

Ambient particulate matter exposure interacts with abdominal obesity to increase blood triglycerides

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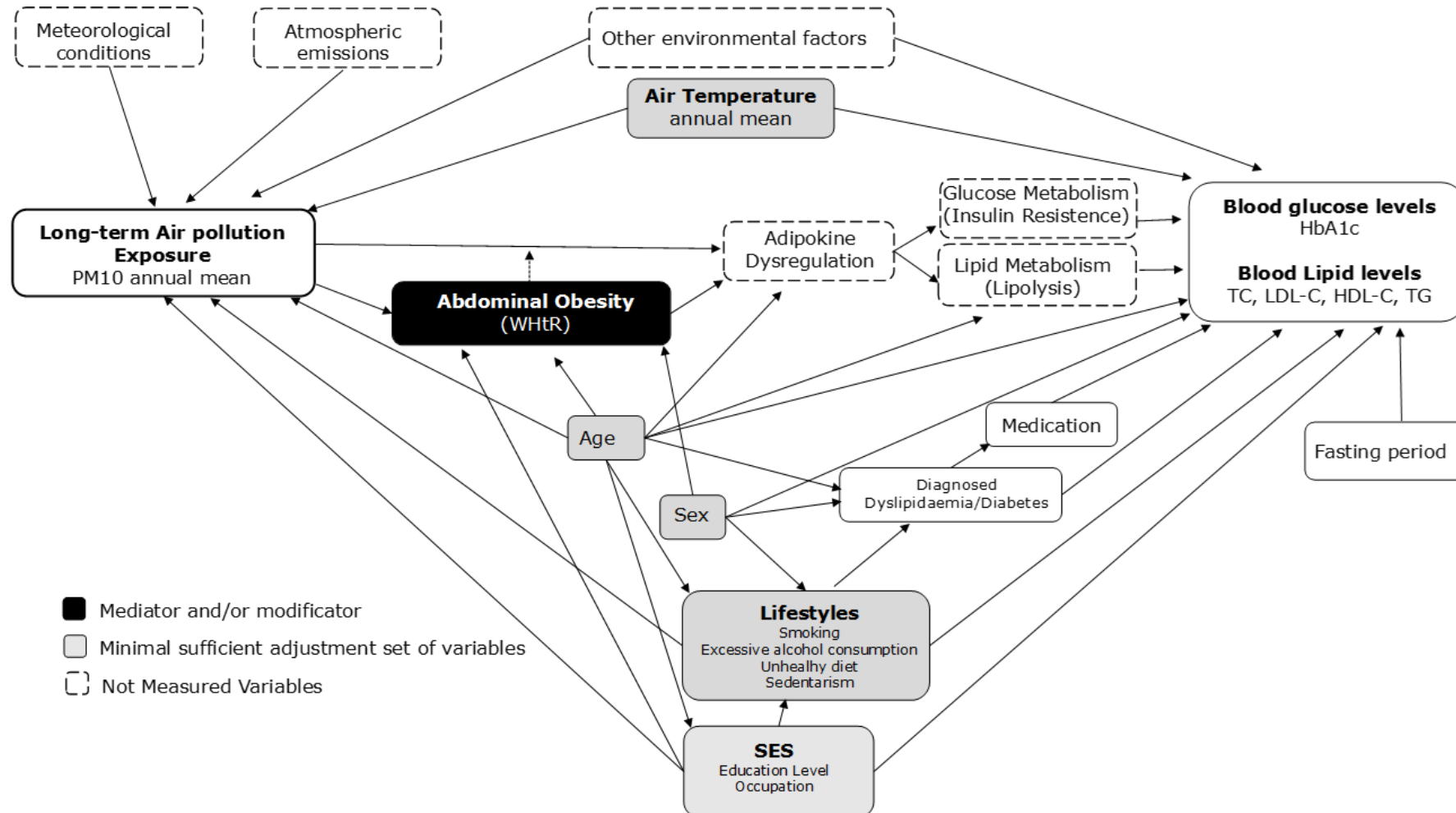
