SUPPLEMENTARY MATERIAL

Ambient particulate air pollution and blood pressure in peri-urban India

Number of pages: 8
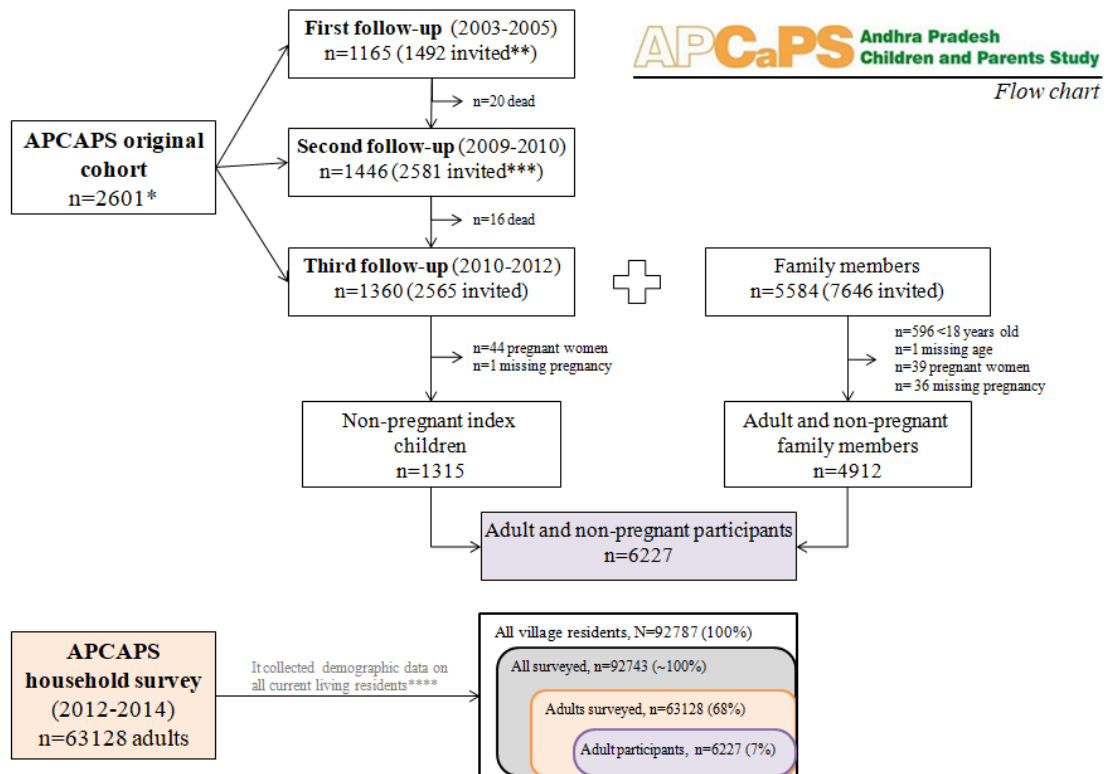
Number of Figures: 3

Number of Tables: 4

Content of the material supplied:

Figure S1 APCAPS flow chart.

First follow-up (2003-2005)
n=1165 (1492 invited**)

APCaPS **Andhra Pradesh Children and Parents Study**
Flow chart

n=20 dead

APCAPS original cohort
n=2601*

Second follow-up (2009-2010)
n=1446 (2581 invited***)

n=16 dead

Third follow-up (2010-2012)
n=1360 (2565 invited)

Family members
n=5584 (7646 invited)

n=44 pregnant women
n=1 missing pregnancy

n=596 <18 years old
n=1 missing age
n=39 pregnant women
n= 36 missing pregnancy

Non-pregnant index children
n=1315

Adult and non-pregnant family members
n=4912

Adult and non-pregnant participants
n=6227

APCAPS household survey (2012-2014)
n=63128 adults

It collected demographic data on all current living residents****

All village residents, N=92787 (100%)

All surveyed, n=92743 (~100%)

Adults surveyed, n=63128 (68%)

Adult participants, n=6227 (7%)

* Children born in 1987-1990 and included in a trial of antenatal nutrition supplementation.

