Supplementary Material and Data

1. Materials and methods

1.1 Alcoholism definition

Alcoholism refers to both alcohol abuse and alcohol dependence. Consistent with the definition provided by the National Institute on Alcohol Abuse and Alcoholism, in this study alcoholism in men was defined as alcohol consumption exceeding 14 standard drinks per week, or 4 drinks per day; alcoholism in women was defined as > 7 standard drinks per week or 3 drinks per day. A standard drink was defined as one 12-ounce bottle of beer, one 5-ounce glass of wine, or 1.5 ounces of distilled spirits (http://pubs.niaaa.nih.gov/publications/aa68/aa68.htm; http://pubs.niaaa.nih.gov/publications/arh27-1/5-17.htm).

1.2 Anthropometric measurements, Epworth Sleepiness Scale (ESS) questionnaire, and definition of hypertension

Body habitus was measured using standard anthropometric methods, with the participants dressed in lightweight clothing and with bare feet. Waist circumference (WC) was measured midway between the lower costal margin and iliac crest, and hip circumference (HC) was measured as the maximum girth at the greater trochanters. Neck circumference (NC) was measured in the standing patient at the level of the cricothyroid membrane. The data were recorded as the mean of two independent measurements. Body mass index (BMI) was calculated as weight divided by height squared (kg/m^2).

The ESS is a self-administered questionnaire that subjectively assesses an

individual's daytime sleepiness level in eight different situations. The ESS used in this study was translated from the original version and has been validated by. Respondents are asked to respond to each of the eight questions using a four-point scale (0–3). The scores are then summed to yield an overall score of 0–24 [1].

Waking blood pressure was measured at approximately 8:00 AM using a mercury sphygmomanometer, with the patient in a seated position after a 5-min rest, as recommended by the American Society of Hypertension guidelines. Two measurements were taken at 1-min intervals. Hypertension was defined as a systolic blood pressure of > 140 mmHg or a diastolic blood pressure of > 90 mmHg. A history of hypertension and current antihypertensive drug treatment were considered to be additional indicators of hypertension.

1.3 Polysomnography and definition of sleep events

Respiratory events were scored using a laboratory-based polysomnographic device (Alice 4 or 5; Respironics, Pittsburgh, PA, USA) according to the American Academy of Sleep Medicine criteria [2]. Apnea was defined as a complete cessation of airflow lasting ≥ 10 s, and hypopnea as either a ≥ 50% reduction in airflow for ≥ 10 s or a < 50% reduction in airflow that was discernible and accompanied by either a ≥ 4% decrease in oxyhemoglobin saturation or an arousal. The AHI was determined based on the number of apnea and hypopnea events per hour during sleep. The total oxygen desaturation index (ODI) was defined as the total number of episodes of ≥ 4% oxyhemoglobin desaturation per total sleep time in hours.

An arousal was identified as an abrupt shift in the electroencephalogram frequency that lasted ≥ 3 s. During rapid eye movement sleep, a concurrent increase in the electromyogram amplitude was required to label an event as an arousal. The arousal index (ArI) was defined as the average number of arousals per hour of sleep.

1.4 Laboratory biochemical measurements

For each patient, a fasting blood sample was drawn from the antecubital vein the morning after polysomnographic monitoring. Serum lipid and fasting serum glucose levels were measured in the hospital laboratory using an autoanalyzer (H-7600; Hitachi, Tokyo, Japan). Serum lipids included total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), apolipoprotein A-I (ApoA-I), apolipoprotein B (ApoB), apolipoprotein E (ApoE), and lipoprotein (a) (Lp(a)). An immunoradiological method was used to measure the fasting serum insulin level. IR was estimated using the previously described homeostasis model assessment method [3]: fasting serum insulin (μU/mL) × fasting plasma glucose (mmol/L) / 22.5. Diabetes was defined as a fasting plasma glucose concentration of ≥ 7.0 mmol/L or the known use of antidiabetic medication before the measurement. Dyslipidaemia with respect to TC, TG, HDL-C, and LDL-C was defined as a serum level of ≥ 5.17, ≥ 1.70, < 1.03, and ≥ 3.33 mmol/L, respectively, according to the diagnostic criteria of the US National Cholesterol Education Program Adult Treatment Panel III [4]. Dyslipidaemia of ApoA, ApoB, and ApoE was defined as a serum level of < 1.20, > 1.10, and > 0.05 or < 0.03 g/L,

respectively, according to the diagnostic criteria of the Joint Committee for Developing Chinese Guidelines on the Prevention and Treatment of dyslipidaemia in Adults[5].

