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Supplemental Material

Fine Particulate Matter and Poor Cognitive Function among Chinese Older Adults: Evidence from a Community-Based, 12-Year Prospective Cohort Study

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Supplementary materials

Table S-1. The differences in characteristics between men and women

Variable	Men	Women
Number of participants	6334 (100)	6990 (100)
Age (year)	84.2±9.9	87.5±11.1
Residence		
Urban	1172 (18.5)	1335 (19.1)
Rural	5162 (81.5)	5655 (80.9)
Marital status		
In marriage	3607 (56.9)	1915 (27.4)
Not in marriage	2727 (43.1)	5075 (72.6)
Educational background		
Illiterate	2244 (35.4)	5548 (79.4)
Literate	4090 (64.6)	1442 (20.6)
Living pattern		
With family member	5409 (85.4)	5734 (82.0)
Alone or in nursing home	925 (14.6)	1256 (18.0)
Tobacco smoking status		
Non-smoker	2449 (38.7)	6108 (87.4)
Current smoker	2484 (39.2)	519 (7.4)
Former smoker	1401 (22.1)	363 (5.2)
Alcohol drinking status		
Non-drinker	3086 (48.7)	5973 (85.5)
Current drinker	2278 (36.0)	742 (10.6)
Former drinker	970 (15.3)	275 (3.9)
Regular exercise		
No	3932 (62.1)	5131 (73.4)
Yes	2402 (37.9)	1859 (26.6)

Hypertension		
No	3359 (53.0)	3612(51.7)
Yes	2975 (47.0)	3378 (48.3)
Heart disease		
No	5907 (93.3)	6406 (91.6)
Yes	427 (6.7)	584 (8.4)
Diabetes		
No	6193 (97.8)	6831 (97.7)
Yes	141 (2.2)	159 (2.3)
Respiratory disease		
No	5513 (87.0)	6338 (90.7)
Yes	821 (13.0)	652 (9.3)
Disability		
No	5850 (92.4)	5954(85.2)
Yes	484 (7.6)	1036(14.8)
Co-morbidity		
No	5075 (80.1)	5738(82.1)
Yes	1259 (19.9)	1252(17.9)

Table S-2. The correlation matrix of individual-level PM_{2.5} exposure from the year of 2002 to 2014

PM_{2.5}	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2002	1.00	-	-	-	-	-	-	-	-	-	-	-	-
2003	0.94	1.00	-	-	-	-	-	-	-	-	-	-	-
2004	0.94	0.89	1.00	-	-	-	-	-	-	-	-	-	-
2005	0.96	0.92	0.96	1.00	-	-	-	-	-	-	-	-	-
2006	0.92	0.93	0.89	0.94	1.00	-	-	-	-	-	-	-	-
2007	0.94	0.96	0.89	0.93	0.94	1.00	-	-	-	-	-	-	-
2008	0.95	0.96	0.9	0.92	0.92	0.97	1.00	-	-	-	-	-	-
2009	0.94	0.94	0.88	0.9	0.9	0.95	0.98	1.00	-	-	-	-	-
2010	0.92	0.96	0.86	0.93	0.93	0.95	0.94	0.92	1.00	-	-	-	-
2011	0.95	0.94	0.88	0.93	0.93	0.96	0.96	0.96	0.96	1.00	-	-	-
2012	0.93	0.93	0.9	0.95	0.96	0.96	0.96	0.93	0.94	0.96	1.00	-	-
2013	0.93	0.96	0.84	0.91	0.93	0.95	0.95	0.95	0.96	0.98	0.95	1.00	-

2014 0.93 0.96 0.88 0.91 0.91 0.96 0.97 0.96 0.95 0.96 0.95 0.96 1.00

† All the *P* value of the correlation coefficients were <0.001.