** These were the children who were successfully linked to historical records.

*** Number of invited index children increased because APCAPS team kept trying to track them.

**** i.e. excluding temporary or permanent migrants and permanently locked households.

Figure S2 Directed acyclic graph (DAG) of the relationship between ambient air pollution (AAP) and blood pressure (BP).
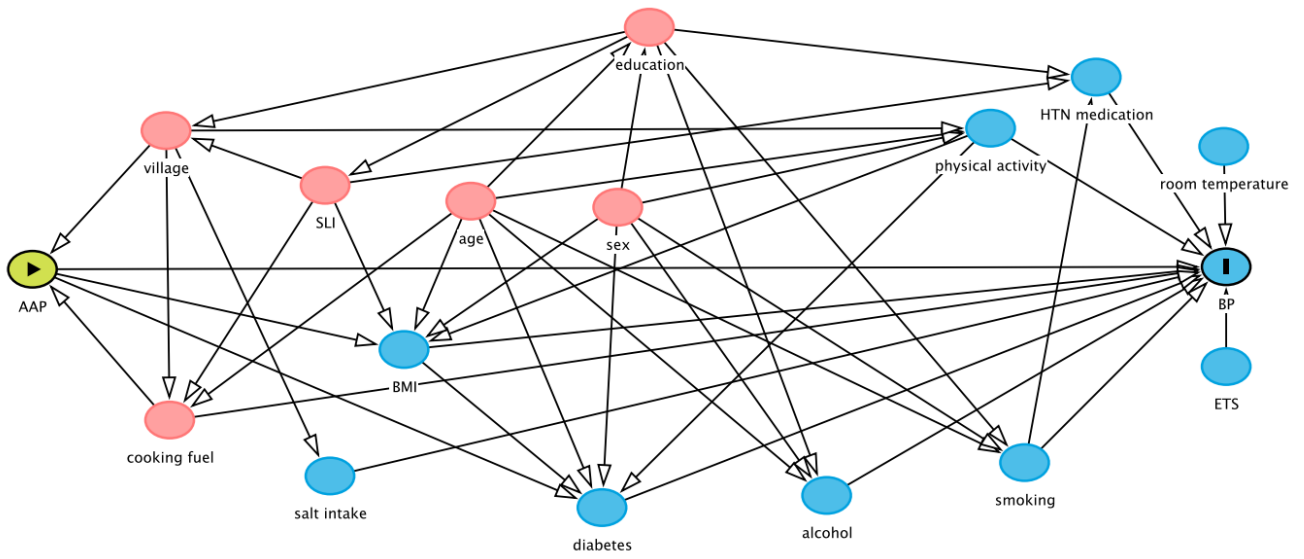
BMI: Body mass index; SLI: Standard Living Index; ETS: Environmental tobacco smoke; HTN medication: antihypertensive medication.
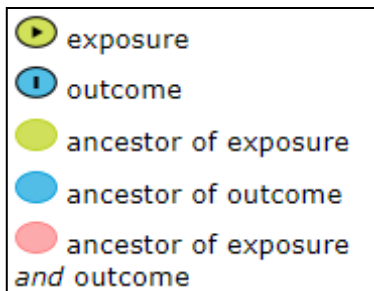
Legend:

Table S1 Coefficients (β) and confidence intervals (CI) according to sex in sensitivity analyses (S1-S5) compared to the fully-adjusted model.

