Supplementary Materials

Urinary polycyclic aromatic hydrocarbons and depressive/anxiety symptoms in older adults: an exploratory machine learning analysis

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Supplementary Text 1. Calculation formula for OH-PAH concentration adjusted for urine specific gravity

Specific gravity (SG) was used to adjust the dilution of the urine sample:

$$SG_{adjusted}\ \text{concentration}=\text{Unadjusted concentration}\times\frac{SG_m-1}{SG_i-1} \quad (S1)$$

where, SG_m is the median SG; SG_i is the individual SG of urine sample; normal range of SG is 1.010-1.035.

Supplementary Table 1. Distributions of SG-adjusted urinary OH-PAHs of participants

Compounds(ng/mL)	DF(%)	GM	5th	25th	Median	75th	95th	Range
1-OHNap	97	0.96	0.09	0.47	1.07	2.35	8.19	<LOQ -37.24
2-OHNap	100	1.42	0.25	0.72	1.27	2.66	10.83	0.071-61.88
2-OHFlu	100	0.13	0.04	0.07	0.12	0.20	0.53	0.016-33.8
3-OHFlu	100	0.13	0.04	0.07	0.11	0.19	0.56	0.016-33.9
1/9-OHPhe	95	0.07	0.01	0.04	0.07	0.13	0.33	<LOQ -15.69
2-OHPhe	100	0.02	0.01	0.02	0.02	0.04	0.09	0.001-6.63
3-OHPhe	100	0.04	0.01	0.02	0.04	0.06	0.14	0.001-6.95
4-OHPhe	86	0.02	0.01	0.01	0.02	0.04	0.14	<LOQ -5.14
1-OHPyr	100	0.34	0.07	0.19	0.36	0.60	1.68	0.008-7.922
ΣOH-NAPs	-	2.84	0.61	1.49	2.56	4.85	18.42	0.116-77.89
ΣOH-FLUs	-	0.24	0.08	0.13	0.21	0.38	1.12	0.005-33.96
ΣOH-PHEs	-	0.17	0.05	0.10	0.15	0.28	0.69	0.005-34.40
ΣOH-PAHs	-	3.90	1.03	2.15	3.52	6.64	21.06	0.134-110.4

DF: Detectable frequency; GM: geometric mean; LOQ: limit of quantification.

Supplementary Table 2. Association of SG-adjusted urinary OH-PAHs with depressive symptoms

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		OR (95%CI)	P_{FDR}	OR (95%CI)	P_{FDR}	OR (95%CI)	P_{FDR}	
1-OHNap								
Model 1		1.180(0.615,2.281)	0.894	0.780(0.381,1.575)	0.894	0.876(0.588,1.339)	0.570	0.511
Model 2	Ref	1.223(0.633,2.378)	0.894	0.845(0.408,1.729)	0.894	0.934(0.619,1.449)	0.816	0.671
Model 3		1.231(0.628,2.434)	0.891	0.815(0.386, 1.700)	0.891	0.919(0.603,1.435)	0.717	0.611
2-OHNap								
Model 1		0.758(0.390,1.456)	0.894	0.628(0.312,1.234)	0.894	0.764(0.418,1.364)	0.570	0.252
Model 2	Ref	0.732(0.375,1.410)	0.894	0.617(0.306,1.215)	0.894	0.770(0.419,1.384)	0.785	0.234
Model 3		0.713(0.361,1.392)	0.891	0.587(0.289,1.165)	0.891	0.731(0.394,1.326)	0.717	0.187
2-OHFlu								
Model 1		1.206(0.603,2.439)	0.894	1.362(0.690,2.726)	0.894	0.744(0.343,1.542)	0.570	0.400
Model 2	Ref	1.177(0.586,2.385)	0.894	1.426(0.720,2.869)	0.894	0.810(0.369,1.696)	0.785	0.326
Model 3		1.157(0.572,2.361)	0.937	1.374(0.678,2.824)	0.891	0.734(0.321,1.614)	0.717	0.401
3-OHFlu								
Model 1		0.942(0.476,1.860)	0.976	1.009(0.514,1.980)	1.000	0.716(0.325,1.496)	0.570	0.983
Model 2	Ref	0.953(0.480,1.886)	0.963	1.089(0.551,2.157)	0.950	0.785(0.353,1.655)	0.785	0.809
Model 3		0.944(0.471,1.886)	0.941	1.024(0.503,2.078)	0.947	0.718(0.310,1.587)	0.717	0.959
1/9-OHPhe								
Model 1	Ref	1.350(0.685,2.702)	0.894	1.217(0.608,2.461)	0.894	0.791(0.454,1.380)	0.570	0.576

Model 2		1.392(0.703,2.797)	0.894	1.295(0.642,2.641)	0.894	0.847(0.485,1.479)	0.785	0.463
Model 3		1.361(0.682,2.758)	0.891	1.228(0.596,2.551)	0.891	0.809(0.452,1.445)	0.717	0.564
2-OHPhe								
Model 1		0.741(0.370,1.461)	0.894	0.901(0.464,1.742)	0.937	0.754(0.305,1.721)	0.570	0.776
Model 2	Ref	0.759(0.378,1.502)	0.894	0.944(0.483,1.835)	0.963	0.807(0.324,1.853)	0.785	0.874
Model 3		0.731(0.361,1.460)	0.891	0.901(0.455,1.772)	0.941	0.771(0.299,1.837)	0.717	0.768
3-OHPhe								
Model 1		0.847(0.438,1.626)	0.894	0.661(0.328,1.306)	0.894	0.768(0.337,1.657)	0.570	0.228
Model 2	Ref	0.870(0.449,1.674)	0.894	0.708(0.348,1.409)	0.894	0.837(0.365,1.819)	0.785	0.319
Model 3		0.924(0.469,1.812)	0.941	0.700(0.339,1.416)	0.891	0.815(0.345,1.834)	0.717	0.315
4-OHPhe								
Model 1		0.551(0.271,1.087)	0.894	0.728(0.376,1.389)	0.894	0.660(0.341,1.246)	0.570	0.323
Model 2	Ref	0.575(0.282,1.139)	0.894	0.763(0.392,1.466)	0.894	0.702(0.362,1.330)	0.785	0.402
Model 3		0.551(0.267,1.103)	0.891	0.692(0.348,1.355)	0.891	0.662(0.336,1.277)	0.717	0.275
1-OHPyr								
Model 1		0.933(0.448,1.939)	0.976	1.667(0.865,3.286)	0.894	1.746(0.884,3.489)	0.570	0.151
Model 2	Ref	0.986(0.470,2.062)	0.970	1.762(0.909,3.496)	0.894	1.847(0.939,3.673)	0.785	0.111
Model 3		0.956(0.450,2.024)	0.941	1.853(0.940,3.746)	0.891	1.950(0.975,3.953)	0.717	0.096
ΣOH-NAPs								
Model 1		0.894(0.460,1.727)	0.937	0.747(0.373,1.473)	0.894	0.773(0.405,1.445)	0.570	0.387
Model 2	Ref	0.873(0.447,1.696)	0.894	0.778(0.387,1.543)	0.894	0.816(0.423,1.540)	0.785	0.457
Model 3		0.830(0.418,1.638)	0.891	0.731(0.359,1.463)	0.891	0.760(0.388,1.456)	0.717	0.365

ΣOH-FLUs								
Model 1		1.350(0.685,2.702)	0.894	1.217(0.608,2.461)	0.894	0.727(0.331,1.516)	0.570	0.671
Model 2	Ref	1.336(0.675,2.681)	0.894	1.287(0.640,2.618)	0.894	0.794(0.358,1.674)	0.785	0.543
Model 3		1.311(0.658,2.651)	0.891	1.206(0.583,2.511)	0.891	0.722(0.312,1.597)	0.717	0.687
ΣOH-PHEs								
Model 1		1.124(0.574,2.214)	0.937	1.008(0.506,2.009)	1.000	0.767(0.354,1.590)	0.570	0.098
Model 2	Ref	1.185(0.602,2.346)	0.894	1.094(0.544,2.201)	0.950	0.828(0.381,1.720)	0.785	0.848
Model 3		1.193(0.597,2.400)	0.891	1.059(0.518,2.167)	0.941	0.787(0.350,1.692)	0.717	0.924
ΣOH-PAHs								
Model 1		1.000(0.517,1.936)	1.000	0.789(0.392,1.568)	0.894	0.872(0.427,1.732)	0.701	0.468
Model 2	Ref	0.981(0.504,1.910)	0.970	0.826(0.408,1.651)	0.894	0.932(0.452,1.873)	0.847	0.566
Model 3		0.936(0.469,1.864)	0.941	0.785(0.383,1.588)	0.891	0.874(0.415,1.791)	0.717	0.483

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

P_{FDR} denotes the Benjamini–Hochberg FDR-adjusted *P*-value. FDR correction was applied separately to continuous-exposure models and to categorical (tertile) models (T2 and T3) ;within each outcome and separately for Model 1, Model 2, and Model 3.

Supplementary Table 3. Association of SG-adjusted urinary OH-PAHs with anxiety symptoms

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		OR (95%CI)	P_{FDR}	OR (95%CI)	P_{FDR}	OR (95%CI)	P_{FDR}	
1-OHNap								
Model 1		1.652(0.858,3.256)	0.962	1.077(0.528,2.204)	1.000	1.097(0.725,1.710)	0.901	0.826
Model 2	Ref	1.598(0.820,3.181)	0.863	1.053(0.507,2.193)	0.991	1.107(0.719,1.757)	0.954	0.893
Model 3		1.550(0.778,3.150)	0.838	0.928(0.433,1.984)	0.945	1.118(0.717,1.794)	0.957	0.846
2-OHNap								
Model 1		1.114(0.584,2.136)	1.000	0.789(0.392,1.568)	1.000	0.869(0.484,1.530)	0.901	0.571
Model 2	Ref	1.085(0.564,2.098)	0.983	0.779(0.384,1.559)	0.983	0.879(0.484,1.565)	0.954	0.562
Model 3		0.967(0.490,1.912)	0.945	0.764(0.371,1.555)	0.894	0.884(0.478,1.601)	0.957	0.558
2-OHFlu								
Model 1		0.741(0.370,1.461)	1.000	1.009(0.528,1.929)	1.000	0.911(0.432,1.837)	0.901	0.925
Model 2	Ref	0.710(0.351,1.413)	0.863	1.084(0.562,2.096)	0.983	0.976(0.456,2.003)	0.954	0.747
Model 3		0.682(0.332,1.379)	0.838	1.195(0.605,2.370)	0.894	1.060(0.479,2.252)	0.957	0.567
3-OHFlu								
Model 1		0.692(0.341,1.375)	0.962	1.064(0.560,2.024)	1.000	0.910(0.429,1.838)	0.901	0.749
Model 2	Ref	0.672(0.328,1.349)	0.863	1.159(0.603,2.236)	0.983	0.979(0.454,2.012)	0.954	0.571
Model 3		0.663(0.318,1.355)	0.838	1.279(0.647,2.539)	0.894	1.061(0.479,2.243)	0.957	0.405
1/9-OHPhe								
Model 1		0.937(0.458,1.910)	1.000	1.562(0.817,3.043)	0.962	1.368(0.789,2.385)	0.901	0.197
Model 2	Ref	0.990(0.479,2.040)	0.991	1.805(0.928,3.588)	0.737	1.529(0.873,2.696)	0.602	0.101
Model 3		1.026(0.489,2.150)	0.945	1.977(0.987,4.054)	0.494	1.568(0.880,2.826)	0.572	0.073
2-OHPhe								
Model 1		0.692(0.341,1.375)	0.962	1.064(0.560,2.024)	1.000	1.091(0.471,2.358)	0.901	0.792
Model 2	Ref	0.697(0.341,1.399)	0.863	1.179(0.614,2.278)	0.983	1.264(0.535,2.788)	0.954	0.575
Model 3		0.735(0.353,1.505)	0.894	1.238(0.631,2.444)	0.894	1.226(0.512,2.746)	0.957	0.498
3-OHPhe								
Model 1	Ref	1.475(0.768,2.884)	0.962	1.008(0.498,2.042)	1.000	1.260(0.589,2.582)	0.901	0.918

Model 2		1.545(0.797,3.054)	0.863	1.129(0.550,2.324)	0.983	1.402(0.641,2.934)	0.954	0.822
Model 3		1.754(0.879,3.576)	0.741	1.143(0.543,2.417)	0.945	1.420(0.636,3.075)	0.957	0.815
4-OHPhe								
Model 1		1.000(0.510,1.963)	1.000	1.068(0.549,2.085)	1.000	1.233(0.666,2.250)	0.901	0.726
Model 2	Ref	1.004(0.505,1.996)	0.991	1.174(0.596,2.326)	0.983	1.406(0.748,2.608)	0.920	0.530
Model 3		0.938(0.463,1.897)	0.945	1.217(0.604,2.465)	0.894	1.446(0.754,2.742)	0.845	0.473
1-OHPyr								
Model 1		1.590(0.779,3.335)	0.962	2.075(1.046,4.271)*	0.962	1.789(0.913,3.545)	0.901	0.423
Model 2	Ref	1.564(0.758,3.315)	0.863	2.092(1.043,4.350)*	0.585	1.845(0.930,3.695)	0.602	0.043*
Model 3		1.593(0.755,3.450)	0.838	2.359(1.148,5.037)*	0.494	2.051(1.012,4.221)*	0.572	0.022*
ΣOH-NAPs								
Model 1		1,253(0.649,2.444)	1.000	1.008(0.506,2.009)	1.000	0.978(0.524,1.797)	0.945	0.951
Model 2	Ref	1.163(0.596,2.286)	0.983	1.004(0.499,2.021)	0.991	0.982(0.516,1.837)	0.954	0.948
Model 3		1.077(0.539,2.169)	0.945	0.956(0.466,1.961)	0.945	0.987(0.508,1.886)	0.969	0.859
ΣOH-FLUs								
Model 1		0.741(0.370,1.461)	1.000	1.009(0.528,1.929)	1.000	0.908(0.428,1.838)	0.901	0.910
Model 2	Ref	0.698(0.345,1.390)	0.863	1.088(0.564,2.105)	0.983	0.976(0.453,2.010)	0.954	0.733
Model 3		0.669(0.325,1.356)	0.838	1.203(0.607,2.389)	0.894	1.060(0.477,2.253)	0.957	0.544
ΣOH-PHEs								
Model 1		0.813(0.387,1.686)	1.000	1.713(0.904,3.316)	0.962	1.493(0.739,2.936)	0.901	0.073
Model 2	Ref	0.848(0.400,1.779)	0.983	1.979(1.024,3.921)*	0.585	1.711(0.834,3.429)	0.602	0.031*
Model 3		0.823(0.377,1.773)	0.894	2.065(1.044,4.186)*	0.494	1.749(0.832,3.615)	0.572	0.027*
ΣOH-PAHs								
Model 1		0.944(0.484,1.838)	1.000	0.952(0.488,1.854)	1.000	1.099(0.552,2.142)	0.901	0.871
Model 2	Ref	0.855(0.433,1.681)	0.983	0.929(0.470,1.831)	0.983	1.115(0.546,2.222)	0.954	0.849
Model 3		0.823(0.405,1.665)	0.894	0.903(0.448,1.813)	0.945	1.148(0.551,2.339)	0.957	0.800

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine. Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking. *$p < 0.05$.

