	2.45 (1.49, 4.05)	2.31 (1.29, 4.15)	1.10 (0.54, 2.24)
Overweight BMI + Elevated DAI	3.77 (2.17, 6.56)	2.65 (1.77, 3.97)	4.37 (2.72, 7.03)	1.91 (1.09, 3.34)
Obese BMI + Normal DAI	3.04 (1.48, 6.22)	3.91 (2.41, 6.33)	3.34 (1.89, 5.90)	1.91 (0.81, 4.48)
Obese BMI + Elevated DAI	4.36 (2.51, 7.58)	4.94 (3.29, 7.41)	5.85 (3.66, 9.33)	2.03 (1.23, 3.37)
Normal waist + Normal DAI	1	1	1	1
Normal waist + Elevated DAI	2.61 (1.35, 5.02)	1.49 (0.89, 2.47)	2.91 (1.62, 5.22)	1.97 (0.89, 4.39)
Abdominal obesity + Normal DAI	1.92 (1.03, 3.59)	2.10 (1.33, 3.30)	2.61 (1.58, 4.31)	1.20 (0.99, 3.70)
Abdominal obesity + Elevated DAI	4.38 (2.55, 7.53)	2.77 (1.85, 4.15)	4.93 (3.17, 7.65)	2.48 (1.41, 4.35)

* Adjusted for sex, age, socioeconomic status, alcohol consumption, smoking, education, and calorie intake. Results expressed as odds ratios (95% confidence intervals). Normal body mass index (BMI): 18.5 to 24.9 kg/m², overweight BMI: 25.0 to 29.9 kg/m², and obese BMI: ≥ 30.0 kg/m². Abdominal obesity was defined as a waist circumference ≥ 80.0 cm in women and ≥ 90.0 cm in men. Elevated DAI was defined as > 1.065.

Table S4. Association* of the dysfunctional adiposity index (DAI) and visceral adiposity index (VAI) with self-reported non-communicable diseases (NCDs) in the Mexican adult population of the ENSANUT 2018 study.

Self-reported NCDs	Association with DAI	p-value	Association with VAI	p-value
Type 2 diabetes	1.39 [1.30 – 1.47]	< 0.001	1.40 [1.32 – 1.48]	< 0.001
Hypertension	1.12 [1.05 – 1.20]	0.001	1.14 [1.07 – 1.21]	< 0.001
Hypercholesterrolemia	1.34 [1.24 – 1.44]	< 0.001	1.35 [1.25 – 1.46]	< 0.001
Cardiovascular disease	1.13 [1.00 – 1.27]	0.041	1.14 [1.01 – 1.28]	0.032

* Adjusted for sex, age, economic status, alcohol consumption, smoking, education, and calorie intake. Results are expressed as odds ratios [95% confidence intervals] per 1-standard deviation increase in DAI or VAI, to account for scale differences.

Table S5. Area under the receiver operating characteristic (ROC) curve * for self-reported noncommunicable diseases (NCDs) in the Mexican adult population of the ENSANUT 2018 study.

	Type 2 diabetes		
	ROC area	**Standard error**	**95% confidence interval**
Body mass index	0.7532	0.0061	0.74125 – 0.76515
Waist circumference	0.7603	0.0060	0.74847 – 0.77212
Tg/HDL-c ratio	0.7623	0.0060	0.75049 – 0.77420
DAI	0.7642	0.0060	0.75236 – 0.77599
	Hypertension		
Body mass index	0.7704	0.0053	0.75996 – 0.78086
Waist circumference	0.7672	0.0054	0.75674 – 0.77774
Tg/HDL-c ratio	0.7457	0.0056	0.73478 – 0.75664
DAI	0.7456	0.0056	0.73464 – 0.75651
	Hypercholesterolemia		
Body mass index	0.7468	0.0055	0.73588 – 0.75763
Waist circumference	0.7444	0.0056	0.73350 – 0.75535
Tg/HDL-c ratio	0.7154	0.0058	0.70405 – 0.72671
DAI	0.7151	0.0058	0.70380 – 0.72647
	Cardiovascular disease		
Body mass index	0.7080	0.0058	0.69669 – 0.71928
Waist circumference	0.7047	0.0058	0.69330 – 0.71609
Tg/HDL-c ratio	0.6891	0.0059	0.67750 – 0.70068
DAI	0.6887	0.0059	0.67706 – 0.70027

* Adjusted for sex, age, economic status, alcohol consumption, smoking, education, and calorie intake. Tg: triglycerides; HDL-c: high-density lipoprotein cholesterol; and DAI: dysfunctional adiposity index.