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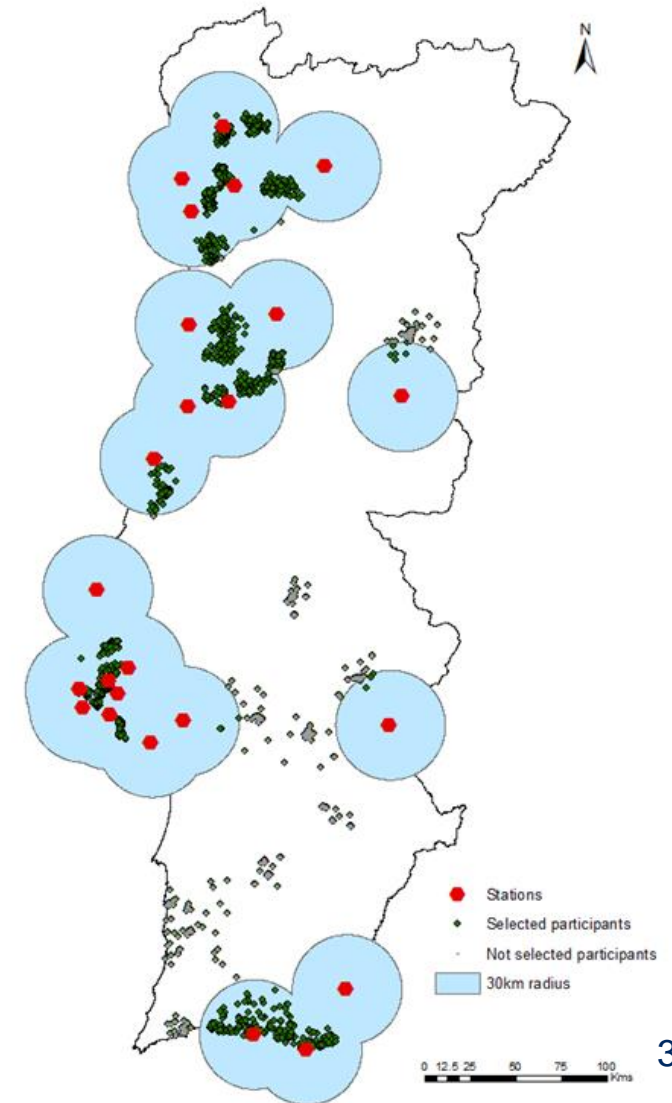
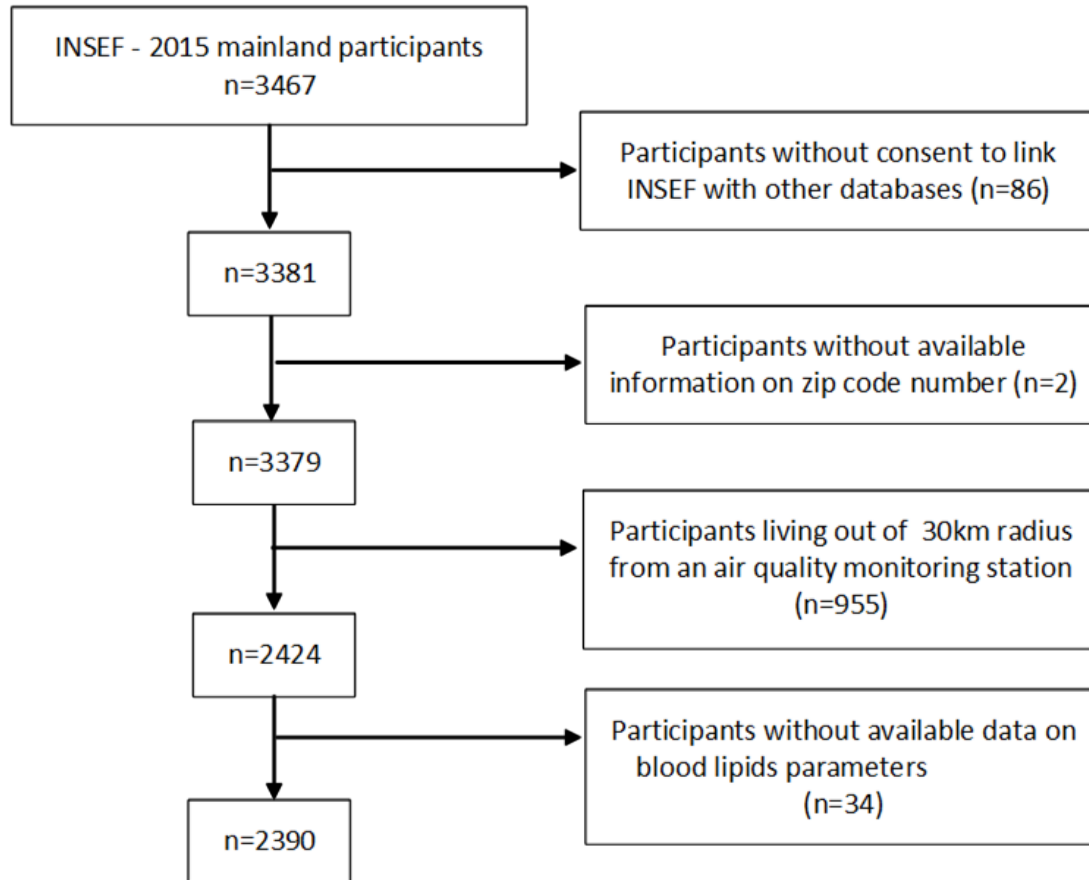
Background