P_{FDR} denotes the Benjamini–Hochberg FDR-adjusted *P*-value. FDR correction was applied separately to continuous-exposure models and to categorical (tertile) models (T2 and T3) ;within each outcome and separately for Model 1, Model 2, and Model 3.

Supplementary Table 4. Association of SG-adjusted urinary OH-PAHs with GDS scores

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		β (95%CI)	P_{FDR}	β (95%CI)	P_{FDR}	β (95%CI)	P_{FDR}	
1-OHNap								
Model 1		0.188(-0.377,0.754)	0.993	0.039(-0.528,0.605)	0.993	-0.003(-0.358,0.352)	0.999	0.922
Model 2	Ref	0.208(-0.360,0.776)	0.986	0.096(-0.480,0.672)	0.986	0.048(-0.316,0.411)	0.932	0.780
Model 3		0.227(-0.353,0.806)	0.982	0.091(-0.501,0.683)	0.982	0.043(-0.331,0.417)	0.941	0.795
2-OHNap								
Model 1		-0.138(-0.703,0.428)	0.993	-0.048(-0.615,0.519)	0.993	0.000(-0.483,0.482)	0.999	0.963
Model 2	Ref	-0.171(-0.737,0.395)	0.986	-0.066(-0.632,0.501)	0.986	0.008(-0.474,0.489)	0.975	0.995
Model 3		-0.191(-0.768,0.386)	0.982	-0.104(-0.679,0.472)	0.982	-0.019(-0.509,0.472)	0.941	0.891
2-OHFlu								
Model 1		0.138(-0.428,0.703)	0.993	0.002(-0.564,0.569)	0.993	-0.331(-0.937,0.275)	0.607	0.979
Model 2	Ref	0.114(-0.452,0.680)	0.986	0.041(-0.527,0.609)	0.986	-0.261(-0.873,0.351)	0.777	0.901
Model 3		0.113(-0.461,0.686)	0.982	-0.008(-0.594,0.578)	0.982	-0.346(-0.989,0.297)	0.719	0.965
3-OHFlu								
Model 1		0.130(-0.435,0.696)	0.993	-0.143(-0.710,0.423)	0.993	-0.338(-0.947,0.271)	0.607	0.590
Model 2	Ref	0.138(-0.427,0.703)	0.986	-0.081(-0.651,0.490)	0.986	-0.264(-0.880,0.352)	0.777	0.755
Model 3		0.132(-0.441,0.705)	0.982	-0.141(-0.731,0.450)	0.982	-0.345(-0.990,0.300)	0.719	0.619
1/9-OHPhe								
Model 1	Ref	-0.007(-0.573,0.559)	0.993	0.039(-0.528,0.606)	0.993	-0.241(-0.707,0.225)	0.607	0.922
Model 2		0.020(-0.546,0.586)	0.986	0.099(-0.472,0.669)	0.986	-0.181(-0.652,0.290)	0.777	0.765

Model 3		0.007(-0.567,0.580)	0.982	0.089(-0.497,0.675)	0.982	-0.199(-0.680,0.282)	0.719	0.796
2-OHPhe								
Model 1		-0.087(-0.653,0.479)	0.993	-0.186(-0.753,0.380)	0.993	-0.285(-0.977,0.407)	0.607	0.513
Model 2	Ref	-0.068(-0.634,0.497)	0.986	-0.140(-0.709,0.429)	0.986	-0.219(-0.915,0.477)	0.777	0.621
Model 3		-0.084(-0.657,0.490)	0.982	-0.161(-0.739,0.417)	0.982	-0.245(-0.954,0.463)	0.719	0.579
3-OHPhe								
Model 1		0.275(-0.287,0.837)	0.993	-0.398(-0.962,0.165)	0.993	-0.283(-0.927,0.362)	0.607	0.129
Model 2	Ref	0.297(-0.266,0.860)	0.986	-0.337(-0.905,0.231)	0.986	-0.211(-0.861,0.438)	0.777	0.199
Model 3		0.302(-0.274,0.878)	0.982	-0.372(-0.952,0.207)	0.982	-0.250(-0.915,0.415)	0.719	0.169
4-OHPhe								
Model 1		-0.333(-0.898,0.232)	0.993	-0.135(-0.701,0.431)	0.993	-0.292(-0.815,0.231)	0.607	0.695
Model 2	Ref	-0.303(-0.870,0.264)	0.986	-0.085(-0.654,0.483)	0.986	-0.234(-0.762,0.294)	0.777	0.829
Model 3		-0.314(-0.890,0.261)	0.982	-0.118(-0.701,0.465)	0.982	-0.260(-0.800,0.280)	0.719	0.745
1-OHPyr								
Model 1		-0.051(-0.613,0.512)	0.993	0.520(-0.044,1.083)	0.993	0.408(-0.158,0.975)	0.607	0.104
Model 2	Ref	-0.017(-0.583,0.549)	0.986	0.555(-0.011,1.120)	0.986	0.462(-0.108,1.031)	0.777	0.079
Model 3		-0.052(-0.627,0.523)	0.982	0.555(-0.021,1.132)	0.982	0.457(-0.125,1.038)	0.719	0.089
ΣOH-NAPs								
Model 1		0.036(-0.530,0.602)	0.993	0.061(-0.506,0.628)	0.993	0.009(-0.513,0.530)	0.999	0.844
Model 2	Ref	0.005(-0.563,0.573)	0.986	0.089(-0.480,0.657)	0.986	0.047(-0.478,0.573)	0.932	0.767
Model 3		-0.021(-0.603,0.560)	0.982	0.062(-0.517,0.641)	0.982	0.025(-0.514,0.563)	0.941	0.839
ΣOH-FLUs								

Model 1		0.225(-0.341,0.790)	0.993	-0.042(-0.608,0.525)	0.993	-0.340(-0.949,0.270)	0.607	0.742
Model 2	Ref	0.210(-0.356,0.775)	0.986	0.006(-0.563,0.574)	0.986	-0.267(-0.884,0.349)	0.777	0.888
Model 3		0.205(-0.369,0.779)	0.982	-0.053(-0.641,0.535)	0.982	-0.352(-0.999,0.295)	0.719	0.736
ΣOH-PHEs								
Model 1		0.181(-0.384,0.747)	0.993	-0.020(-0.586,0.547)	0.993	-0.283(-0.892,0.326)	0.607	0.896
Model 2	Ref	0.223(-0.344,0.790)	0.986	0.054(-0.517,0.626)	0.986	-0.216(-0.830,0.398)	0.777	0.908
Model 3		0.200(-0.380,0.781)	0.982	0.045(-0.539,0.630)	0.982	-0.246(-0.875,0.382)	0.719	0.933
ΣOH-PAHs								
Model 1		0.181(-0.384,0.747)	0.993	0.133(-0.433,0.700)	0.993	0.060(-0.520,0.639)	0.999	0.645
Model 2	Ref	0.152(-0.416,0.720)	0.986	0.163(-0.407,0.732)	0.986	0.107(-0.477,0.691)	0.932	0.557
Model 3		0.135(-0.450,0.719)	0.982	0.138(-0.442,0.718)	0.982	0.081(-0.517,0.680)	0.941	0.616

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

P_{FDR} denotes the Benjamini–Hochberg FDR-adjusted *P*-value. FDR correction was applied separately to continuous-exposure models and to categorical (tertile) models (T2 and T3) ;within each outcome and separately for Model 1, Model 2, and Model 3.

Supplementary Table 5. Association of SG-adjusted urinary OH-PAHs with HAMA scores

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		β (95%CI)	P_{FDR}	β (95%CI)	P_{FDR}	β (95%CI)	P_{FDR}	
1-OHNap								
Model 1		0.826(-0.710,2.362)	0.994	0.134(-1.405,1.673)	0.994	0.013(-0.952,0.979)	0.978	0.828
Model 2	Ref	0.635(-0.883,2.152)	0.936	-0.038(-1.576,1.499)	0.962	-0.034(-1.005,0.936)	0.945	0.982
Model 3		0.561(-0.964,2.086)	0.930	-0.338(-1.895,1.220)	0.930	-0.107(-1.092,0.877)	0.996	0.700
2-OHNap								
Model 1		0.384(-1.152,1.920)	0.994	-0.448(-1.987,1.092)	0.994	-0.229(-1.540,1.082)	0.975	0.594
Model 2	Ref	0.222(-1.289,1.732)	0.936	-0.558(-2.07,0.954)	0.936	-0.240(-1.527,1.047)	0.945	0.509
Model 3		0.035(-1.482,1.553)	0.963	-0.663(-2.177,0.851)	0.930	-0.344(-1.636,0.947)	0.996	0.438
2-OHFlu								
Model 1		-0.696(-2.232,0.841)	0.994	-0.081(-1.621,1.459)	0.994	-0.123(-1.773,1.526)	0.975	0.953
Model 2	Ref	-0.791(-2.299,0.718)	0.936	0.107(-1.408,1.621)	0.962	0.060(-1.576,1.696)	0.945	0.837
Model 3		-0.815(-2.323,0.693)	0.887	0.125(-1.416,1.666)	0.947	0.005(-1.692,1.702)	0.996	0.841
3-OHFlu								
Model 1		-1.080(-2.613,0.454)	0.994	0.066(-1.471,1.602)	0.994	-0.106(-1.763,1.552)	0.975	0.820
Model 2	Ref	-1.103(-2.606,0.401)	0.785	0.287(-1.232,1.806)	0.936	0.083(-1.563,1.730)	0.945	0.608
Model 3		-1.129(-2.633,0.375)	0.775	0.265(-1.285,1.814)	0.930	0.006(-1.695,1.707)	0.996	0.648
1/9-OHPhe								
Model 1		0.196(-1.340,1.732)	0.994	0.856(-0.683,2.395)	0.994	0.448(-0.819,1.715)	0.975	0.305
Model 2	Ref	0.357(-1.15,1.864)	0.936	1.224(-0.295,2.743)	0.748	0.748(-0.509,2.005)	0.793	0.138
Model 3		0.360(-1.147,1.867)	0.930	1.137(-0.403,2.676)	0.775	0.684(-0.582,1.950)	0.942	0.177
2-OHPhe								
Model 1		0.036(-1.502,1.575)	0.994	0.274(-1.267,1.815)	0.994	0.355(-1.527,2.236)	0.975	0.702
Model 2	Ref	0.037(-1.473,1.547)	0.962	0.566(-0.953,2.086)	0.936	0.751(-1.107,2.609)	0.945	0.439
Model 3		0.076(-1.435,1.587)	0.959	0.542(-0.980,2.064)	0.930	0.571(-1.295,2.437)	0.996	0.461

3-OHPhe								
Model 1		1.304(-0.228,2.837)	0.994	0.264(-1.272,1.799)	0.994	0.860(-0.892,2.611)	0.975	0.854
Model 2	Ref	1.375(-0.131,2.88)	0.748	0.558(-0.962,2.079)	0.936	1.100(-0.633,2.833)	0.793	0.560
Model 3		1.536(0.017,3.055)*	0.624	0.464(-1.064,1.992)	0.930	0.992(-0.759,2.742)	0.942	0.651
4-OHPhe								
Model 1		-0.761(-2.298,0.776)	0.994	-0.540(-2.079,1.000)	0.994	-0.206(-1.630,1.219)	0.975	0.586
Model 2	Ref	-0.800(-2.315,0.714)	0.936	-0.287(-1.805,1.231)	0.936	0.125(-1.286,1.536)	0.945	0.825
Model 3		-0.975(-2.490,0.540)	0.887	-0.374(-1.909,1.160)	0.930	0.030(-1.394,1.454)	0.996	0.739
1-OHPyr								
Model 1		0.862(-0.668,2.393)	0.994	1.626(0.093,3.160)*	0.988	1.480(-0.057,3.017)	0.780	0.041*
Model 2	Ref	0.735(-0.778,2.248)	0.936	1.592(0.080,3.103)*	0.748	1.522(0.004,3.040)*	0.650	0.045*
Model 3		0.791(-0.724,2.306)	0.887	1.726(0.207,3.246)*	0.624	1.596(0.067,3.125)*	0.533	0.029*
ΣOH-NAPs								
Model 1		0.239(-1.299,1.777)	0.994	-0.149(-1.690,1.392)	0.994	-0.166(-1.584,1.253)	0.975	0.795
Model 2	Ref	-0.079(-1.595,1.438)	0.962	-0.241(-1.76,1.278)	0.936	-0.248(-1.651,1.155)	0.945	0.712
Model 3		-0.210(-1.741,1.322)	0.930	-0.431(-1.957,1.094)	0.930	-0.403(-1.820,1.014)	0.996	0.548
ΣOH-FLUs								
Model 1		-0.609(-2.146,0.928)	0.994	0.006(-1.534,1.546)	0.994	-0.128(-1.787,1.532)	0.975	0.915
Model 2	Ref	-0.748(-2.256,0.76)	0.936	0.204(-1.313,1.72)	0.936	0.063(-1.585,1.710)	0.945	0.710
Model 3		-0.799(-2.309,0.712)	0.887	0.202(-1.345,1.749)	0.930	-0.004(-1.711,1.702)	0.996	0.741
ΣOH-PHEs								
Model 1		-0.312(-1.845,1.222)	0.994	0.930(-0.606,2.467)	0.994	0.759(-0.897,2.415)	0.975	0.193
Model 2	Ref	-0.206(-1.713,1.302)	0.936	1.280(-0.240,2.800)	0.748	1.090(-0.547,2.728)	0.793	0.076
Model 3		-0.174(-1.696,1.349)	0.930	1.182(-0.352,2.716)	0.775	0.958(-0.696,2.611)	0.942	0.103
ΣOH-PAHs								
Model 1		0.101(-1.437,1.640)	0.994	-0.272(-1.813,1.269)	0.994	0.123(-1.453,1.698)	0.975	0.700
Model 2	Ref	-0.243(-1.761,1.274)	0.936	-0.417(-1.939,1.105)	0.936	0.055(-1.504,1.615)	0.945	0.608
Model 3		-0.265(-1.805,1.275)	0.930	-0.561(-2.088,0.967)	0.930	-0.094(-1.671,1.483)	0.996	0.486

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

P_{FDR} denotes the Benjamini–Hochberg FDR-adjusted *P*-value. FDR correction was applied separately to continuous-exposure models and to categorical (tertile) models (T2 and T3) ;within each outcome and separately for Model 1, Model 2, and Model 3.