1.5 Statistical analysis

1.5.1 Multivariate ordinal logistic regression analyses

Multivariate analyses were performed using ordinal logistic regression under a proportional odds model, in which AHI was grouped in four ordered categories (see Table 1). This approach simultaneously modeled three cumulative logits, corresponding to the use of binary cut points at 5, 15, and 30 and expressed as log {Pr(AHI≥5)/Pr(AHI<5)}, log{Pr(AHI≥15)/Pr(AHI<15)}, and log{Pr(AHI) ≥30/Pr(AHI<30)}, respectively. Under this proportional odds model, one parameter is estimated for each predictor in the model. The parameter represents the effect of a 1-unit increase in the predictor variable on the logit (log odds), which is assumed to be the same for all three logits. A test of parallel lines was used to verify whether the location parameters (slope coefficients) differed across response categories (sTable 3).

1.5.2 RCS analysis

We performed RCS analysis using two steps:

1) The R software package (http://www.r-project.org/) within R for Windows (ver. 3.02) was used to obtain the knots: The restricted cubic splines analysis was performed using the R package Hmisc. The knots were equally spaced between

the splines on the quantile scale using the default setting (typically 5). The functional form of the relation between each variable and the outcome was visually evaluated using the function rcspline.plot, from the Hmisc library. This graphically shows the relation between the continuous confounder and the log(odds) of the outcome.

An example of our R code is as follows:

```
Library (Hmisc)
load (data)
rcspline.plot(ODI,LDL2,showknots=TRUE,plotcl=TRUE,statloc=11,adj=BMI,smooth=T)
```

AHI, ODI and ArI were modeled separately.

2) MATLAB 8.0 software was used to map the RCS curves:

The spline functions of the regression model were as follows:

$$\text{Log}(p/(1-p))=\beta_0 + \beta_1 x_1 + \sum_{i=1}^{k-2} \beta_{1i} S_i(x_1) + \sum_{i=2}^{p} \beta_i x_i \quad (1)$$

The main effect in Eq. (1) is x1; xi is used to correct the model. The main effect, which is $S_i(x_1)$ in Eq. (1), was expanded using RCS as follows:

Several low-order polynomials defined in the subset of the variable domain were used to replace the function, defined in the whole domain. This accounts for the use of splines, the points of which are used to divide the variable domain into so-called knots. For k knots, as in Eq. (1), the number of knots of low-order functions is k−2.

For RCS, a third-order polynomial was used.

Equation (2) is the RCS function:

$$S_i(x_1) = (x_1 - t_i)_+^3 - \frac{t_k - t_i}{t_k - t_{k-1}}(x_1 - t_{k-1})_+^3 + \frac{t_{k-1} - t_i}{t_k - t_{k-1}}(x_1 - t_k)_+^3 \quad (2)$$

$$(x_1 - t_i)_+^3 = \begin{cases} (x_1 - t_i)^3 & if \ x_1 \geq t_i \\ 0 & otherwise \end{cases}$$

1.5.3 Segmented multivariate linear regression analyses

A segmented multivariate linear regression analysis was used to identify risk factors [6]. Because the current clinical categorization standard for OSA severity is mainly based upon the AHI, this index was used for the regression. However, based upon the AHI knots generated by the RCS analysis, the patients were regrouped into four stage-specific groups: AHI <10, 10 ≤ AHI < 30, 30 ≤ AHI < 55, and AHI ≥ 55 (see Supplementary Table 4 for the baseline data of these new groups). Each stage was subjected to multivariate linear regressions between each of the three indices of OSA severity and the risk factors of dyslipidaemia in selected lipid components (LDL-C, HDL-C, TG, and ApoE), and the covariates of dyslipidaemia (BMI, WHR, etc.) based upon the multicollinearity analysis.