- ✓ Blood lipids levels dysregulation represent potential mechanism intermediating the adverse cardiovascular effects of PM exposure.
- ✓ **Study Aim:** to estimate the effect of particulate matter exposure on blood lipid levels in the adult Portuguese mainland population and to assess the potential mediation and/or modification action of abdominal obesity on this effect.



Methods

- ✓ Data from 2390 participants of the 1st Portuguese Health Examination Survey (INSEF, 2015) with available data on blood lipids parameters and living within a 30km radius of an air quality monitoring station with available PM₁₀ measurements.
- ✓ PM₁₀ concentrations: air quality monitoring network of the Portuguese Environment Agency.
- ✓ Generalized linear models



Results

Characteristics	Participants with AO (n=1831)	Participants without AO (n=536)	Total participants (n=2390)
Sex (n=2390) - %			
Males	48.80	42.84	47.41
Females	51.20	57.15	52.59
Age (n=2390) - %			
25-49 years old	42.66	82.96	52.76
50-74 years old	57.34	17.04	47.24
^a Level of Education (n=2389) - %			
Low education	66.37	35.07	58.44
Medium education	19.00	29.38	21.86
High education	14.63	35.55	19.70
^b Occupation (n=2203) - %			
White-collar occupation	57.98	76.18	62.61
Blue-collar occupation	42.02	23.82	37.39
Lifestyles variables - %			
^c Smokers (n=2390)	17.44	32.22	20.95
^d Excessive alcohol consumers (n=2388)	40.21	24.49	36.07
^e Unhealthy Diet (n=2388)	33.69	43.36	36.10
^f Sedentary (n=2375)	46.01	39.15	44.53
Diagnosed Dyslipidemia (n=2373) - %	30.64	8.26	24.95
Dyslipidemia medication (n=2390) - %	24.33	4.45	19.33
Individual allocated 1-year average temperature (n=2390) - °C (mean±sd)	15.58±1.42	15.90±1.44	15.66±1.43

Note: These results are part of the article "PM₁₀ exposure interacts with abdominal obesity to increase blood triglycerides: a cross-sectional linkage study" already accepted for publication in the European Journal of Public Health.

Results

Characteristics	Participants with AO (n=1831)	Participants without AO (n=536)	All participants (n=2390)
Individual allocated 1-year average PM ₁₀ (n=2390) - μg/m ³ (mean±sd)	17.54±3.01	17.87±2.74	17.63±2.95
Outcome variables			
TC (n=2390) - mg/dL (mean±sd)	196.45±37.50	184.25±34.98	193.65±37.74
HDL-C (n=2390) - mg/dL (mean±sd)	52.04±13.16	59.82±14.54	54.03±14.02
LDL-C (n=2390) - mg/dL (mean±sd)	131.73±34.14	116.94±31.70	128.18±34.39
TG (n=2390) - mg/dL (mean±sd)	162.63±102.61	99.87±56.25	147.35±97.36

Results

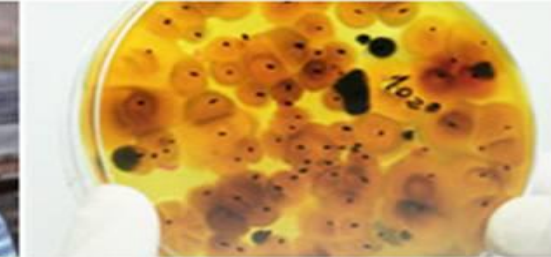
	% Change per 1 µg/m ³ of PM ₁₀ increment			
	TG	TC	HDL-C	LDL-C
All included participants (n=2390)				
Not adjusted model	0.19 (-1.08; 1.48)	0.09 (-0.52; 0.70)	0.12 (-0.43; 0.68)	-0.89 (-1.87; 0.11)
*Adjusted model	1.70 (0.11; 3.32)	0.59 (-0.07; 1.24)	-0.20 (-0.74; 0.33)	0.47 (-0.20; 1.15)
Participants with AO (n=1831)^a				
Not adjusted model	0.92 (-0.60; 2.46)	1.75 (-0.45; 0.80)	-0.21 (-0.69; 0.27)	-0.64 (-1.66; 0.39)
*Adjusted model	1.84 (0.02; 3.69)	0.62 (-0.02; 1.27)	-0.38 (-0.97; 0.21)	0.56 (-0.22; 1.35)
Participants without AO (n=536)				
Not adjusted model	-1.76 (-3.60; 0.12)	0.03 (-0.71; 0.78)	0.64 (-0.37; 1.66)	-1.32 (-2.39; -0.24)
*Adjusted model	0.75 (-1.90; 3.47)	0.62 (-0.38; 1.63)	0.46 (-0.52; 1.45)	0.23 (-0.66; 1.12)

* Adjusted for age, sex, educational level, occupation, smoking status, excessive alcohol consumption, unhealthy diet, sedentary and individual allocated 1-year average temperature. ^a Participants without available data on waist or height measurements (n=23) and consequently without AO data were excluded from the stratified analysis.

Abbreviations: AO- Abdominal Obesity; TC - Total Cholesterol; HDL-C - High density Lipoprotein cholesterol; LDL-C - Low density lipoprotein cholesterol; TG - Triglycerides.; PM- Particulate matter.

Conclusions

- Even at low levels of exposure, long-term PM₁₀ exposure interacts with abdominal obesity to increase non-fasting blood triglycerides levels by about 2% per each 1 µg/m³ PM₁₀ increase;
- To the best of our knowledge, this is the first study showing the modification action of abdominal obesity regarding the PM₁₀ effect on a blood lipid parameter.
- Our findings suggest that reducing both abdominal obesity prevalence and PM₁₀ below current standards would result in additional health benefits for the population.



Thank you for your attention!

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