Supplementary Table 6. Association of SG-adjusted urinary OH-PAHs with depressive symptoms stratified by sex

OH-PAHs	Males OR (95%CI)[a]	*P* for trend	Females OR (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.605(0.172,2.020)	0.392	0.988(0.409,2.390)	0.974	0.603
T3	0.594(0.170,1.951)		0.986(0.409,2.377)		
Continuous	0.977(0.431,2.318)		0.895(0.541,1.540)		0.849
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.592(0.178,1.841)	0.178	0.756(0.314,1.785)	0.585	0.893
T3	0.435(0.120,1.405)		0.778(0.325,1.831)		
Continuous	0.493(0.170,1.319)		0.957(0.429,2.087)		0.336
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	1.580(0.515,5.165)	0.205	1.164(0.468,2.923)	0.384	0.392
T3	0.439(0.095,1.811)		1.472(0.611,3.628)		
Continuous	0.334(0.072,1.325)		0.989(0.346,2.681)		0.125
3-OHFlu					
T1	1(Ref.)		1(Ref.)		0.482
T2	0.947(0.294,3.059)	0.283	1.135(0.474,2.739)	0.868	
T3	0.504(0.125,1.879)		1.081(0.442,2.646)		
Continuous	0.373(0.079,1.485)		0.899(0.310,2.454)		0.207
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	1.196(0.399,3.683)	0.424	1.030(0.406,2.618)	0.318	0.067
T3	0.518(0.124,1.916)		1.570(0.660,3.843)		
Continuous	0.539(0.165,1.708)		0.888(0.447,1.766)		0.336
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.311(0.078,1.033)	0.081	1.081(0.443,2.654)	0.892	0.284
T3	0.348(0.097,1.097)		1.065(0.436,2.606)		
Continuous	0.217(0.034,1.104)		1.282(0.406,3.620)		0.067
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.614(0.182,1.949)	0.177	1.346(0.562,3.285)	0.847	0.158
T3	0.429(0.116,1.433)		0.938(0.373,2.337)		
Continuous	0.403(0.080,1.706)		1.038(0.351,2.870)		0.231
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.429(0.120,1.378)	0.124	0.719(0.296,1.703)	0.502	0.433
T3	0.384(0.104,1.258)		0.745(0.305,1.777)		
Continuous	0.453(0.132,1.445)		0.751(0.322,1.684)		0.300

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	0.396(0.096,1.397)	0.908	1.405(0.537,3.789)	0.048*	0.465
T3	0.987(0.322,3.017)		2.506(1.038,6.463)*		
Continuous	1.416(0.356,5.602)		2.312(0.998,5.533)		0.438
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	0.546(0.147,1.856)	0.627	0.926(0.388,2.197)	0.532	0.965
T3	0.717(0.220,2.267)		0.753(0.304,1.829)		
Continuous	0.574(0.177,1.687)		0.910(0.379,2.145)		0.481
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	1.112(0.361,3.498)	0.133	1.136(0.460,2.833)	0.395	0.523
T3	0.358(0.078,1.430)		1.455(0.607,3.572)		
Continuous	0.344(0.073,1.384)		0.944(0.326,2.577)		0.156
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	0.744(0.239,2.233)	0.126	0.748(0.293,1.863)	0.611	0.240
T3	0.360(0.087,1.260)		1.203(0.511,2.853)		
Continuous	0.349(0.070,1.491)		1.017(0.379,2.551)		0.155
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	0.772(0.220,2.617)	0.812	1.315(0.543,3.239)	0.973	0.876
T3	0.842(0.254,2.775)		1.047(0.423,2.601)		
Continuous	0.548(0.141,1.861)		1.156(0.442,2.959)		0.309

a Calculated using logistic regression, adjusted for age, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 7. Association of SG-adjusted urinary OH-PAHs with anxiety symptoms stratified by sex

OH-PAHs	Males OR (95%CI)[a]	*P* for trend	Females OR (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	1.159(0.359,3.942)	0.622	1.120(0.443,2.853)	0.857	0.625
T3	1.351(0.406,4.706)		0.912(0.360,2.303)		
Continuous	1.349(0.560,3.450)		0.992(0.593,1.722)		0.485
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	1.009(0.324,3.231)	0.829	0.792(0.318,1.942)	0.453	0.531
T3	0.888(0.270,2.931)		0.699(0.272,1.753)		
Continuous	1.236(0.482,3.103)		0.658(0.280,1.485)		0.272
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.635(0.209,1.876)	0.375	0.847(0.315,2.223)	0.490	0.605
T3	0.563(0.156,1.903)		1.334(0.544,3.330)		
Continuous	0.464(0.100,1.828)		1.513(0.547,4.087)		0.146
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.660(0.218,1.945)	0.363	0.899(0.341,2.334)	0.663	0.275
T3	0.549(0.151,1.865)		1.214(0.488,3.060)		
Continuous	0.568(0.127,2.122)		1.413(0.504,3.821)		0.221
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.908(0.282,2.911)	0.800	0.828(0.292,2.275)	0.133	0.319
T3	1.194(0.371,3.954)		2.039(0.839,5.179)		
Continuous	1.128(0.345,3.548)		1.774(0.885,3.693)		0.463
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.290(0.080,0.921)	0.111	1.678(0.638,4.545)	0.394	0.433
T3	0.390(0.117,1.196)		1.540(0.600,4.098)		
Continuous	0.399(0.070,1.837)		1.910(0.651,5.629)		0.103
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.897(0.289,2.765)	0.601	2.904(1.095,8.264)	0.523	0.848
T3	0.727(0.214,2.398)		1.540(0.565,4.366)		
Continuous	0.606(0.124,2.415)		2.163(0.773,6.251)		0.133
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.977(0.303,3.202)	0.503	1.353(0.540,3.468)	0.607	0.873
T3	1.480(0.445,5.153)		1.288(0.493,3.416)		
Continuous	1.156(0.342,3.802)		1.669(0.743,3.753)		0.497

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	1.928(0.569,7.217)	0.085	1.645(0.615,4.554)	0.155	0.543
T3	2.926(0.895,10.833)		1.979(0.781,5.284)		
Continuous	2.051(0.555,7.794)		2.000(0.849,4.855)		0.889
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	1.232(0.380,4.212)	0.577	0.996(0.405,2.451)	0.345	0.713
T3	1.410(0.438,4.798)		0.627(0.234,1.627)		
Continuous	1.359(0.472,3.812)		0.717(0.292,1.703)		0.312
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	0.666(0.221,1.954)	0.392	0.921(0.350,2.386)	0.579	0.501
T3	0.573(0.157,1.954)		1.277(0.514,3.215)		
Continuous	0.510(0.111,1.974)		1.465(0.524,3.971)		0.180
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	0.773(0.231,2.528)	0.524	0.945(0.339,2.592)	0.146	0.557
T3	1.458(0.454,4.898)		1.886(0.764,4.854)		
Continuous	0.925(0.202,3.571)		2.297(0.912,6.010)		0.232
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	1.227(0.380,4.167)	0.480	0.854(0.342,2.111)	0.262	0.598
T3	1.526(0.474,5.190)		0.583(0.219,1.491)		
Continuous	1.410(0.424,4.433)		0.913(0.345,2.336)		0.560

a Calculated using logistic regression, adjusted for age, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 8. Association of SG-adjusted urinary OH-PAHs with GDS scores stratified by sex

OH-PAHs	Malesβ (95%CI)[a]	*P* for trend	Femalesβ (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.047(-0.841,0.936)	0.727	-0.035(-0.831,0.760)	0.751	0.635
T3	-0.155(-1.040,0.730)		0.135(-0.656,0.925)		
Continuous	0.116(-0.515,0.747)		-0.009(-0.487,0.469)		0.955
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	-0.234(-1.092,0.624)	0.408	-0.287(-1.075,0.502)	0.619	0.631
T3	-0.370(-1.233,0.493)		0.161(-0.622,0.944)		
Continuous	-0.290(-0.988,0.408)		0.224(-0.477,0.926)		0.300
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.213(-0.649,1.075)	0.251	0.220(-0.572,1.013)	0.874	0.684
T3	-0.483(-1.397,0.430)		-0.045(-0.843,0.752)		
Continuous	-0.548(-1.478,0.381)		-0.252(-1.164,0.660)		0.435
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	-0.228(-1.097,0.642)	0.405	0.365(-0.419,1.149)	0.975	0.840
T3	-0.400(-1.315,0.516)		-0.003(-0.798,0.791)		
Continuous	-0.428(-1.357,0.501)		-0.345(-1.259,0.569)		0.635
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.178(-0.675,1.031)	0.380	-0.377(-1.165,0.412)	0.578	0.025*
T3	-0.442(-1.313,0.428)		0.266(-0.528,1.059)		
Continuous	-0.471(-1.288,0.347)		-0.115(-0.724,0.493)		0.418
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.528(-1.385,0.330)	0.043	0.252(-0.552,1.055)	0.990	0.368
T3	-0.908(-1.773,-0.043) *		0.002(-0.793,0.797)		
Continuous	-0.967(-2.012,0.078)		0.247(-0.738,1.232)		0.076
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.037(-0.902,0.828)	0.279	0.749(-0.053,1.551)	0.986	0.070
T3	-0.480(-1.362,0.403)		0.065(-0.722,0.851)		
Continuous	-0.660(-1.626,0.306)		0.019(-0.916,0.954)		0.238
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.206(-1.078,0.666)	0.247	-0.081(-0.871,0.710)	0.884	0.395
T3	-0.518(-1.399,0.364)		0.059(-0.742,0.859)		
Continuous	-0.539(-1.385,0.306)		-0.125(-0.846,0.596)		0.313

1-OHPyr					
T1	1(Ref.)		1(Ref.)		0.661
T2	-0.527(-1.378,0.324)	0.823	0.317(-0.476,1.109)	0.063	
T3	0.142(-0.714,0.998)		0.753(-0.030,1.535)		
Continuous	0.120(-0.883,1.122)		0.630(-0.103,1.363)		0.329
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	-0.140(-1.012,0.733)	0.973	-0.162(-0.962,0.637)	0.725	0.807
T3	-0.002(-0.879,0.876)		0.136(-0.652,0.924)		
Continuous	-0.192(-0.963,0.579)		0.214(-0.553,0.981)		0.379
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	-0.030(-0.889,0.829)	0.173	0.305(-0.481,1.092)	0.918	0.525
T3	-0.610(-1.530,0.311)		0.058(-0.737,0.853)		
Continuous	-0.503(-1.437,0.430)		-0.297(-1.214,0.620)		0.515
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	-0.086(-0.939,0.766)	0.166	-0.243(-1.040,0.554)	0.388	0.200
T3	-0.615(-1.487,0.256)		0.313(-0.482,1.108)		
Continuous	-0.704(-1.676,0.268)		-0.023(-0.866,0.820)		0.217
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	0.125(-0.744,0.995)	0.797	0.340(-0.467,1.147)	0.397	0.648
T3	0.125(-0.756,1.007)		0.360(-0.428,1.149)		
Continuous	-0.251(-1.116,0.615)		0.351(-0.494,1.197)		0.253

a Calculated using logistic regression, adjusted for age, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 9. Association of SG-adjusted urinary OH-PAHs with HAMA scores stratified by sex

OH-PAHs	Males β (95%CI)[a]	*P* for trend	Females β (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	-0.723(-3.012,1.566)	0.705	-0.111(-2.214,1.992)	0.581	0.945
T3	0.423(-1.858,2.703)		-0.600(-2.688,1.489)		
Continuous	0.412(-1.218,2.042)		-0.499(-1.761,0.763)		0.446
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.157(-2.058,2.373)	0.392	-0.333(-2.423,1.758)	0.688	0.772
T3	-0.917(-3.143,1.310)		-0.438(-2.514,1.638)		
Continuous	-0.201(-2.009,1.606)		-0.520(-2.374,1.335)		0.762
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	-0.452(-2.681,1.778)	0.171	-1.067(-3.153,1.018)	0.538	0.259
T3	-1.624(-3.987,0.739)		0.555(-1.545,2.654)		
Continuous	-1.506(-3.906,0.894)		0.880(-1.531,3.291)		0.137
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	-0.479(-2.719,1.760)	0.178	-1.380(-3.444,0.683)	0.667	0.233
T3	-1.585(-3.943,0.772)		0.420(-1.671,2.511)		
Continuous	-1.148(-3.547,1.251)		0.619(-1.798,3.037)		0.239
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.513(-2.729,1.703)	0.729	0.294(-1.793,2.382)	0.178	0.276
T3	-0.361(-2.624,1.901)		1.485(-0.615,3.585)		
Continuous	-0.611(-2.730,1.507)		1.192(-0.410,2.795)		0.229
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-1.284(-3.508,0.939)	0.103	1.728(-0.387,3.843)	0.323	0.287
T3	-1.908(-4.150,0.335)		1.092(-0.999,3.183)		
Continuous	-1.403(-4.120,1.315)		1.617(-0.980,4.214)		0.121
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.207(-2.028,2.443)	0.339	2.358(0.240,4.476)*	0.466	0.575
T3	-1.083(-3.363,1.197)		0.933(-1.144,3.009)		
Continuous	-0.924(-3.429,1.581)		2.160(-0.295,4.615)		0.078
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.250(-2.511,2.010)	0.776	0.141(-1.949,2.231)	0.955	0.979
T3	0.297(-1.988,2.582)		-0.060(-2.177,2.057)		
Continuous	-0.559(-2.753,1.635)		0.358(-1.548,2.265)		0.497