| | MEN | | | | WOMEN | | | |
| | SBP | | DBP | | SBP | | DBP | |
Model	β	95%CI	β	95%CI	β	95%CI	β	95%CI
				PM$_{2.5}$				
3	0.52	-0.82 to 1.85	0.41	-0.69 to 1.52	1.43	0.12 to 2.74	0.87	-0.18 to 1.91
S1	0.57	-0.76 to 1.90	0.42	-0.68 to 1.52	1.43	0.13 to 2.73	0.79	-0.26 to 1.83
S2	0.54	-0.81 to 1.89	0.49	-0.64 to 1.61	1.44	0.12 to 2.77	0.97	-0.09 to 2.03
S3	0.45	-0.90 to 1.81	0.36	-0.75 to 1.47	1.34	-0.01 to 2.68	0.82	-0.23 to 1.88
S4	0.52	-0.82 to 1.85	0.41	-0.68 to 1.50	1.45	0.14 to 2.76	0.89	-0.14 to 1.93
				BC				
3	-0.20	-0.86 to 0.47	-0.04	-0.59 to 0.51	0.15	-0.52 to 0.81	0.11	-0.41 to 0.64
S1	-0.13	-0.79 to 0.54	0.02	-0.53 to 0.57	0.17	-0.49 to 0.83	0.09	-0.44 to 0.62
S2	-0.20	-0.88 to 0.47	-0.09	-0.65 to 0.47	0.24	-0.43 to 0.91	0.21	-0.32 to 0.75
S3	-0.36	-1.41 to 0.69	-0.09	-0.95 to 0.77	0.12	-0.93 to 1.18	0.13	-0.70 to 0.96
S4	-0.20	-0.86 to 0.47	-0.04	-0.58 to 0.50	0.15	-0.52 to 0.81	0.12	-0.41 to 0.64

PM$_{2.5}$: particles less than 2.5 μm; BC: black carbon; SBP: systolic blood pressure; DBP: diastolic blood pressure

Model 3 (main): age, antihypertensive medication, mean village concentration, cooking fuel, education attainment, standard living index, physical activity, environmental tobacco smoke, active smoking (only in men), alcohol, room temperature, and salt intake

Model S1: model 3, averaging the last two BP readings rather than the three

Model S2: model 3, excluding those 195 participants taking medication (2872 men / 2464 women)

Model S3: treating village as a fixed effect removing mean village concentration and keeping random effect for household (IQR for BC = 0.2 µg/m^3)

Model S4: model 3, adding a natural spline with 3 degrees of freedom in age

Table S2 Coefficients (β) and confidence intervals (CI) according to age.

	≤40 years (n=2918)				>40 years (n=2552)			
	SBP		DBP		SBP		DBP	
Model	β	*95% CI*	β	*95% CI*	β	*95% CI*	β	*95% CI*
PM$_{2.5}$								
3	0.91	-0.01 to 1.83	0.75	-0.15 to 1.66	1.21	-0.48 to 2.89	0.59	-0.64 to 1.82
4	0.89	0.03 to 1.74	0.73	-0.11 to 1.57	1.21	-0.56 to 2.77	0.59	-0.58 to 1.77
BC								
3	-0.16	-0.64 to 0.31	-0.21	-0.67 to 0.25	0.14	-0.68 to 0.96	0.27	-0.33 to 0.87
4	-0.24	-0.68 to 0.20	-0.28	-0.71 to 0.15	-0.03	-0.83 to 0.77	0.12	-0.45 to 0.69

Model 3 (main): age, sex, antihypertensive medication, mean village concentration, cooking fuel, education attainment, standard living index, physical activity, environmental tobacco smoke, active smoking, alcohol, room temperature, and salt intake

Model 4 (including potential mediators): model 3 + body mass index and diabetes

Table S3 Associations between residential exposure to particles and blood pressure according to primary cooking fuel among women. Changes in SBP and DBP are expressed as a unit increase (in mm Hg) per 1 µg/m^3 increase in within-village PM$_{2.5}$ and per IQR increase in within-village BC (=0.1 µg/m^3).

	SBP				DBP			
	Clean fuel (n=955)		Biomass (n=1424)		Clean fuel (n=955)		Biomass (n=1424)	
	β	*95%CI*	β	*95%CI*	β	*95%CI*	β	*95%CI*
PM$_{2.5}$	0.90	-1.01 to 2.81	1.64	-0.05 to 3.33	0.83	-0.72 to 2.38	0.81	-0.51 to 2.12
BC	-0.21	-1.16 to 0.75	0.14	-0.71 to 1.00	-0.28	-1.05 to 0.49	0.10	-0.56 to 0.77