The two steps of the collinearity analyses were: (1) a preliminary analysis using a Pearson correlation and (2) collinearity diagnostics to determine the selected covariates in the multivariate linear regression analyses. For detail, please see Supplementary Tables 5-7.

2. Results

2.1 Distribution characteristics of dyslipidaemia in groups categorized by the new OSA severity knots

The study population was regrouped using the new OSA severity knots to verify both the clinical significance of our findings and the multistage dose–effect relationship between OSA severity and dyslipidaemia. The numbers of patients in the four stages were 848, 695, 633, and 807, respectively. The baselines of the patients grouped according to the new knots are shown in sTable 4. Although the ratio of dyslipidaemia generally increased with the severity of OSA, the ratios of TC, TG, LDL-C, and ApoE disorders did not significantly differ between stage II and stage III, and the ratio of HDL-C disorders did not significantly differ between stages III and IV (sTable 4). These results further accentuated the increasing and plateau phases in the comprehensive correlation patterns between dyslipidaemia and the severity of OSA.

3. Supplementary References

1. Johns MW. A new method for measuring daytime sleepiness the Epworth Sleepiness Scale. Sleep. 1991;.14:.540-5.

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3. Bonora E, Targher G, Alberiche M, et al. Homeostasis model assessment closely mirrors the glucose clamp technique in the assessment of insulin sensitivity: studies in subjects with various degrees of glucose tolerance and insulin sensitivity. Diabetes

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4. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, And Treatment of High Blood Cholesterol In Adults (Adult Treatment Panel III). JAMA 2001;285:2486–97.

5. Chinese guidelines on prevention and treatment of dyslipidaemia in adults. Joint Committee for Developing Chinese guidelines on Prevention and Treatment of Dyslipidaemia in Adults. Zhonghua Xin Xue Guan Bing Za Zhi 2007;35:390–419.

6. Sera F, Ferrari P. A multilevel model to estimate the within- and the between-center components of the exposure/disease association in the EPIC study. PLoS One 2015; 10:e0117815.

4. **Supplementary Figure legends**

sFigure 1. Restricted cubic spline regression of the multistage correlation patterns between dyslipidaemia and the severity of OSA (data for ApoA-I, ApoB and ApoE are shown).

The left *y*-axis shows the log odds of dyslipidaemia for each serum lipid level, and the right *y*-axis represents the number of patients. The x-axis shows the continuous values for the AHI, ODI, or ArI. The population number for each OSA severity-measure unit is indicated by the green line.

5. sTable (1-7)

sTable 1 The definition and assignment of the variables

Parameters	Definition and assignment
Sex	Female = 1, Male = 0
Diabetes	Subjects with diabetes = 1, subjects without diabetes = 0
Hypertension	Subjects with hepertension = 1, subjects without hepertension = 0
Smoking status	Smoking = 1, never smoking = 0
Drinking status	Drinking = 1, never drinking = 0
TC	≥5.17mmol/L = 1; normal = 0
TG	≥ 1.7 mmol/L = 1; normal = 0
HDL-C	HDL-C<1.03 mmol/L = 1; HDL-C ≥1.03mmol/L = 0
LDL-C	LDL-C≥ 3.33mmol/L = 1; LDL-C < 3.33mmol/L = 0
ApoA-I	ApoA-I <1.2 g/L = 1; ApoA-I≥1.2g/L = 0
ApoB	ApoB >1.1g/L = 1; ApoB ≤1.1g/L = 0
ApoE	ApoE >0.05g/L or < 0.03g/L = 1; 0.03g/L< ApoE >0.05g/L= 0

sTable 2. Abbreviations list.