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	-0.136(-2.336,2.064)	0.212	1.897(-0.195,3.988)	0.052	0.922
T3	1.481(-0.731,3.693)		1.972(-0.094,4.038)		
Continuous	1.340(-1.243,3.923)		1.596(-0.343,3.535)		0.745
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	-0.331(-2.585,1.924)	0.873	-0.842(-2.953,1.269)	0.308	0.907
T3	-0.214(-2.481,2.053)		-1.091(-3.172,0.990)		
Continuous	-0.137(-2.130,1.856)		-0.806(-2.833,1.220)		0.629
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	-0.159(-2.381,2.063)	0.206	-1.131(-3.200,0.937)	0.469	0.266
T3	-1.475(-3.856,0.906)		0.691(-1.400,2.781)		
Continuous	-1.360(-3.770,1.051)		0.750(-1.675,3.175)		0.179
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	-0.881(-3.090,1.328)	0.801	0.599(-1.506,2.703)	0.129	0.371
T3	0.282(-1.977,2.541)		1.614(-0.487,3.714)		
Continuous	-0.767(-3.291,1.757)		1.811(-0.404,4.026)		0.138
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	-0.239(-2.486,2.008)	0.959	0.261(-1.869,2.391)	0.268	0.770
T3	-0.088(-2.366,2.190)		-1.093(-3.175,0.989)		
Continuous	-0.109(-2.347,2.129)		-0.298(-2.536,1.940)		0.922

a Calculated using logistic regression, adjusted for age, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 10. Association of SG-adjusted urinary OH-PAHs with depressive symptoms stratified by BMI

OH-PAHs	Overweight OR (95% CI)[a]	*P* for trend	Non-overweight OR (95% CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	1.810(0.733,4.674)	0.440	0.623(0.186,1.951)	0.700	0.295
T3	0.678(0.236,1.893)		0.831(0.250,2.649)		
Continuous	1.039(0.561,2.019)		0.616(0.310,1.251)		0.536
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.854(0.350,2.064)	0.053	0.628(0.196,1.925)	0.651	0.530
T3	0.385(0.136,1.001)		0.767(0.245,2.342)		
Continuous	0.594(0.255,1.312)		0.930(0.335,2.468)		0.860
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.958(0.386,2.371)	0.755	1.429(0.417,5.273)	0.169	0.751
T3	0.866(0.342,2.166)		2.336(0.688,8.687)		
Continuous	0.543(0.169,1.618)		0.859(0.220,3.075)		0.918
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	1.103(0.451,2.710)	0.571	0.915(0.285,2.881)	0.867	0.990
T3	0.780(0.298,1.995)		1.094(0.329,3.559)		
Continuous	0.568(0.174,1.697)		0.782(0.198,2.819)		0.975
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.948(0.380,2.361)	0.674	0.983(0.291,3.293)	0.423	0.935
T3	0.806(0.303,2.107)		1.548(0.521,4.819)		
Continuous	0.674(0.295,1.532)		0.793(0.319,1.956)		0.754
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.690(0.280,1.656)	0.124	1.255(0.378,4.228)	0.263	0.352
T3	0.482(0.182,1.205)		1.882(0.615,6.068)		
Continuous	0.382(0.087,1.432)		1.455(0.361,4.821)		0.253
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.628(0.252,1.518)	0.060	1.228(0.364,4.235)	0.460	0.406
T3	0.398(0.145,1.014)		1.554(0.474,5.267)		
Continuous	0.389(0.106,1.285)		1.743(0.453,5.836)		0.128
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.396(0.152,0.969)	0.044	0.562(0.151,1.890)	0.589	0.525
T3	0.396(0.147,0.999)		1.270(0.442,3.723)		
Continuous	0.519(0.199,1.290)		0.745(0.257,2.079)		0.814

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	0.812(0.301,2.145)	0.398	1.265(0.362,4.534)	0.125	0.647
T3	1.568(0.644,3.918)		2.504(0.794,8.677)		
Continuous	1.843(0.698,5.001)		2.341(0.785,7.180)		0.531
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	0.927(0.382,2.239)	0.071	0.361(0.087,1.275)	0.761	0.127
T3	0.403(0.140,1.068)		1.052(0.340,3.222)		
Continuous	0.614(0.239,1.495)		0.845(0.273,2.481)		0.832
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	1.183(0.479,2.960)	0.954	1.288(0.394,4.391)	0.451	0.919
T3	0.992(0.387,2.540)		1.603(0.474,5.629)		
Continuous	0.548(0.168,1.646)		0.819(0.208,2.957)		0.938
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	0.811(0.329,1.975)	0.190	1.063(0.320,3.537)	0.344	0.731
T3	0.527(0.195,1.353)		1.644(0.551,5.151)		
Continuous	0.462(0.133,1.438)		1.127(0.331,3.504)		0.570
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	1.421(0.578,3.574)	0.354	0.461(0.126,1.527)	0.927	0.261
T3	0.645(0.229,1.746)		0.941(0.299,2.898)		
Continuous	0.639(0.219,1.740)		1.114(0.325,3.600)		0.642

a Calculated using logistic regression, adjusted for age, sex, marital status, educational level, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 11. Association of SG-adjusted urinary OH-PAHs with anxiety symptoms stratified by BMI

OH-PAHs	Overweight OR (95%CI)[a]	*P* for trend	Non-overweight OR (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	1.865(0.682,5.500)	0.398	1.217(0.439,3.427)	0.245	0.270
T3	1.643(0.596,4.837)		0.411(0.103,1.432)		
Continuous	1.497(0.748,3.195)		0.872(0.465,1.676)		0.337
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.832(0.328,2.102)	0.320	0.974(0.346,2.736)	0.589	0.921
T3	0.616(0.230,1.596)		0.732(0.231,2.210)		
Continuous	0.878(0.381,1.933)		0.848(0.313,2.205)		0.124
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.537(0.190,1.437)	0.488	0.790(0.259,2.339)	0.674	0.270
T3	1.273(0.528,3.113)		1.235(0.403,3.739)		
Continuous	0.929(0.301,2.630)		1.332(0.414,3.966)		0.654
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.740(0.270,1.977)	0.318	0.698(0.229,2.051)	0.992	0.499
T3	1.468(0.596,3.699)		0.986(0.314,3.006)		
Continuous	0.971(0.315,2.715)		1.305(0.402,3.880)		0.643
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	1.838(0.691,5.171)	0.146	0.068(0.004,0.401)*	0.291	0.002*
T3	2.109(0.770,6.112)		1.753(0.675,4.715)		
Continuous	1.497(0.641,3.581)		1.667(0.760,3.750)		0.838
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.582(0.219,1.487)	0.877	0.959(0.301,2.995)	0.432	0.836
T3	0.926(0.373,2.283)		1.528(0.523,4.610)		
Continuous	0.661(0.159,2.335)		2.037(0.664,6.238)		0.150
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	1.417(0.579,3.566)	0.419	2.698(0.840,9.286)	0.239	0.704
T3	0.683(0.239,1.869)		2.135(0.670,7.174)		
Continuous	0.728(0.208,2.230)		2.777(0.915,9.168)		0.095
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	1.392(0.567,3.520)	0.994	0.221(0.044,0.830)	0.310	0.093
T3	0.987(0.353,2.723)		1.461(0.547,4.016)		
Continuous	1.075(0.409,2.742)		1.886(0.771,4.692)		0.342

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	2.022(0.768,5.749)	0.164	1.303(0.377,4.562)	0.043*	0.830
T3	1.995(0.734,5.817)		3.224(1.079,10.663)*		
Continuous	1.708(0.614,4.886)		2.512(0.928,7.132)		0.259
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	0.932(0.352,2.493)	0.951	1.131(0.391,3.325)	0.764	0.847
T3	1.016(0.393,2.659)		0.853(0.256,2.738)		
Continuous	1.261(0.506,3.064)		0.699(0.236,1.931)		0.120
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	0.617(0.215,1.690)	0.219	0.796(0.271,2.279)	0.741	0.365
T3	1.588(0.655,3.957)		0.821(0.251,2.537)		
Continuous	0.946(0.305,2.674)		1.324(0.408,3.948)		0.644
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	1.773(0.652,5.161)	0.093	0.182(0.026,0.772)*	0.104	0.111
T3	2.415(0.892,7.066)		1.848(0.708,5.028)		
Continuous	1.249(0.395,3.648)		2.338(0.861,6.661)		0.312
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	0.669(0.242,1.813)	0.822	0.898(0.303,2.653)	0.529	0.763
T3	1.053(0.419,2.667)		0.697(0.212,2.169)		
Continuous	1.391(0.495,3.754)		0.922(0.297,2.681)		0.231

a Calculated using logistic regression, adjusted for age, sex, marital status, educational level, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 12. Association of SG-adjusted urinary OH-PAHs with GDS scores stratified by BMI

OH-PAHs	Overweight β (95%CI)[a]	*P* for trend	Non-overweight β (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.521(-0.294,1.336)	0.741	-0.161(-1.034,0.713)	0.866	0.159
T3	0.153(-0.652,0.957)		-0.067(-0.992,0.859)		
Continuous	0.203(-0.342,0.748)		-0.280(-0.825,0.266)		0.563
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	-0.204(-1.004,0.597)	0.299	-0.085(-0.949,0.779)	0.577	0.755
T3	-0.417(-1.199,0.365)		0.244(-0.634,1.122)		
Continuous	-0.188(-0.851,0.475)		0.186(-0.575,0.946)		0.869
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.268(-0.516,1.052)	0.677	0.036(-0.835,0.907)	0.904	0.815
T3	-0.137(-0.921,0.646)		0.058(-0.877,0.994)		
Continuous	-0.449(-1.347,0.448)		-0.223(-1.169,0.722)		0.959
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	0.401(-0.385,1.187)	0.720	-0.188(-1.052,0.677)	0.584	0.370
T3	-0.083(-0.870,0.705)		-0.265(-1.194,0.664)		
Continuous	-0.416(-1.315,0.484)		-0.263(-1.210,0.684)		0.996
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	0.062(-0.734,0.859)	0.918	-0.404(-1.279,0.470)	0.758	0.389
T3	-0.055(-0.868,0.759)		0.136(-0.725,0.997)		
Continuous	-0.314(-1.007,0.380)		-0.182(-0.856,0.492)		0.963
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.109(-0.890,0.672)	0.134	0.276(-0.596,1.148)	0.601	0.489
T3	-0.594(-1.377,0.188)		0.243(-0.631,1.118)		
Continuous	-0.748(-1.785,0.288)		0.220(-0.753,1.193)		0.225
3-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.043(-0.835,0.749)	0.140	0.460(-0.437,1.357)	0.927	0.644
T3	-0.575(-1.363,0.213)		0.087(-0.813,0.987)		
Continuous	-0.683(-1.611,0.245)		0.235(-0.727,1.198)		0.191
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.344(-1.135,0.447)	0.596	-0.458(-1.325,0.409)	0.862	0.716
T3	-0.211(-1.008,0.586)		0.037(-0.825,0.900)		
Continuous	-0.354(-1.118,0.409)		-0.210(-0.976,0.555)		0.567

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	-0.259(-1.041,0.523)	0.496	0.218(-0.661,1.098)	0.133	0.229
T3	0.361(-0.430,1.152)		0.681(-0.193,1.555)		
Continuous	0.290(-0.541,1.121)		0.607(-0.218,1.431)		0.633
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	0.076(-0.731,0.884)	0.652	-0.314(-1.204,0.576)	0.557	0.445
T3	-0.166(-0.961,0.629)		0.219(-0.694,1.131)		
Continuous	-0.072(-0.825,0.680)		0.049(-0.764,0.863)		0.980
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	0.464(-0.323,1.250)	0.991	-0.175(-1.044,0.694)	0.906	0.554
T3	0.055(-0.730,0.840)		-0.070(-1.007,0.867)		
Continuous	-0.444(-1.346,0.458)		-0.245(-1.195,0.705)		0.967
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	-0.002(-0.798,0.795)	0.390	-0.109(-0.980,0.761)	0.542	0.716
T3	-0.343(-1.141,0.456)		0.234(-0.628,1.096)		
Continuous	-0.569(-1.471,0.333)		0.014(-0.865,0.893)		0.417
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	0.483(-0.323,1.289)	0.819	-0.497(-1.392,0.398)	0.611	0.191
T3	0.128(-0.664,0.920)		0.126(-0.777,1.028)		
Continuous	-0.119(-0.966,0.728)		0.223(-0.660,1.107)		0.766

a Calculated using logistic regression, adjusted for age, sex, marital status, educational level, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 13. Association of SG-adjusted urinary OH-PAHs with HAMA scores stratified by BMI

