

Supplementary text.

Discussion for DM patients.

Most of study subjects with DM may be managed by antihyperglycemic agents or lifestyle change such as dietary modification or regular exercise without insulin treatment. From 168 DM patients in the present data, 80 subjects (47.62%) had diabetes treatments including antihyperglycemic agents or insulin therapy. Unfortunately, we could not examine the proportion of subjects treated with insulin, because there is no available information about the types of diabetes treatment. Instead, we examined its proportion using Korean National Health and Nutritional Examination Survey (KNHANES), a representative Korean general population, and found that only 3.7% of adult patients with diabetes treatments used insulin therapy; 91.6% used oral antihyperglycemic medication, and the remaining 4.7% used both. Therefore, we expect that DM patients may be unlikely to be treated with insulin in the present study. Nevertheless, our observation on enhanced effect in DM patients still needs to be interpreted carefully.

Supplementary Table 1. Baseline characteristics of included and excluded participants ($n=560^a$)

Characteristic	Included Participants ($n=502^b$)	Excluded Participants ($n=58$)	<i>P</i> -value ^c
Continuous variables (mean \pm SD)			
Age (y)	70.8 \pm 5.3	70.0 \pm 5.0	0.287
BMI (kg/m ²)	24.8 \pm 2.9	24.3 \pm 2.3	0.119
Fasting insulin (μ U/mL)	7.0 \pm 6.0	6.2 \pm 6.0 ^d	0.417
Fasting glucose (mmol/L)	5.34 \pm 1.15	5.37 \pm 0.98 ^e	0.853
HOMA-IR ^f	1.7 \pm 1.7	1.6 \pm 1.8 ^d	0.545
Urinary 1-OHP (μ g/L) ^g	0.12 (0.11-0.13)	0.12 (0.10-0.16) ^h	0.893
Urinary cotinine (μ g/g cr) ^g	3.23 (2.69-3.86)	3.34 (1.77-6.28) ⁱ	0.910
SBP (mm Hg)	131.9 \pm 16.5	128.1 \pm 17.4 ^j	0.114
DBP (mm Hg)	74.6 \pm 9.8	72.2 \pm 9.3 ^j	0.082
HDL-cholesterol (mg/dL)	50.9 \pm 13.3	49.6 \pm 12.2 ^e	0.520
Ambient PM ₁₀ (μ g/m ³ on lag day1)	44.4 \pm 25.1	43.7 \pm 16.2 ^k	0.799
Categorical variables [No. (%)]			
Sex (Male)	132 (26.3)	14 (24.1)	0.875
Education			0.868
\leq Elementary School	284 (56.6)	23 (54.8) ^l	
\leq High School	164 (32.7)	16 (38.1)	
$>$ High School	54 (10.8)	3 (7.1)	
Moderate to vigorous physical activity	313 (62.4)	30 (68.2) ^d	0.517
Current hypertension	334 (66.5)	26 (50.0) ^j	0.018
Current diabetes mellitus	168 (33.5)	21 (42.9) ^h	0.208

^aSubjects (N=560) eligible for the study participants

^bParticipants (N=502) are the individuals having all interest variables in this study: urinary t,t-MA, HOMA-IR, age, sex, education, physical activity, BMI, current diagnosis of hypertension and diabetes mellitus, HDL-Cholesterol, cotinine, and air pollution at enrollment

^cContinuous variables: t-test, categorical variables: X²: 2*2 table (Fisher's Exact Test) or 2*C table (Mantel-Haenszel Chi-Square Test)

Non-Participants (N=44^d, 46^e, 49^h, 53ⁱ, 52^j, 35^k, 42^l, and 58 for the others) are the individuals having the variable to be compared.

^fHOMA index: fasting insulin (μ U/mL) x fasting glucose (mmol/L)/22.5.

^gGeometric means (95% confidence interval) were presented.

Supplementary Table 2. Fully-adjusted changes (95% CI) in HOMA-IR in relationship to 1-OHP quartiles