Parameters and terminology	Abbreviations
body mass index	BMI
neck circumference	NC
waist circumference	WC
hip circumference	HC
waist circumference/hip circumference ratio	WHR
insulin resistance index	IR
total cholesterol	TC
triglyceride	TG
high density lipoprotein cholesterol	HDL-C
low density lipoprotein cholesterol	LDL-C
apolipoprotein A-I	ApoA-I
apolipoprotein B	ApoB
apolipoprotein E	ApoE
lipoprotein(a)	Lp(a)
obstructive sleep apnea	OSA
apnea-hypopnea index	AHI
polysomnography	PSG
percentage of time with SaO2<90%	CT90
arterial oxygen saturation	SaO2
arousal index	ArI
oxygen desaturation index	ODI
Epworth sleepiness score	ESS
continuous positive airway pressure	CPAP
cardiovascular disease	CVD
restricted cubic spline	RCS
95%confidence interval	95% CI
odds ratio	OR

sTable 3. Ordinal multivariate logistic regression analyses .

		Estimate	95% CI		P value
			Lower Bound	Upper Bound	
Threshold	[AHI4 = 0]	8.839	7.253	10.424	<0.001
	[AHI4 = 1]	10.090	8.494	11.686	<0.001
	[AHI4 = 2]	11.012	9.408	12.617	<0.001
Location	Age	0.021	0.014	0.029	<0.001
	Glucose	0.037	-0.059	0.134	0.448
	insulin resistance inde	0.455	0.299	0.610	<0.001
	TG	0.097	-0.016	0.209	0.093
	LDL-C	0.263	0.161	0.364	<0.001
	HDL-C	-0.113	-0.479	0.254	0.546
	ApoE	-0.033	-0.111	0.045	0.408
	BMI	0.125	0.096	0.154	<0.001
	WHR	4.449	2.820	6.079	<0.001
	ESS	0.098	0.083	0.113	<0.001
	[Sex=0]	0.828	0.601	1.055	<0.001
	[Sex=1]	0[a]	.	.	
	[Hypertension=0]	-0.416	-0.603	-0.229	<0.001
	[Hypertension=1]	0[a]	.	.	.
	[Smoke=0]	-0.195	-0.365	-0.025	0.024
	[Smoke=1]	0[a]	.	.	.

Multivariate analyses were performed using ordinal logistic regression under a proportional odds model, for which AHI was grouped in 4 ordered categories (please see table 1).Test of parallel lines for Logit link functions, displayed significance(P<0.01). Only showed Logit link functions.

Abbreviations: WHR, waist circumference/hip circumference ratio; TG, triglyceride; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; apoE, apolipoprotein E; AHI, apnea-hypopnea index; ESS, Epworth sleepiness score.

sTable 4. The characteristics of parameters in groups classified by new knots for OSA severity.

