



Supplementary Figure S1: Directed Acyclic Graph of this study. This graph represents the hypothesized relationships among various factors related to sexual function. Each node in the graph represents a specific variable: “Demographics (Age, Population, Residence, Region, and Income)”, “Lifestyle (BMI, smoking status, and drinking status)”, “Personal Characteristics (Personality)”, “Health Status (Constitution and underlying disease)”, “Psychological Status (Depression score)”, “Temperature”, “PM wave”, and “Sexual Function”.

Supplement Table S1: Association of sexual function scores with PM_{2.5} and PM₁₀ waves under different definitions

PM wave	Male				Female	
	IIEF5 scores		PEDT scores		FSFI scores	
	β(95%CI)	P	β(95%CI)	P	β(95%CI)	P
PM _{2.5} -75μg/m ³ -D3	-0.0085(-0.0268,0.0099)	0.3675	0.0017(-0.0166,0.0199)	0.8580	0.0002(-0.0388,0.0391)	0.9937
PM _{2.5} -75μg/m ³ -D4	-0.0046(-0.0254,0.0162)	0.6644	0.0025(-0.0181,0.0232)	0.8097	-0.0165(-0.0609,0.0279)	0.4669
PM _{2.5} -75μg/m ³ -D5	-0.0040(-0.0270,0.0191)	0.7367	0.0012(-0.0217,0.0241)	0.9163	-0.0254(-0.0752,0.0245)	0.3182
PM _{2.5} -75μg/m ³ -D6	-0.0034(-0.0293,0.0225)	0.7981	0.0048(-0.0209,0.0305)	0.7162	-0.0257(-0.0826,0.0312)	0.3756
PM _{2.5} -75μg/m ³ -D7	-0.0022(-0.0308,0.0264)	0.8785	0.0088(-0.0196,0.0372)	0.5451	-0.0192(-0.0834,0.0451)	0.5592
PM _{2.5} -75μg/m ³ -D8	-0.0030(-0.0342,0.0282)	0.8503	0.0142(-0.0168,0.0452)	0.3699	-0.0159(-0.0872,0.0553)	0.6614
PM ₁₀ -150μg/m ³ -D3	-0.0145(-0.0280,-0.0010)	0.0347*	0.0111(-0.0023,0.0244)	0.1035	0.0013(-0.0242,0.0267)	0.9228
PM ₁₀ -150μg/m ³ -D4	-0.0166(-0.0323,-0.0009)	0.0386*	0.0130(-0.0026,0.0286)	0.1022	-0.0007(-0.0297,0.0282)	0.9598
PM ₁₀ -150μg/m ³ -D5	-0.0193(-0.0371,-0.0015)	0.0334*	0.0143(-0.0033,0.0319)	0.1123	-0.0045(-0.0366,0.0276)	0.7834
PM ₁₀ -150μg/m ³ -D6	-0.0218(-0.0415,-0.0021)	0.0299*	0.0154(-0.0042,0.0349)	0.1229	-0.0060(-0.0410,0.0290)	0.7365
PM ₁₀ -150μg/m ³ -D7	-0.0243(-0.0458,-0.0028)	0.0271*	0.0178(-0.0036,0.0392)	0.1024	-0.0067(-0.0447,0.0314)	0.7309
PM ₁₀ -150μg/m ³ -D8	-0.0264(-0.0497,-0.0032)	0.0259*	0.0199(-0.0032,0.0430)	0.0909	-0.0055(-0.0463,0.0353)	0.7912

Note: The models were adjusted for age, population, residence, region, income, BMI, smoking status, drinking status, personality, constitution, underlying disease,

depression score, mean NO₂ exposure in the first 1, 3, and 6 months, and mean PM_{2.5} exposure in the first 12 months. *P < 0.05.

Supplement Table S2. Effect of PM₁₀ wave exposure on IIEF-5 scores in different age subgroups

PM ₁₀ wave	age≤30 years		age>30 years	
	β(95%CI)	P	β(95%CI)	P
PM ₁₀ -150μg/m ³ -D3	-0.0325(-0.0503,-0.0147)	0.0004*	0.0158(-0.0044,0.0360)	0.1249
PM ₁₀ -150μg/m ³ -D4	-0.0345(-0.0553,-0.0138)	0.0011*	0.0139(-0.0098,0.0376)	0.2502
PM ₁₀ -150μg/m ³ -D5	-0.0356(-0.0591,-0.0122)	0.0029*	0.0089(-0.0180,0.0358)	0.5159
PM ₁₀ -150μg/m ³ -D6	-0.0364(-0.0622,-0.0105)	0.0059*	0.0040(-0.0259,0.0340)	0.7930
PM ₁₀ -150μg/m ³ -D7	-0.0376(-0.0658,-0.0093)	0.0091*	-0.0001(-0.0330,0.0329)	0.9973
PM ₁₀ -150μg/m ³ -D8	-0.0379(-0.0683,-0.0074)	0.0148*	-0.0054(-0.0412,0.0304)	0.7691

Note: The models were adjusted for age, population, residence, region, income, BMI, smoking status, drinking status, personality, constitution, underlying disease, depression score, mean NO₂ exposure in the first 1, 3, and 6 months, and mean PM_{2.5} exposure in the first 12 months. PM=particulate matter. *P < 0.05.

Supplement Table S3. Effect of PM₁₀ wave exposure on IIEF-5 scores in different income subgroups

PM ₁₀ wave	Income level					
	<5,000 RMB/m		5,000-10,000 RMB/m		10,000 RMB/m	
	β(95%CI)	P	β(95%CI)	P	β(95%CI)	P
PM ₁₀ -150μg/m ³ -D3	-0.0613(-0.1008,-0.0218)	0.0024*	-0.0058(-0.0229,0.0114)	0.5092	-0.0028(-0.0258,0.0202)	0.8118
PM ₁₀ -150μg/m ³ -D4	-0.0785(-0.1260,-0.0310)	0.0012*	-0.0059(-0.0258,0.0140)	0.5625	-0.0024(-0.0289,0.0241)	0.8583
PM ₁₀ -150μg/m ³ -D5	-0.0940(-0.1492,-0.0388)	0.0009*	-0.0080(-0.0303,0.0143)	0.4830	-0.0020(-0.0321,0.0281)	0.8960
PM ₁₀ -150μg/m ³ -D6	-0.1088(-0.1711,-0.0465)	0.0006*	-0.0106(-0.0351,0.0139)	0.3947	0.0002(-0.0333,0.0338)	0.9886
PM ₁₀ -150μg/m ³ -D7	-0.1182(-0.1878,-0.0486)	0.0009*	-0.0143(-0.0409,0.0123)	0.2916	0.0019(-0.0350,0.0388)	0.9199
PM ₁₀ -150μg/m ³ -D8	-0.1277(-0.2045,-0.0508)	0.0012*	-0.0167(-0.0452,0.0118)	0.2508	0.0022(-0.0380,0.0425)	0.9136

Note: The models were adjusted for age, population, residence, region, income, BMI, smoking status, drinking status, personality, constitution, underlying disease, depression score, mean NO₂ exposure in the first 1, 3, and 6 months, and mean PM_{2.5} exposure in the first 12 months. PM=particulate matter. *P < 0.05.