OH-PAHs	Overweight β (95%CI)[a]	*P* for trend	Non-overweight β (95%CI)[a]	*P* for trend	*P* for interaction
1-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.371(-1.616,2.359)	0.816	0.637(-1.929,3.204)	0.487	0.633
T3	0.242(-1.720,2.203)		-1.086(-3.805,1.633)		
Continuous	0.287(-1.038,1.612)		-0.609(-2.222,1.003)		0.732
2-OHNap					
T1	1(Ref.)		1(Ref.)		
T2	0.233(-1.709,2.176)	0.245	-0.719(-3.272,1.834)	0.682	0.814
T3	-1.020(-2.918,0.878)		-0.555(-3.148,2.039)		
Continuous	-0.675(-2.285,0.935)		-0.003(-2.251,2.244)		0.274
2-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	-1.169(-3.071,0.732)	0.911	-0.744(-3.299,1.811)	0.327	0.721
T3	0.005(-1.895,1.906)		1.257(-1.487,4.001)		
Continuous	-0.567(-2.752,1.617)		0.926(-1.864,3.716)		0.518
3-OHFlu					
T1	1(Ref.)		1(Ref.)		
T2	-0.775(-2.686,1.136)	0.602	-1.569(-4.103,0.965)	0.597	0.906
T3	0.377(-1.537,2.292)		0.607(-2.115,3.330)		
Continuous	-0.466(-2.654,1.723)		0.797(-1.999,3.593)		0.517
1/9-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	1.620(-0.303,3.543)	0.152	-3.158(-5.666,-0.651)*	0.439	0.005*
T3	1.322(-0.642,3.286)		1.006(-1.464,3.476)		
Continuous	0.937(-0.746,2.621)		0.537(-1.453,2.527)		0.910
2-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-1.055(-2.958,0.849)	0.428	1.368(-1.191,3.928)	0.138	0.258
T3	-0.788(-2.694,1.118)		1.971(-0.595,4.537)		
Continuous	-1.181(-3.706,1.344)		2.314(-0.538,5.167)		0.020*
3-OHPhe					
T1	1(Ref.)		1(Ref.)		0.363
T2	1.245(-0.672,3.162)	0.321	2.495(-0.133,5.122)	0.184	
T3	-0.830(-2.737,1.078)		1.963(-0.674,4.599)		
Continuous	-0.574(-2.838,1.691)		2.902(0.093,5.710)		0.026*
4-OHPhe					
T1	1(Ref.)		1(Ref.)		
T2	-0.150(-2.067,1.767)	0.197	-2.524(-5.036,-0.011)*	0.339	0.040*
T3	-1.281(-3.213,0.651)		0.998(-1.500,3.496)		
Continuous	-0.787(-2.643,1.069)		0.980(-1.276,3.237)		0.089

1-OHPyr					
T1	1(Ref.)		1(Ref.)		
T2	1.203(-0.700,3.105)	0.211	0.605(-1.976,3.185)	0.052	0.717
T3	1.122(-0.803,3.047)		2.602(0.036,5.167)*		
Continuous	0.953(-1.065,2.970)		2.369(-0.054,4.792)		0.060
ΣOH-NAPs					
T1	1(Ref.)		1(Ref.)		
T2	-0.322(-2.282,1.639)	0.344	-0.560(-3.197,2.078)	0.877	0.915
T3	-0.920(-2.850,1.010)		0.131(-2.573,2.834)		
Continuous	-0.495(-2.323,1.334)		-0.402(-2.803,2.000)		0.417
ΣOH-FLUs					
T1	1(Ref.)		1(Ref.)		
T2	-1.078(-2.988,0.832)	0.745	-0.831(-3.384,1.722)	0.462	0.849
T3	0.184(-1.722,2.091)		0.922(-1.831,3.675)		
Continuous	-0.543(-2.738,1.653)		0.870(-1.934,3.674)		0.507
ΣOH-PHEs					
T1	1(Ref.)		1(Ref.)		
T2	0.503(-1.435,2.441)	0.483	-1.866(-4.387,0.654)	0.127	0.168
T3	0.703(-1.240,2.646)		1.565(-0.931,4.061)		
Continuous	0.147(-2.053,2.347)		1.889(-0.689,4.468)		0.118
ΣOH-PAHs					
T1	1(Ref.)		1(Ref.)		
T2	-0.771(-2.731,1.190)	0.399	0.245(-2.415,2.904)	0.924	0.921
T3	-0.860(-2.788,1.068)		-0.075(-2.757,2.607)		
Continuous	-0.454(-2.512,1.604)		0.274(-2.336,2.883)		0.790

a Calculated using logistic regression, adjusted for age, sex, marital status, educational level, exercise, smoking status and alcohol drinking.

* $p < 0.05$.

Supplementary Table 14. Association of SG-adjusted urinary OH-PAHs with depressive symptoms after excluding outliers

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		OR (95%CI)	*P* value	OR (95%CI)	*P* value	OR (95%CI)	*P* value	
1-OHNap								
Model 1		1.180(0.615,2.281)	0.619	0.729(0.322,1.574)	0.431	0.883(0.562,1.456)	0.604	0.489
Model 2	Ref	1.242(0.643,2.418)	0.519	0.780(0.343,1.698)	0.540	0.936(0.592,1.556)	0.787	0.643
Model 3		1.249(0.633,2.487)	0.522	0.740(0.319,1.641)	0.467	0.909(0.568,1.520)	0.701	0.569
2-OHNap								
Model 1		0.758(0.390,1.456)	0.408	0.637(0.286,1.345)	0.250	0.806(0.368,1.783)	0.591	0.293
Model 2	Ref	0.731(0.375,1.409)	0.352	0.615(0.275,1.303)	0.217	0.796(0.361,1.771)	0.572	0.271
Model 3		0.725(0.365,1.419)	0.350	0.605(0.267,1.301)	0.210	0.775(0.344,1.759)	0.539	0.243
2-OHFlu								
Model 1		1.206(0.603,2.439)	0.596	1.708(0.827,3.544)	0.146	1.071(0.385,3.070)	0.897	0.289
Model 2	Ref	1.178(0.587,2.387)	0.645	1.738(0.839,3.621)	0.136	1.127(0.403,3.260)	0.822	0.280
Model 3		1.153(0.570,2.352)	0.692	1.650(0.784,3.485)	0.185	0.994(0.351,2.918)	0.991	0.391
3-OHFlu								
Model 1		0.942(0.476,1.860)	0.863	1.210(0.584,2.475)	0.602	0.962(0.341,2.784)	0.943	0.552
Model 2	Ref	0.950(0.479,1.880)	0.882	1.271(0.611,2.614)	0.515	1.025(0.361,2.991)	0.963	0.498
Model 3		0.937(0.468,1.871)	0.852	1.176(0.553,2.464)	0.668	0.928(0.322,2.757)	0.892	0.649
1/9-OHPhe								
Model 1	Ref	1.350(0.685,2.702)	0.389	1.375(0.662,2.858)	0.390	0.867(0.457,1.708)	0.670	0.398
Model 2		1.391(0.703,2.794)	0.346	1.475(0.703,3.100)	0.301	0.940(0.490,1.871)	0.856	0.299

Model 3		1.344(0.672,2.726)	0.405	1.342(0.625,2.884)	0.448	0.849(0.435,1.711)	0.638	0.446
2-OHPhe								
Model 1		0.741(0.370,1.461)	0.389	1.055(0.522,2.101)	0.880	1.100(0.336,3.731)	0.876	0.975
Model 2	Ref	0.752(0.375,1.486)	0.415	1.073(0.530,2.144)	0.842	1.131(0.344,3.853)	0.841	0.934
Model 3		0.727(0.359,1.454)	0.370	1.023(0.497,2.077)	0.950	1.056(0.312,3.698)	0.931	0.997
3-OHPhe								
Model 1		0.847(0.438,1.626)	0.619	0.674(0.309,1.406)	0.303	0.948(0.328,2.892)	0.924	0.375
Model 2	Ref	0.869(0.448,1.672)	0.673	0.713(0.326,1.497)	0.382	1.032(0.350,3.212)	0.956	0.485
Model 3		0.953(0.481,1.878)	0.888	0.729(0.328,1.553)	0.421	1.066(0.352,3.422)	0.912	0.540
4-OHPhe								
Model 1		0.551(0.271,1.087)	0.090	0.678(0.312,1.404)	0.307	0.506(0.221,1.175)	0.109	0.129
Model 2	Ref	0.567(0.278,1.124)	0.109	0.696(0.320,1.446)	0.343	0.539(0.235,1.254)	0.147	0.148
Model 3		0.536(0.259,1.077)	0.085	0.624(0.280,1.327)	0.232	0.525(0.227,1.227)	0.133	0.114
1-OHPyr								
Model 1		0.933(0.448,1.939)	0.853	1.507(0.733,3.114)	0.263	1.818(0.750,4.692)	0.200	0.539
Model 2	Ref	1.008(0.480,2.111)	0.984	1.615(0.780,3.363)	0.195	2.038(0.842,5.244)	0.126	0.409
Model 3		0.976(0.456,2.082)	0.949	1.763(0.833,3.768)	0.138	2.333(0.929,6.250)	0.080	0.359
ΣOH-NAPs								
Model 1		0.894(0.460,1.727)	0.738	0.744(0.331,1.590)	0.456	0.820(0.350,1.953)	0.650	0.515
Model 2	Ref	0.876(0.449,1.700)	0.694	0.752(0.334,1.612)	0.474	0.832(0.354,1.989)	0.675	0.496
Model 3		0.825(0.414,1.632)	0.581	0.710(0.311,1.540)	0.397	0.772(0.321,1.880)	0.565	0.432
ΣOH-FLUs								

Model 1		1.350(0.685,2.702)	0.389	1.442(0.684,3.030)	0.332	0.973(0.348,2.786)	0.958	0.371
Model 2	Ref	1.331(0.673,2.671)	0.413	1.485(0.702,3.135)	0.297	1.035(0.368,2.993)	0.949	0.360
Model 3		1.307(0.656,2.641)	0.449	1.366(0.632,2.935)	0.422	0.913(0.320,2.685)	0.866	0.485
ΣOH-PHEs								
Model 1		1.124(0.574,2.214)	0.732	1.157(0.565,2.354)	0.686	1.005(0.392,2.655)	0.992	0.679
Model 2	Ref	1.175(0.597,2.325)	0.640	1.237(0.600,2.540)	0.560	1.085(0.420,2.886)	0.867	0.543
Model 3		1.188(0.594,2.394)	0.626	1.195(0.568,2.498)	0.636	1.002(0.380,2.714)	0.997	0.647
ΣOH-PAHs								
Model 1		1.000(0.517,1.936)	1.000	0.929(0.438,1.916)	0.843	1.402(0.549,3.682)	0.486	0.641
Model 2	Ref	0.979(0.503,1.905)	0.950	0.948(0.446,1.964)	0.886	1.454(0.566,3.853)	0.443	0.629
Model 3		0.922(0.461,1.844)	0.819	0.912(0.425,1.909)	0.808	1.370(0.524,3.681)	0.526	0.707

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

Supplementary Table 15. Association of SG-adjusted urinary OH-PAHs with anxiety symptoms after excluding outliers

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		OR (95%CI)	*P* value	OR (95%CI)	*P* value	OR (95%CI)	*P* value	
1-OHNap								
Model 1		1.652(0.858,3.256)	0.138	1.077(0.528,2.204)	0.838	1.097(0.725,1.710)	0.673	0.826
Model 2	Ref	1.598(0.820,3.181)	0.173	1.053(0.507,2.193)	0.890	1.107(0.719,1.757)	0.656	0.893
Model 3		1.550(0.778,3.150)	0.217	0.928(0.433,1.984)	0.846	1.118(0.717,1.794)	0.632	0.846
2-OHNap								
Model 1		1.114(0.584,2.136)	0.742	0.789(0.392,1.568)	0.500	0.869(0.484,1.530)	0.631	0.571
Model 2	Ref	1.085(0.564,2.098)	0.806	0.779(0.384,1.559)	0.481	0.879(0.484,1.565)	0.666	0.562
Model 3		0.967(0.490,1.912)	0.924	0.764(0.371,1.555)	0.459	0.884(0.478,1.601)	0.688	0.558
2-OHFlu								
Model 1		0.741(0.370,1.461)	0.389	1.009(0.528,1.929)	0.979	0.911(0.432,1.837)	0.799	0.925
Model 2	Ref	0.710(0.351,1.413)	0.332	1.084(0.562,2.096)	0.808	0.976(0.456,2.003)	0.948	0.747
Model 3		0.682(0.332,1.379)	0.290	1.195(0.605,2.370)	0.607	1.060(0.479,2.252)	0.883	0.567
3-OHFlu								
Model 1		0.692(0.341,1.375)	0.296	1.064(0.560,2.024)	0.850	0.910(0.429,1.838)	0.799	0.749
Model 2	Ref	0.672(0.328,1.349)	0.267	1.159(0.603,2.236)	0.658	0.979(0.454,2.012)	0.954	0.571
Model 3		0.663(0.318,1.355)	0.263	1.279(0.647,2.539)	0.479	1.061(0.479,2.243)	0.880	0.405
1/9-OHPhe								
Model 1		0.937(0.458,1.910)	0.857	1.562(0.817,3.043)	0.182	1.368(0.789,2.385)	0.266	0.197
Model 2	Ref	0.990(0.479,2.040)	0.979	1.805(0.928,3.588)	0.085	1.529(0.873,2.696)	0.139	0.101
Model 3		1.026(0.489,2.150)	0.945	1.977(0.987,4.054)	0.057	1.568(0.880,2.826)	0.129	0.073
2-OHPhe								
Model 1		0.692(0.341,1.375)	0.296	1.064(0.560,2.024)	0.850	1.091(0.471,2.358)	0.832	0.792
Model 2	Ref	0.697(0.341,1.399)	0.313	1.179(0.614,2.278)	0.621	1.264(0.535,2.788)	0.575	0.575
Model 3		0.735(0.353,1.505)	0.402	1.238(0.631,2.444)	0.534	1.226(0.512,2.746)	0.632	0.498
3-OHPhe								