	HOMA-IR (score)
Overall (n=502, obs=996)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	0.28 (-0.16, 0.72)
Q 3 (0.124-0.203)	0.18 (-0.27, 0.63)
Q 4 (0.204-4.461)	0.57 (0.10, 1.04)
<i>P</i> -Trend	0.037
Males (n=132, obs=244)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	-0.38 (-1.34, 0.57)
Q 3 (0.124-0.203)	-0.41 (-1.43, 0.61)
Q 4 (0.204-4.461)	0.19 (-0.81, 1.18)
<i>P</i> -Trend	0.904
Males with low BMI (n=79, obs=148)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	-0.07 (-0.73, 0.59)
Q 3 (0.124-0.203)	-0.20 (-1.07, 0.67)
Q 4 (0.204-4.461)	0.80 (-0.01, 1.60)
<i>P</i> -Trend	0.249
Males with high BMI (n=53, obs=96)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	-1.03 (-3.16, 1.11)
Q 3 (0.124-0.203)	-0.30 (-2.24, 1.65)
Q 4 (0.204-4.461)	-0.89 (-2.82, 1.04)
<i>P</i> -Trend	0.484
Females (n=370, obs=752)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	0.38 (-0.08, 0.85)
Q 3 (0.124-0.203)	0.22 (-0.25, 0.69)
Q 4 (0.204-4.461)	0.71 (0.22, 1.20)
<i>P</i> -Trend	0.013
Females with low BMI (n=199, obs=404)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	0.57 (-0.03, 1.17)
Q 3 (0.124-0.203)	-0.05 (-0.68, 0.57)
Q 4 (0.204-4.461)	0.47 (-0.18, 1.12)
<i>P</i> -Trend	0.377
Females with high BMI (n=171, obs=348)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	-0.12 (-0.83, 0.59)
Q 3 (0.124-0.203)	0.36 (-0.32, 1.03)
Q 4 (0.204-4.461)	0.82 (0.09, 1.55)
<i>P</i> -Trend	0.023

Measures of effect medication: by sex difference ($p=0.343$), by BMI difference within males ($p=0.380$), by BMI difference within females ($p=0.180$)

Q, quartile (~25th%; ~median; ~75th%; ~100th%). Q1 is the reference.

Models were adjusted for age, sex, elapsed time, education, physical activities, BMI, hypertension, HDL-cholesterol, cotinine, and ambient PM_{10} .

Supplementary Table 3. Fully-adjusted changes (95% CI) in HOMA-IR in relationship to 1-OHP quartiles in participants without abnormal liver function ($n=488$)

	HOMA-IR (score)	
1-OHP quartile ($\mu\text{g/g cr}$)		
Q 1 (0.011-0.075)	0 (Reference)	
Q 2 (0.075-0.124)	0.26	(-0.19, 0.71)
Q 3 (0.124-0.203)	0.16	(-0.31, 0.62)
Q 4 (0.204-4.461)	0.56	(0.08, 1.05)
<i>P</i> -Trend	<i>0.043</i>	

Q, quartile (~25th%; ~median; ~75th%; ~100th%). Q1 is the reference.

Models were adjusted for age, sex, elapsed time, education, physical activities, BMI, hypertension, HDL-cholesterol, cotinine, and ambient PM10.

Supplementary Table 4. Fully-adjusted changes (95% CI) in HOMA-IR in relation to 1-OHP quartiles

	HOMA-IR (score)	
With diabetes (n=168, obs=323)		
1-OHP quartile ($\mu\text{g/g cr}$)		
Q 1 (0.011-0.075)	0 (Reference)	
Q 2 (0.075-0.124)	0.54	(-0.41, 1.48)
Q 3 (0.124-0.203)	0.77	(-0.28, 1.82)
Q 4 (0.204-4.461)	1.51	(0.49, 2.52)
<i>P</i> -Trend	0.008	
Without diabetes (n=334, obs=673)		
1-OHP quartile ($\mu\text{g/g cr}$)		
Q 1 (0.011-0.075)	0 (Reference)	
Q 2 (0.075-0.124)	0.05	(-0.40, 0.50)
Q 3 (0.124-0.203)	-0.07	(-0.52, 0.38)
Q 4 (0.204-4.461)	0.05	(-0.43, 0.53)
<i>P</i> -Trend	0.930	

Q, quartile (~25th%; ~median; ~75th%; ~100th%). Q1 is the reference.

Models were adjusted for age, sex, elapsed time, education, physical activities, BMI, hypertension, HDL-cholesterol, cotinine, and ambient PM10.

Supplementary Table 5. Fully-adjusted changes (95% CI) in MDA in relationship to 1-OHP quartiles

	Urinary MDA ($\mu\text{g/g cr}$)
Overall (n=502, obs=996)	
1-OHP quartile ($\mu\text{g/g cr}$)	
Q 1 (0.011-0.075)	0 (Reference)
Q 2 (0.075-0.124)	0.05 (-0.01, 0.11)
Q 3 (0.124-0.203)	0.08 (0.01, 0.14)
Q 4 (0.204-4.461)	0.14 (0.07, 0.21)
<i>P</i> -Trend	<0.001

Q, quartile (~25th%; ~median; ~75th%; ~100th%). Q1 is the reference.

Models were adjusted for age, sex, elapsed time, education, physical activities, BMI, hypertension, HDL-cholesterol, cotinine, and ambient PM₁₀.