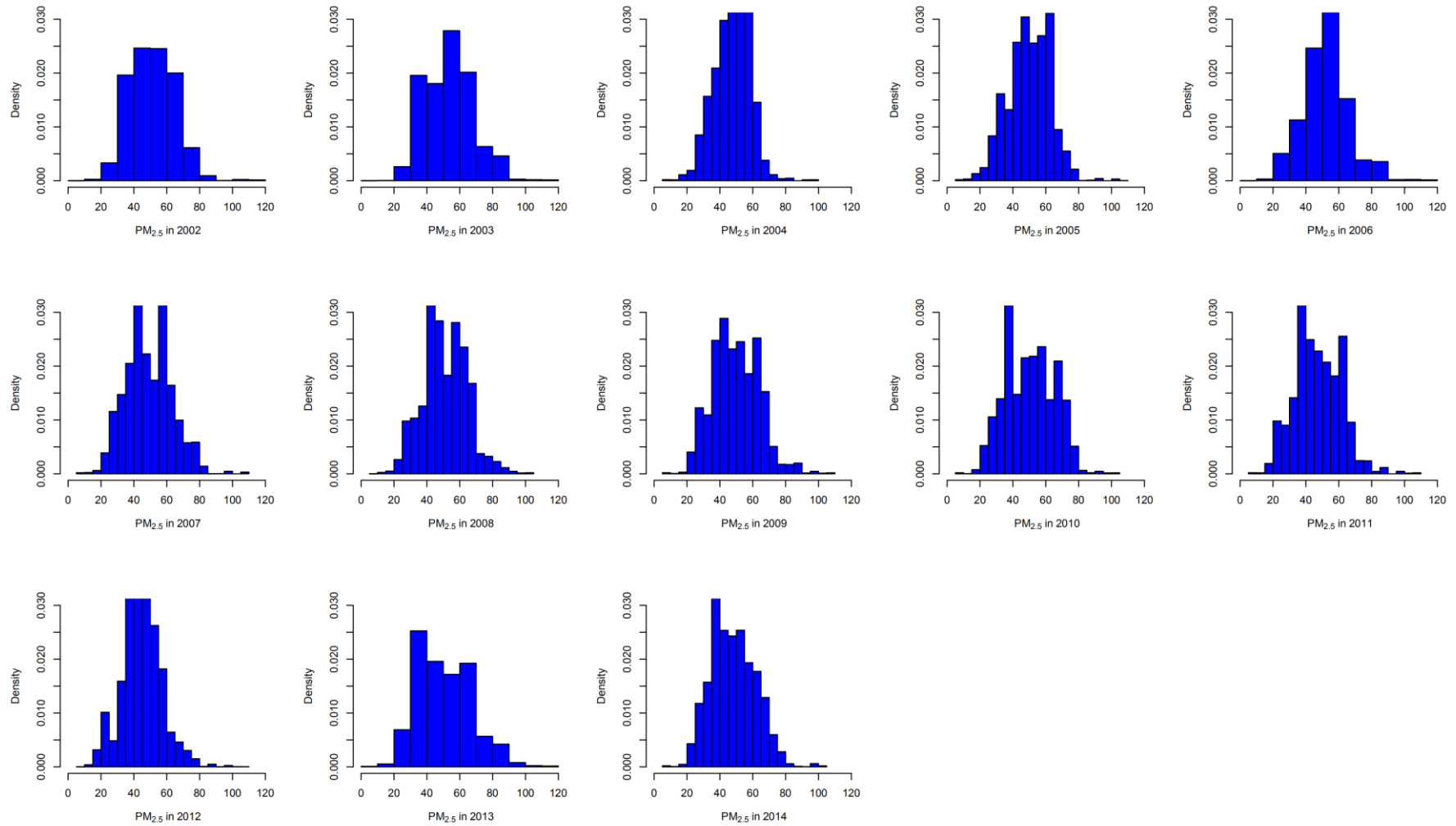


Figure S-1. The distribution of PM_{2.5} over the entire study period from 2002 to 2014

Table S-3. The association of PM_{2.5} and poor cognitive function (MMSE<18) in crude models or in model adjusted for age among Chinese older adults aged 65 years and older.