Model 1		1.475(0.768,2.884)	0.247	1.008(0.498,2.042)	0.981	1.260(0.589,2.582)	0.538	0.918
Model 2	Ref	1.545(0.797,3.054)	0.202	1.129(0.550,2.324)	0.740	1.402(0.641,2.934)	0.381	0.822
Model 3		1.754(0.879,3.576)	0.114	1.143(0.543,2.417)	0.724	1.420(0.636,3.075)	0.377	0.815
4-OHPhe								
Model 1		1.000(0.510,1.963)	1.000	1.068(0.549,2.085)	0.846	1.233(0.666,2.250)	0.499	0.726
Model 2	Ref	1.004(0.505,1.996)	0.990	1.174(0.596,2.326)	0.642	1.406(0.748,2.608)	0.283	0.530
Model 3		0.938(0.463,1.897)	0.858	1.217(0.604,2.465)	0.582	1.446(0.754,2.742)	0.260	0.473
1-OHPyr								
Model 1		1.590(0.779,3.335)	0.208	2.075(1.046,4.271)	0.041*	1.789(0.913,3.545)	0.092	0.423
Model 2	Ref	1.564(0.758,3.315)	0.231	2.092(1.043,4.350)	0.041*	1.845(0.930,3.695)	0.081	0.043*
Model 3		1.593(0.755,3.450)	0.227	2.359(1.148,5.037)	0.022*	2.051(1.012,4.221)	0.048*	0.022*
ΣOH-NAPs								
Model 1		1,253(0.649,2.444)	0.503	1.008(0.506,2.009)	0.981	0.978(0.524,1.797)	0.945	0.951
Model 2	Ref	1.163(0.596,2.286)	0.659	1.004(0.499,2.021)	0.991	0.982(0.516,1.837)	0.954	0.948
Model 3		1.077(0.539,2.169)	0.833	0.956(0.466,1.961)	0.902	0.987(0.508,1.886)	0.969	0.859
ΣOH-FLUs								
Model 1		0.741(0.370,1.461)	0.389	1.009(0.528,1.929)	0.979	0.908(0.428,1.838)	0.795	0.910
Model 2	Ref	0.698(0.345,1.390)	0.309	1.088(0.564,2.105)	0.801	0.976(0.453,2.010)	0.949	0.733
Model 3		0.669(0.325,1.356)	0.268	1.203(0.607,2.389)	0.596	1.060(0.477,2.253)	0.882	0.544
ΣOH-PHEs								
Model 1		0.813(0.387,1.686)	0.578	1.713(0.904,3.316)	0.103	1.493(0.739,2.936)	0.251	0.073
Model 2	Ref	0.848(0.400,1.779)	0.663	1.979(1.024,3.921)	0.045*	1.711(0.834,3.429)	0.133	0.031*
Model 3		0.823(0.377,1.773)	0.619	2.065(1.044,4.186)	0.040*	1.749(0.832,3.615)	0.132	0.027*
ΣOH-PAHs								
Model 1		0.944(0.484,1.838)	0.866	0.952(0.488,1.854)	0.886	1.099(0.552,2.142)	0.784	0.871
Model 2	Ref	0.855(0.433,1.681)	0.648	0.929(0.470,1.831)	0.832	1.115(0.546,2.222)	0.761	0.849
Model 3		0.823(0.405,1.665)	0.588	0.903(0.448,1.813)	0.774	1.148(0.551,2.339)	0.708	0.800

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

Supplementary Table 16. Association of SG-adjusted urinary OH-PAHs with GDS scores after excluding outliers

OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		β (95%CI)	*P* value	β (95%CI)	*P* value	β (95%CI)	*P* value	
1-OHNap								
Model 1		0.188(-0.369,0.746)	0.508	0.073(-0.535,0.681)	0.814	0.064(-0.344,0.472)	0.759	0.711
Model 2	Ref	0.218(-0.343,0.780)	0.447	0.118(-0.495,0.732)	0.705	0.107(-0.307,0.521)	0.612	0.580
Model 3		0.228(-0.345,0.801)	0.436	0.096(-0.533,0.725)	0.765	0.084(-0.338,0.507)	0.697	0.624
2-OHNap								
Model 1		-0.138(-0.706,0.431)	0.635	-0.037(-0.671,0.597)	0.909	0.071(-0.602,0.744)	0.836	0.970
Model 2	Ref	-0.174(-0.742,0.395)	0.550	-0.072(-0.705,0.562)	0.824	0.054(-0.617,0.726)	0.874	0.918
Model 3		-0.192(-0.772,0.389)	0.518	-0.116(-0.761,0.529)	0.724	0.003(-0.684,0.689)	0.994	0.827
2-OHFlu								
Model 1		0.138(-0.437,0.712)	0.639	0.298(-0.343,0.938)	0.363	0.017(-0.880,0.914)	0.970	0.469
Model 2	Ref	0.109(-0.465,0.683)	0.709	0.319(-0.320,0.958)	0.329	0.068(-0.829,0.964)	0.882	0.446
Model 3		0.109(-0.473,0.692)	0.713	0.263(-0.388,0.914)	0.429	-0.044(-0.964,0.877)	0.926	0.585
3-OHFlu								
Model 1		0.130(-0.445,0.706)	0.657	0.049(-0.591,0.688)	0.881	-0.107(-1.018,0.803)	0.817	0.651
Model 2	Ref	0.137(-0.437,0.712)	0.640	0.103(-0.537,0.743)	0.753	-0.039(-0.950,0.872)	0.933	0.573
Model 3		0.125(-0.459,0.708)	0.675	0.047(-0.607,0.700)	0.889	-0.130(-1.063,0.803)	0.785	0.712
1/9-OHPhe								
Model 1	Ref	-0.007(-0.577,0.563)	0.980	0.228(-0.385,0.841)	0.466	-0.100(-0.673,0.472)	0.732	0.669
Model 2		0.021(-0.549,0.592)	0.942	0.300(-0.319,0.918)	0.343	-0.023(-0.605,0.559)	0.939	0.522

Model 3		-0.014(-0.593,0.564)	0.961	0.251(-0.385,0.888)	0.439	-0.075(-0.671,0.521)	0.805	0.634
2-OHPhe								
Model 1		-0.087(-0.661,0.487)	0.767	0.036(-0.586,0.659)	0.909	0.252(-0.782,1.285)	0.633	0.844
Model 2	Ref	-0.076(-0.651,0.499)	0.795	0.060(-0.563,0.684)	0.849	0.288(-0.747,1.323)	0.586	0.786
Model 3		-0.100(-0.684,0.483)	0.737	0.026(-0.609,0.660)	0.937	0.228(-0.825,1.281)	0.671	0.865
3-OHPhe								
Model 1		0.275(-0.294,0.845)	0.344	-0.304(-0.924,0.315)	0.337	0.137(-0.795,1.069)	0.773	0.729
Model 2	Ref	0.294(-0.276,0.864)	0.312	-0.253(-0.876,0.370)	0.427	0.202(-0.734,1.138)	0.672	0.876
Model 3		0.299(-0.283,0.882)	0.315	-0.290(-0.920,0.341)	0.369	0.172(-0.780,1.123)	0.724	0.820
4-OHPhe								
Model 1		-0.333(-0.905,0.239)	0.254	-0.007(-0.647,0.632)	0.982	-0.193(-0.921,0.534)	0.603	0.846
Model 2	Ref	-0.321(-0.895,0.253)	0.274	0.019(-0.620,0.659)	0.953	-0.142(-0.871,0.588)	0.704	0.894
Model 3		-0.346(-0.928,0.235)	0.244	-0.023(-0.675,0.628)	0.944	-0.135(-0.876,0.607)	0.722	0.847
1-OHPyr								
Model 1		-0.051(-0.609,0.508)	0.859	0.579(-0.025,1.183)	0.061	0.659(-0.035,1.353)	0.064	0.366
Model 2	Ref	-0.006(-0.568,0.556)	0.983	0.622(0.017,1.228)	0.045*	0.757(0.057,1.457)	0.035*	0.273
Model 3		-0.043(-0.615,0.528)	0.882	0.641(0.023,1.258)	0.043*	0.762(0.047,1.476)	0.037*	0.298
ΣOH-NAPs								
Model 1		0.036(-0.525,0.597)	0.899	0.075(-0.558,0.709)	0.816	0.158(-0.564,0.880)	0.668	0.771
Model 2	Ref	0.008(-0.557,0.572)	0.979	0.080(-0.554,0.715)	0.805	0.159(-0.565,0.883)	0.667	0.804
Model 3		-0.026(-0.605,0.553)	0.929	0.028(-0.618,0.675)	0.932	0.097(-0.645,0.838)	0.798	0.927
ΣOH-FLUs								

Model 1		0.225(-0.350,0.799)	0.444	0.173(-0.464,0.809)	0.595	-0.102(-1.001,0.797)	0.824	0.568
Model 2	Ref	0.202(-0.372,0.776)	0.490	0.209(-0.427,0.845)	0.519	-0.037(-0.937,0.862)	0.935	0.546
Model 3		0.202(-0.381,0.786)	0.497	0.150(-0.500,0.800)	0.652	-0.144(-1.070,0.782)	0.760	0.673
ΣOH-PHEs								
Model 1		0.181(-0.392,0.754)	0.536	0.177(-0.433,0.787)	0.571	0.073(-0.749,0.896)	0.861	0.399
Model 2	Ref	0.218(-0.357,0.792)	0.458	0.244(-0.371,0.858)	0.437	0.151(-0.677,0.978)	0.722	0.281
Model 3		0.175(-0.415,0.764)	0.562	0.219(-0.408,0.847)	0.493	0.093(-0.753,0.939)	0.830	0.351
ΣOH-PAHs								
Model 1		0.181(-0.393,0.756)	0.537	0.344(-0.286,0.974)	0.285	0.628(-0.182,1.439)	0.129	0.187
Model 2	Ref	0.150(-0.428,0.728)	0.612	0.348(-0.285,0.981)	0.282	0.636(-0.178,1.451)	0.127	0.194
Model 3		0.113(-0.483,0.710)	0.710	0.319(-0.324,0.963)	0.331	0.606(-0.226,1.438)	0.154	0.233

CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

*$p < 0.05$.

Supplementary Table 17. Association of SG-adjusted urinary OH-PAHs with HAMA scores after excluding outliers

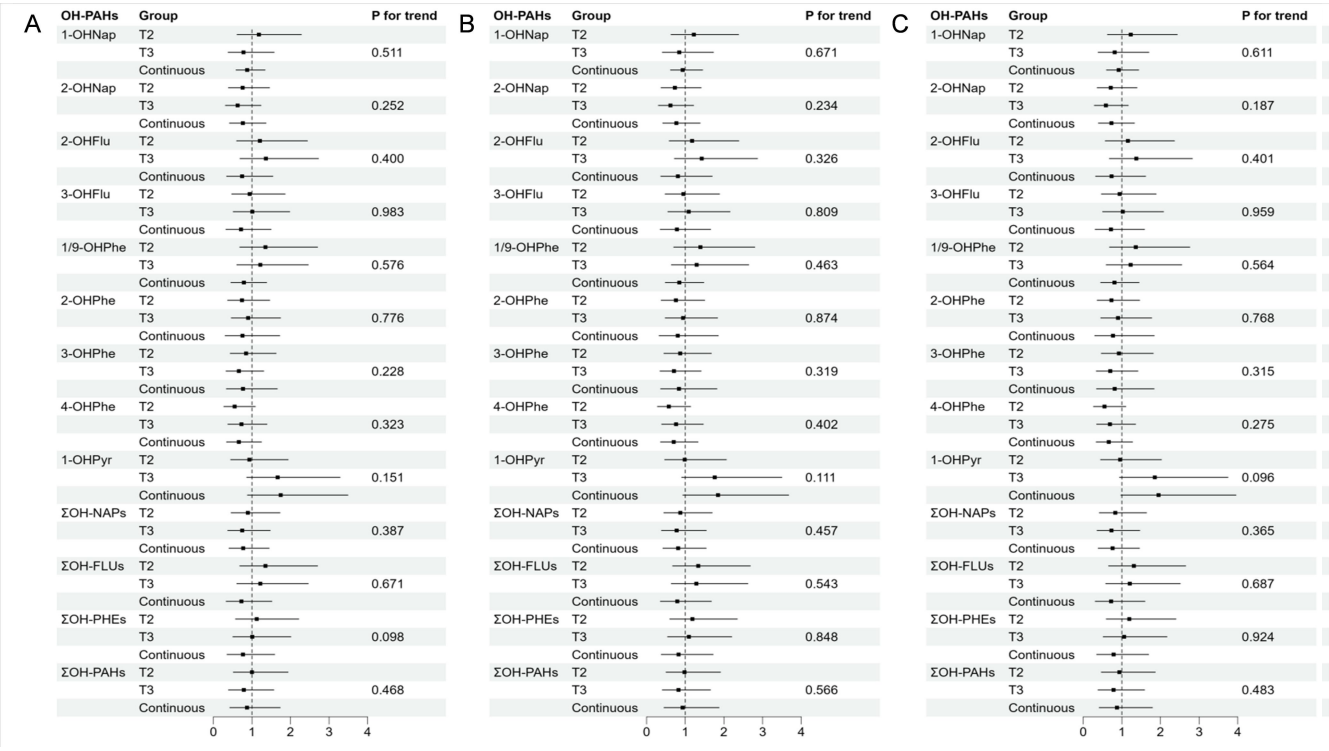
OH-PAHs	T1	T2		T3		Continuous		*P* for trend
		β (95%CI)	*P* value	β (95%CI)	*P* value	β (95%CI)	*P* value	
1-OHNap								
Model 1		0.826(-0.719,2.371)	0.295	-0.206(-1.891,1.479)	0.811	-0.209(-1.342,0.923)	0.717	0.987
Model 2	Ref	0.682(-0.852,2.215)	0.384	-0.274(-1.949,1.402)	0.749	-0.196(-1.327,0.935)	0.734	0.977
Model 3		0.603(-0.935,2.140)	0.443	-0.695(-2.381,0.992)	0.420	-0.313(-1.449,0.823)	0.589	0.676
2-OHNap								
Model 1		0.384(-1.176,1.944)	0.630	-0.516(-2.255,1.222)	0.561	-0.261(-2.110,1.587)	0.782	0.576
Model 2	Ref	0.198(-1.327,1.723)	0.799	-0.683(-2.382,1.016)	0.431	-0.349(-2.153,1.454)	0.704	0.485
Model 3		0.013(-1.513,1.540)	0.986	-0.652(-2.349,1.044)	0.452	-0.323(-2.130,1.484)	0.726	0.379
2-OHFlu								
Model 1		-0.696(-2.265,0.874)	0.385	0.428(-1.321,2.176)	0.632	0.277(-2.174,2.728)	0.825	0.405
Model 2	Ref	-0.792(-2.330,0.745)	0.313	0.600(-1.113,2.313)	0.493	0.385(-2.022,2.792)	0.754	0.339
Model 3		-0.800(-2.337,0.736)	0.308	0.499(-1.219,2.216)	0.570	0.141(-2.295,2.576)	0.910	0.471
3-OHFlu								
Model 1		-1.080(-2.646,0.486)	0.177	0.536(-1.204,2.275)	0.546	0.025(-2.463,2.513)	0.984	0.631
Model 2	Ref	-1.107(-2.639,0.424)	0.157	0.764(-0.943,2.471)	0.381	0.220(-2.224,2.665)	0.860	0.511
Model 3		-1.129(-2.662,0.404)	0.150	0.599(-1.117,2.316)	0.494	0.011(-2.454,2.476)	0.993	0.686
1/9-OHPhe								
Model 1		0.196(-1.315,1.706)	0.800	0.351(-1.275,1.976)	0.673	-0.240(-1.756,1.277)	0.757	0.615
Model 2	Ref	0.335(-1.152,1.821)	0.659	0.730(-0.881,2.342)	0.375	0.066(-1.449,1.582)	0.932	0.387
Model 3		0.284(-1.197,1.765)	0.707	0.456(-1.173,2.085)	0.584	-0.165(-1.690,1.360)	0.832	0.643
2-OHPhe								
Model 1		0.036(-1.525,1.597)	0.964	0.584(-1.109,2.277)	0.499	0.889(-1.923,3.701)	0.536	0.340
Model 2	Ref	0.032(-1.503,1.567)	0.967	0.794(-0.872,2.460)	0.351	1.186(-1.580,3.952)	0.401	0.239
Model 3		0.106(-1.429,1.641)	0.893	0.830(-0.839,2.499)	0.331	1.177(-1.595,3.949)	0.406	0.223
3-OHPhe								
Model 1	Ref	1.304(-0.250,2.859)	0.101	0.204(-1.487,1.894)	0.814	1.127(-1.413,3.667)	0.385	0.996