PM$_{2.5}$: particles less than 2.5 μm in diameter; BC: black carbon; SBP: systolic blood pressure; DBP: diastolic blood pressure; IQR: inter-quartile range; CI: Confidence Interval. Clean fuel refers to gas or electricity

Figure S3 Regression coefficients for the association between fine particulate matter ($PM_{2.5}$) and blood pressure in men after the leave-one-village-out approach.
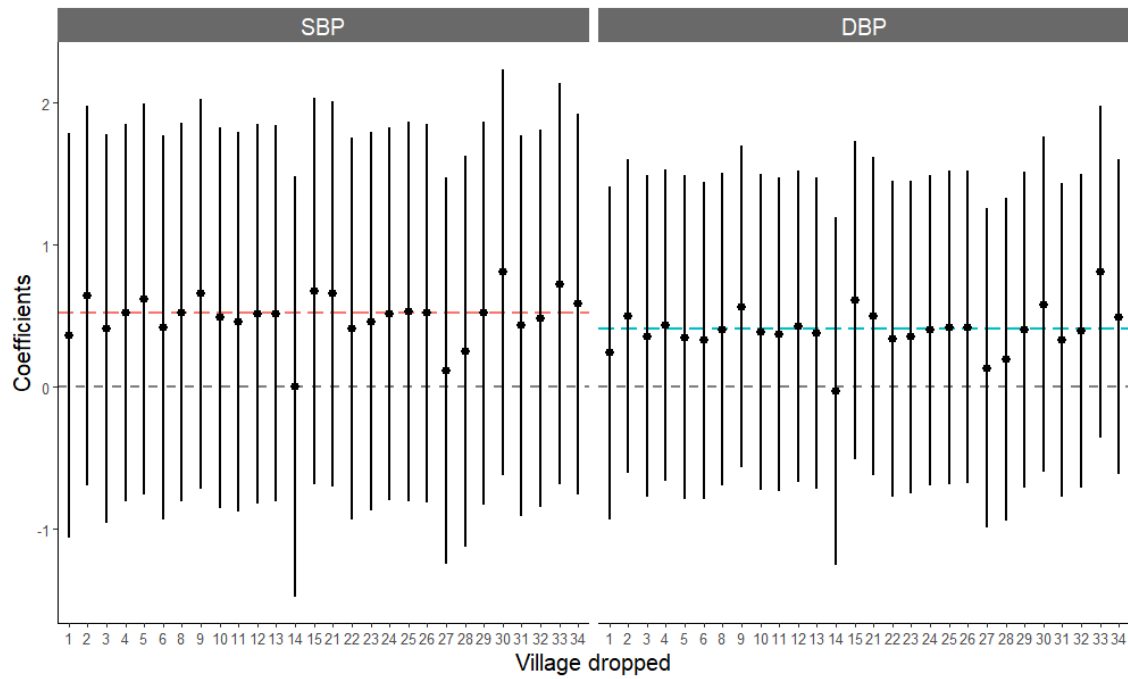
Error bars represent 95% Confidence Interval. Dashed black line corresponds to the zero level. Red dashed line corresponds to the systolic blood pressure (SBP) coefficient from the model considering all villages (showed for reference), whereas blue dashed line corresponds to diastolic blood pressure (DBP) coefficient

Table S4 Comparison of demographic characteristics between general adult (≥18 years) residents of the villages (n=63128) and our study participants (n=5531).

	ALL		MEN		WOMEN	
	General residents	Study participants	General residents	Study participants	General residents	Study participants
Sex, n(%)						
Men	32161 (51.0)	2979 (53.9)	32161 (100)	2979 (100)	-	-
Women	32161 (49.0)	2552 (46.1)	-	-	32161 (100)	2552 (100)
Age, mean ± SD	38 ± 16	38 ± 13	38 ± 16	37 ± 15	38 ± 15	38 ± 11
Formal education, n(%)						
With any kind	33561 (53.2)	2596 (46.9)	20629 (64.2)	1839 (61.8)	12932 (41.8)	757 (29.7)
Without (either illiterate or literate)	29550 (46.8)	2934 (53.1)	11523 (35.8)	1139 (38.2)	18027 (58.2)	1795 (70.3)