PM _{2.5}	Events	Participants	Crude model	Model 1	Final model
Each 10 ug/m³ increase in PM_{2.5}	3271	13324	1.044(1.017-1.071)	1.054(1.028-1.081)	1.051(1.023-1.079)
PM_{2.5} as categorical variable					
First quartile(<41.4μg/m³)	773	3317	1.00	1.00	1.00
Second quartile(≥41.4–50.3μg/m³)	844	3366	1.12(1.02-1.24)	1.19(1.08-1.31)	1.20(1.09-1.33)
Third quartile(≥50.3–60.7μg/m³)	838	3370	1.23(1.12-1.36)	1.29(1.17-1.42)	1.27(1.15-1.41)
Forth quartile(≥60.7μg/m³)	816	3271	1.29(1.17-1.42)	1.24(1.13-1.37)	1.21(1.09-1.34)
P-value for trend					<0.001
PM_{2.5} categorized by Chinese guidelines					
<15 ug/m³	2	20	0.34(0.09-1.43)	0.45(0.11-1.81)	0.50(0.12-2.00)
≥15-35 ug/m³	364	1555	1.00	1.00	1.00
≥35-75 ug/m³	2772	11225	1.11(0.99-1.24)	1.20(1.07-1.33)	1.20(1.09-1.34)
≥75 ug/m³	133	524	1.12 (0.92-1.37)	1.20(0.98-1.46)	1.28(1.04-1.59)

P-value for trend<0.001

Model 1: Adjusted for age(continuous);

Final model: Adjusted covariates including age (continuous); sex, residence, current marital status, living pattern, education (literacy status), smoking status, alcohol drinking status, regular exercise, diabetes, heart disease, hypertension, respiratory disease, disability in activities of daily living, gross domestic product (GDP), physicians per 1000 Persons at prefecture-level.

Table S-4. Sensitivity analyses: The association of PM_{2.5} and poor cognitive function (MMSE<18) after excluding deaths in the first year or removing participants lost to follow up among Chinese older adults aged 65 years and older

PM _{2.5}	Excluding deaths in the first year			Removing participants lost to follow up		
	Events	Participants	Cumulative exposure	Events	Participants	Cumulative exposure
Each 10 ug/m³ increase in PM_{2.5}	3271	12459	1.056(1.029-1.084)	3271	11901	1.062(1.034-1.089)
PM_{2.5} as categorical variable						
First quartile(<41.4µg/m³)	773	3100	1.00	773	3073	1.00
Second quartile(≥41.4–50.3µg/m³)	844	3139	1.20(1.09-1.33)	844	3043	1.21(1.09-1.33)
Third quartile(≥50.3–60.7µg/m³)	838	3156	1.29(1.17-1.42)	838	2945	1.31(1.19-1.45)

Forth quartile($\geq 60.7\mu\text{g}/\text{m}^3$)	816	3064	1.24(1.12-1.37)	816	2840	1.27(1.15-1.41)
P-value for trend						<0.001
PM_{2.5} categorized by Chinese guidelines			<0.001			
<15 ug/m ³	2	18	0.50(0.13-2.03)	2	17	0.45(0.11-1.82)
$\geq 15\text{-}35$ ug/m ³	364	1449	1.00	364	1403	1.00
$\geq 35\text{-}75$ ug/m ³	2772	10495	1.22(1.09-1.36)	2772	10005	1.21(1.08-1.35)
≥ 75 ug/m ³	133	497	1.28(1.05-1.57)	133	476	1.24 (1.01-1.52)
P-value for trend			<0.001			<0.001

Adjusted covariates including age (continuous); sex, residence, current marital status, living pattern, education (literacy status), smoking status, alcohol drinking status, regular exercise, diabetes, heart disease, hypertension, respiratory disease, disability in activities of daily living, gross domestic product (GDP), physicians per 1000 Persons at prefecture-level