Model 2		1.364(-0.162,2.890)	0.081	0.446(-1.222,2.114)	0.601	1.313(-1.189,3.815)	0.304	0.784
Model 3		1.590(0.052,3.128)	0.043*	0.362(-1.303,2.027)	0.670	1.307(-1.204,3.819)	0.308	0.792
4-OHPhe								
Model 1		-0.761(-2.267,0.746)	0.323	-0.982(-2.666,0.702)	0.254	-1.210(-3.122,0.703)	0.216	0.340
Model 2	Ref	-0.809(-2.284,0.667)	0.283	-0.834(-2.477,0.810)	0.321	-0.955(-2.828,0.918)	0.318	0.381
Model 3		-1.011(-2.493,0.471)	0.182	-0.920(-2.579,0.740)	0.278	-0.998(-2.887,0.890)	0.301	0.315
1-OHPyr								
Model 1		0.862(-0.674,2.398)	0.272	1.803(0.141,3.464)	0.034*	2.204(0.300,4.109)	0.024	0.072
Model 2	Ref	0.762(-0.759,2.282)	0.327	1.824(0.187,3.461)	0.030*	2.351(0.463,4.238)	0.015	0.052
Model 3		0.821(-0.701,2.343)	0.291	2.090(0.445,3.735)	0.013*	2.629(0.732,4.526)	0.007	0.030*
ΣOH-NAPs								
Model 1		0.239(-1.325,1.803)	0.765	-0.099(-1.866,1.667)	0.913	-0.195(-2.209,1.820)	0.850	0.830
Model 2	Ref	-0.056(-1.604,1.493)	0.944	-0.139(-1.880,1.602)	0.876	-0.341(-2.329,1.646)	0.737	0.711
Model 3		-0.146(-1.704,1.412)	0.855	-0.368(-2.108,1.372)	0.679	-0.584(-2.579,1.411)	0.567	0.482
ΣOH-FLUs								
Model 1		-0.609(-2.178,0.960)	0.447	0.394(-1.343,2.132)	0.657	0.005(-2.451,2.462)	0.997	0.392
Model 2	Ref	-0.758(-2.293,0.778)	0.334	0.603(-1.099,2.305)	0.488	0.175(-2.238,2.588)	0.887	0.338
Model 3		-0.786(-2.324,0.752)	0.317	0.471(-1.243,2.184)	0.591	-0.064(-2.510,2.383)	0.959	0.426
ΣOH-PHEs								
Model 1		-0.312(-1.854,1.230)	0.692	0.952(-0.689,2.594)	0.256	0.674(-1.544,2.891)	0.552	0.518
Model 2	Ref	-0.231(-1.746,1.285)	0.766	1.278(-0.343,2.898)	0.123	1.030(-1.158,3.218)	0.357	0.277
Model 3		-0.174(-1.707,1.359)	0.824	1.174(-0.458,2.805)	0.159	0.862(-1.345,3.068)	0.444	0.359
ΣOH-PAHs								
Model 1		0.101(-1.470,1.673)	0.899	-0.029(-1.754,1.695)	0.973	0.615(-1.604,2.834)	0.587	0.700
Model 2	Ref	-0.233(-1.786,1.321)	0.769	-0.202(-1.903,1.499)	0.816	0.363(-1.831,2.556)	0.746	0.831
Model 3		-0.237(-1.812,1.338)	0.768	-0.371(-2.069,1.326)	0.668	0.140(-2.061,2.341)	0.901	0.986

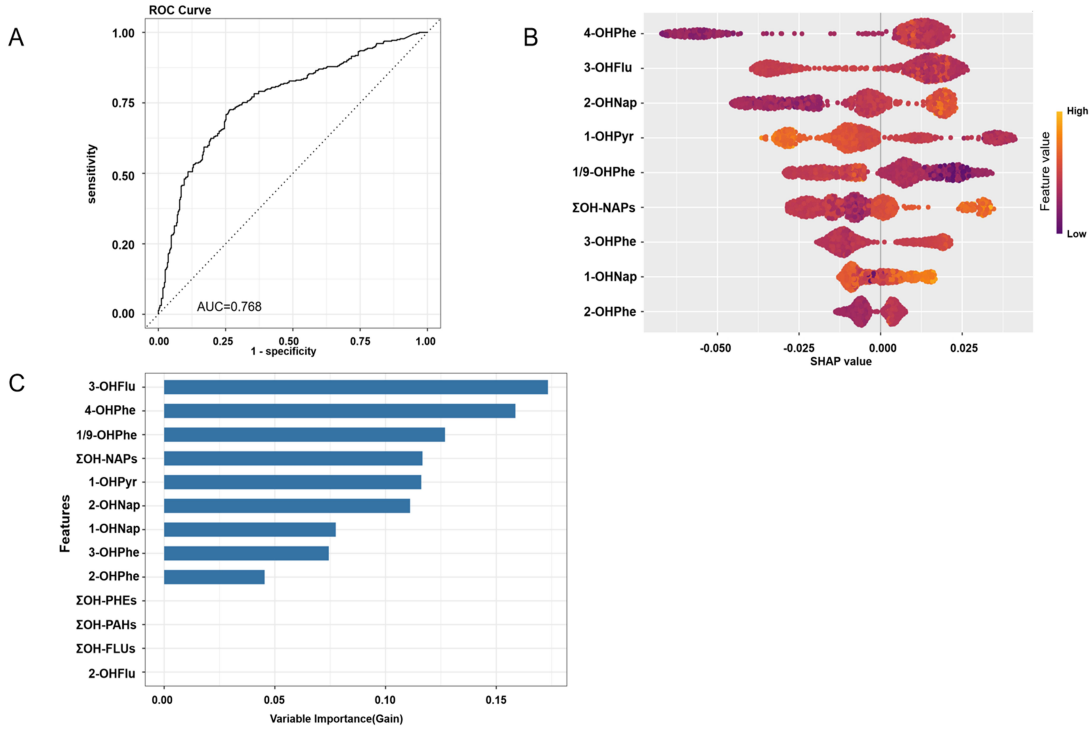
CI: confidence interval; OR: odds ratio; Q, quartile; Continuous, Ln-transformed concentration of PAHs in urine.

Model 1 is a crude model; Model 2 adjusted for age, sex; Model3 further adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status and alcohol drinking.

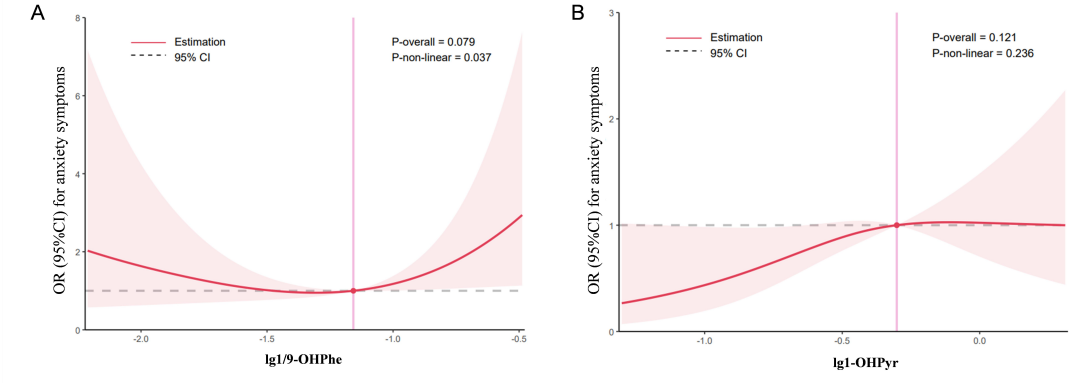
*$p < 0.05$.



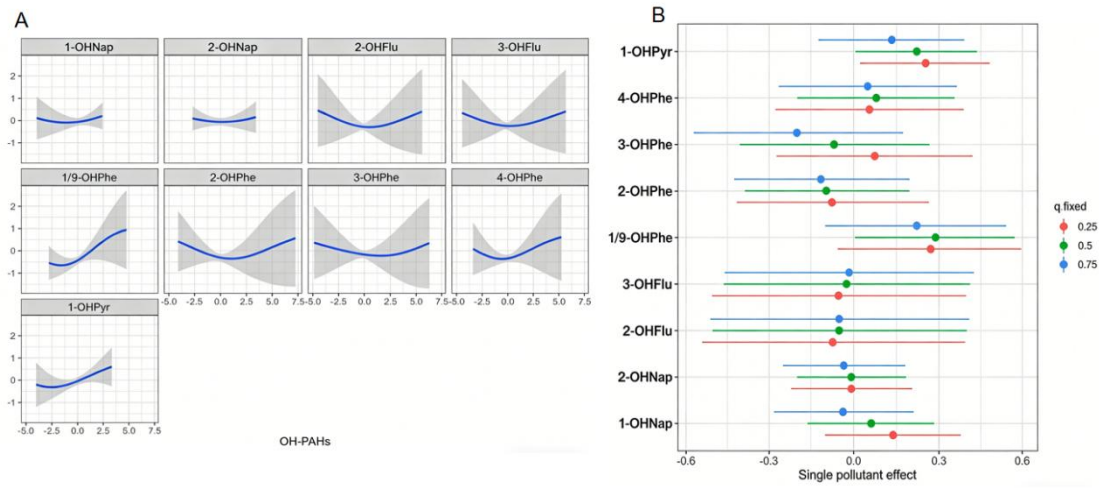
Supplementary Figure 1. OR of the association between individual OH-PAHs and depressive symptoms in the crude model (A), the model adjusted for age and gender (B), and the model adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and alcohol drinking (C) through logistic regression analysis.



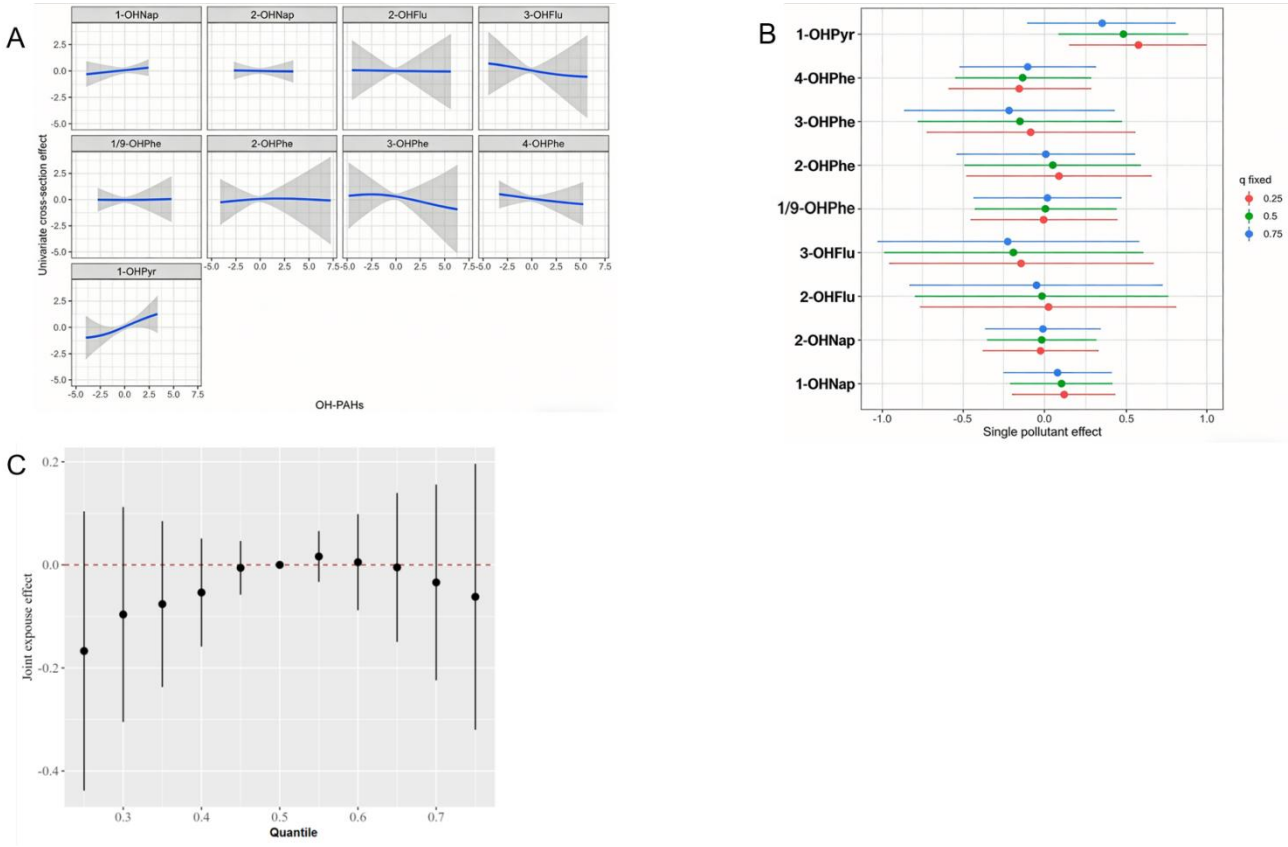
Supplementary Figure 2. Predictive performance and feature contribution of the XGBoost model for depressive symptoms. (A) ROC curve for prediction of depressive symptoms. (B) SHAP beeswarm plot showing marginal effects of OH-PAH metabolites on depression risk. Each dot represents one participant, colored by pollutant exposure level (red = high, blue = low); horizontal SHAP values indicate elevated (positive) or reduced (negative) depression risk, with features ordered by mean absolute SHAP values. (C) Gain-based variable importance bar plot derived from XGBoost training.



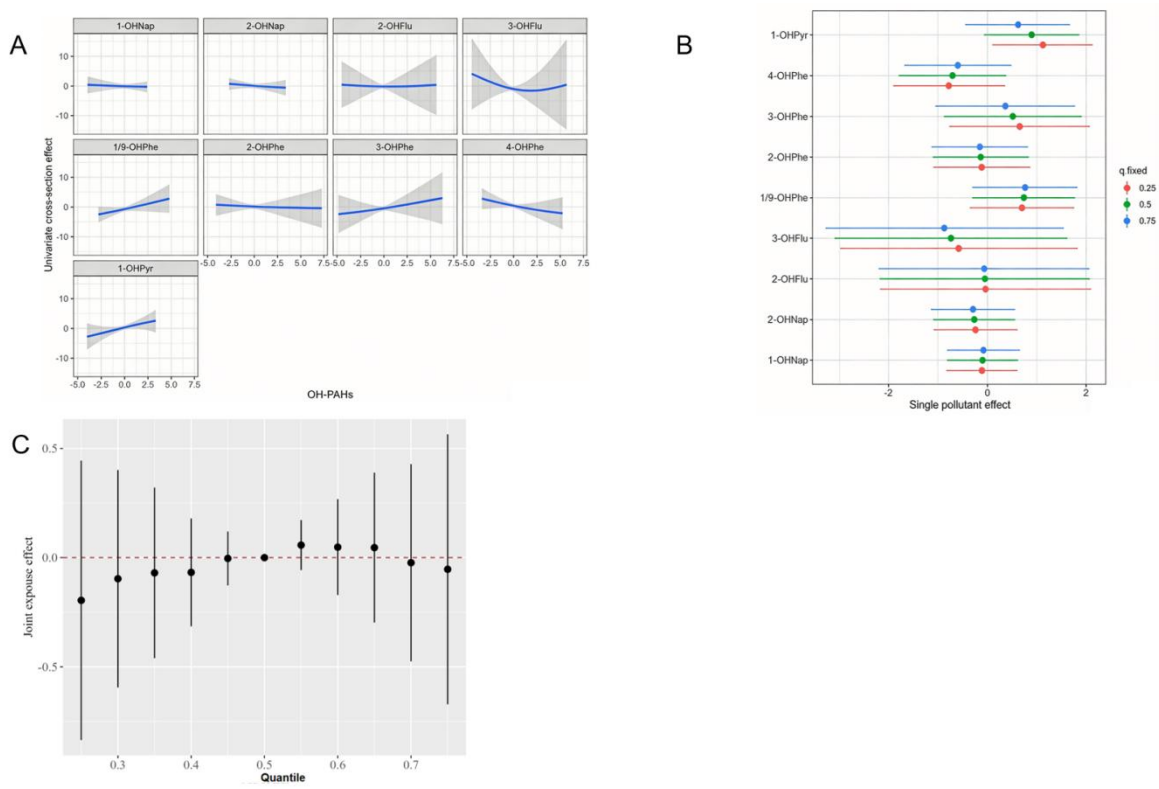
Supplementary Figure 3. Restricted cubic splines analysis of the associations between urinary OH-PAHs and anxiety symptoms. (A) Dose-response relationship between 1/9-OHPhe and anxiety symptoms in the non-overweight subgroup after BMI stratification, models were adjusted for age, sex, marital status, educational level, exercise, smoking status, and drinking; (B) Dose-response relationship between 1-OHPyr and anxiety symptoms in older adults, models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking. Shaded areas indicate 95% confidence intervals for the fitted dose-response curves.



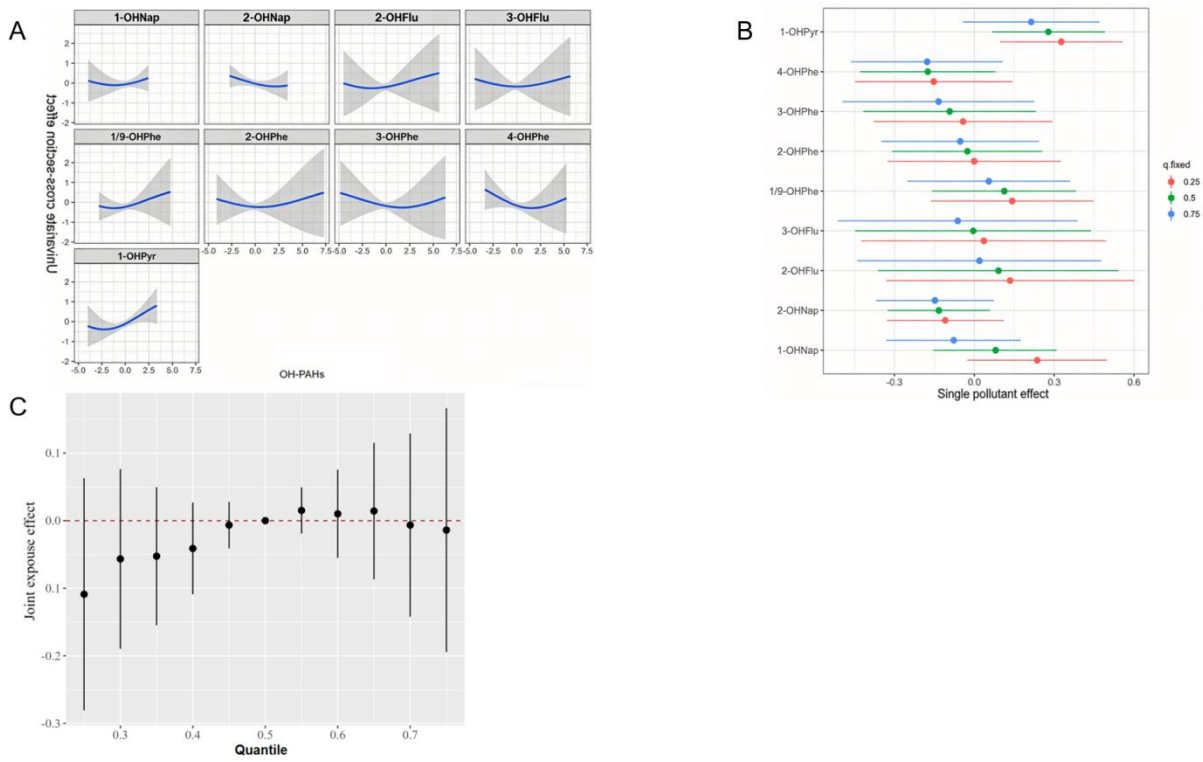
Supplementary Figure 4. Assessing the combined effects of OH-PAHs on anxiety symptoms using the BKMR model. (A) The combined effect of OH-PAHs as a mixture on anxiety symptoms. (B) The exposure-response function between selected OH-PAHs concentrations and anxiety symptoms, with the concentrations of other OH-PAHs held constant at the median (95 % confidence interval). Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking.



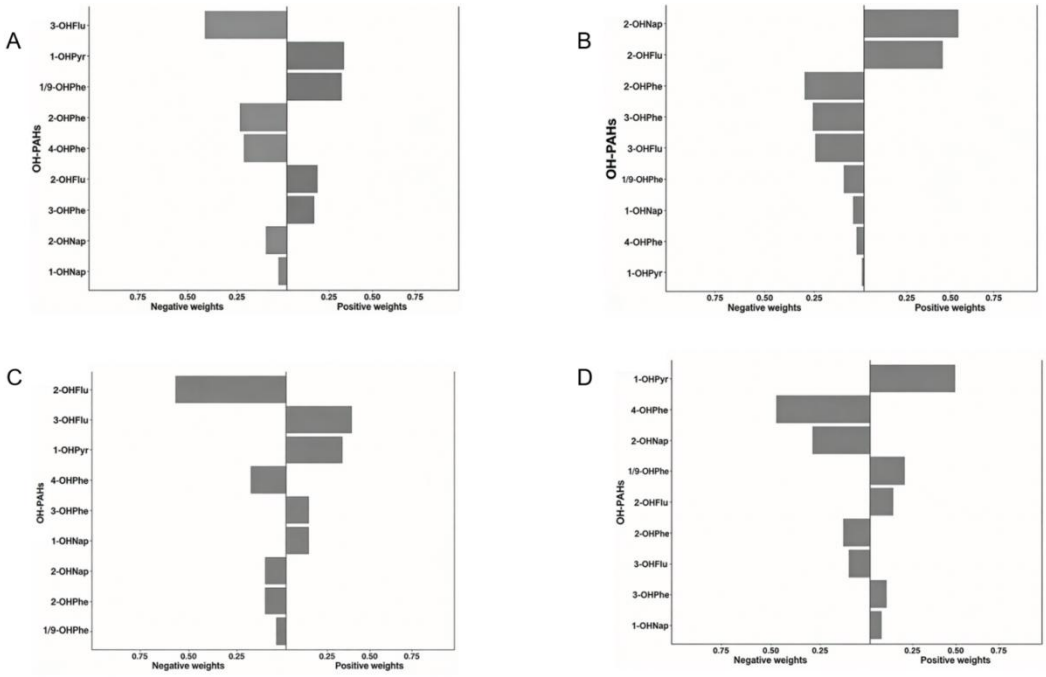
Supplementary Figure 5. Assessing the combined effects of OH-PAHs on GDS scores using the BKMR model. (A) The exposure-response function between selected OH-PAHs concentrations and GDS scores, with the concentrations of other OH-PAHs held constant at the median (95 % confidence interval). (B) The effect of individual OH-PAHs (effect estimates and 95 % confidence intervals, where an estimate of 0 represents no effect). (C) The combined effect of OH-PAHs as a mixture on GDS scores. Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking.



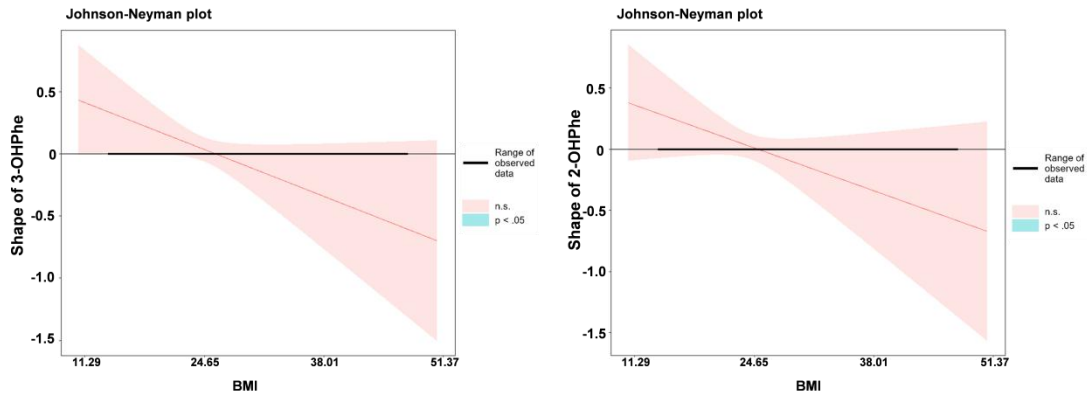
Supplementary Figure 6. Assessing the combined effects of OH-PAHs on HAMA scores using the BKMR model. (A) The exposure-response function between selected OH-PAHs concentrations and HAMA scores, with the concentrations of other OH-PAHs held constant at the median (95 % confidence interval). (B) The effect of individual OH-PAHs (effect estimates and 95 % confidence intervals, where an estimate of 0 represents no effect). (C) The combined effect of OH-PAHs as a mixture on HAMA scores. Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking.



Supplementary Figure 7. Assessing the combined effects of OH-PAHs on depressive symptoms using the BKMR model. (A) The exposure-response function between selected OH-PAHs concentrations and depressive symptoms, with the concentrations of other OH-PAHs held constant at the median (95 % confidence interval). (B) The effect of individual OH-PAHs (effect estimates and 95 % confidence intervals, where an estimate of 0 represents no effect). (C) The combined effect of OH-PAHs as a mixture on depressive symptoms. Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking



Supplementary Figure 8. Relationship between Qgcomp index and depressive and anxiety outcomes. (A) Bar chart of the impact weights of OH-PAHs mixtures on HAMA scores. (B) Bar chart of the impact weights of OH-PAHs mixtures on anxiety symptoms. (C) Bar chart of the impact weights of OH-PAHs mixtures on GDS scores. (D) Bar chart of the impact weights of OH-PAHs mixtures on depressive symptoms. Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking.



Supplementary Figure 9. BMI moderates the relationship between urinary OH-PAHs and anxiety symptoms. Models were adjusted for age, sex, marital status, educational level, BMI, exercise, smoking status, and drinking