Variable	Stage I: AHI < 10 (N = 848)	Stage II: 10 < AHI < 30 (N=695)	Stage III: 30 < AHI < 55 (N=633)	Stage IV: AHI > 55 (N=807)	*P* value
Demographics					
Age (yrs)	40(31-49)	43 (35-54)	44 (35.5-55)	42 (35-51)	<0.001
Female, N (%)	297 (52.1)	139 (24.4)	65 (11.4)	69 (12.1)	<0.001
BMI (kg/m^2)	24.0(22.1-26.1)	25.9(24.2-28.0)	26.7(24.8-28.7)	28.4(26.4-30.9)	<0.001
WHR	0.90(0.87-0.95)	0.94(0.91-0.97)	0.96(0.93-0.99)	0.97(0.94-1.00)	<0.001
Biochemistry assays					
Glucose (mmol/L)	5.01(4.68-5.33)	5.23 (4.89-5.67)	5.32 (4.93-5.77)	5.46 (5.06-6.11)	<0.001
insulin resistance index	0.51(0.09-0.91)	0.91(0.46-1.27)	0.97(0.55-1.42)	1.28(0.85-1.68)	<0.001
TC (mmol/L)	4.49(3.88-5.13)	4.74 (4.22-5.4)	4.83 (4.22-5.38)	4.88 (4.32-5.49)	<0.001
TG (mmol/L)	1.16(0.78-1.7)	1.58 (1.12-2.32)	1.68(1.23-2.41)	1.83 (1.33-2.68)	<0.001
HDL-C (mmol/L)	1.12 (0.97-1.33)	1.05 (0.91-1.22)	1.02 (0.91-1.17)	1.02 (0.89-1.16)	<0.001
LDL-C (mmol/L)	2.75 (2.27-3.32)	3.02 (2.53-3.6)	3.08 (2.59-3.59)	3.22 (2.7-3.77)	<0.001
apoE (mg/dL)	3.86 (3.23-4.86)	4.35 (3.56-5.31)	4.36 (3.55-5.49)	4.56 (3.73-5.68)	<0.001
Dyslipidemia					
HyperTC, N (%)	204 (24.1)	218 (31.4)*	217 (34.3)*	314 (38.9)	<0.001
HyperTG, N (%)	213 (25.1)	311 (44.7)*	313 (49.4)*	459 (56.9)	<0.001
HypoHDL-C, N (%)	317 (37.4)	327 (47.1)	336 (53.1)*	438 (54.3)*	<0.001
HyperLDL-C, N (%)	195 (23.0)	234 (33.7)*	227 (35.9)*	348 (43.1)	<0.001
HyperapoE, N (%)	328 (38.7)	296 (42.6)*	291 (46.0)*	375 (46.5)	0.005
Sleep apnea					
AHI	2.9(0.8-6.2)	18.7 (13.8-23.9)	43.0 (36.65-48.85)	68.6 (61.8-77.2)	<0.001
CT90	0 (0-0.3)	1.7(0.4- 4.8)	9.02 (3.1-19.3)	30.9(13.48-47.97)	<0.001
Minimum SaO_2	91.0 (88.0-95.0)	83.0 (78.0-88.0)	76.0 (68.0-82.0)	68.0 (60.0-74.0)	<0.001
ODI	3.1 (0.9-6.9)	19.9 (13.6-27.6)	44.6 (35.8-52.25)	68.6 (59.5-79.1)	<0.001
Arousal index	13.95 (7-22.6)	22.2 (10.1-32.5)	27.1 (9.9-41.3)	48.2 (24.1-66.7)	<0.001
Medical history					
ESS	5 (1-9)	8 (4-11)	9 (6-13)	12 (8-16)	<0.001
Non-smoker, N (%)	618 (72.9)	432 (62.2)	341 (53.9)	433 (53.7)	<0.001
Non-drinker, N (%)	686 (80.9)	543 (78.1)	459 (72.5)	581 (72.0)	<0.001
Presence of hypertension, N (%)	111 (13.1)	205 (29.5)	219 (34.6)	339 (42.0)	<0.001
Presence of diabetes, N (%)	51 (6.0)	95 (13.7)	109 (17.2)	204 (25.3)	<0.001

Distributed data are presented as the means means ± standard deviation (SD); skewed data are presented as the median (interquartile range); and categorical data are presented as the number (percentage). * $\chi 2$ tests for two groups, P>0.05.

Abbreviations: BMI, Body mass index; WHR, waist circumference/hip circumference ratio; TC, total cholesterol; TG, triglyceride; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; apoE, apolipoprotein E; Lp(a), Lipoprotein(a); AHI, apnea-hypopnea index; CT90, percentage of time with SaO2<90%; SaO2, oxygen saturation; ODI, oxygen desaturation index; ESS, Epworth sleepiness score.

Differences of baseline characteristics among four groups were examined by using Kruskal-Wallis H test, one-way ANOVA, $\chi 2$ tests according to the characteristics of data distribution.

The population was categorized by new knots for OSA severity.

sTable 5. The result of Pearson correlation.

		age	sex	Glu-0	TC	TG	HDL	LDL	APOA-1	APOB	APOE	insulin-0	BMI	waist/hip	IR
age	Pearson Correlation	1	.180**	.161**	.099**	.010	.085**	.050**	.166**	.082**	.033	-.064**	.006	.105**	-.022
	Sig. (2-tailed)		.000	.000	.000	.579	.000	.006	.000	.000	.075	.001	.748	.000	.238
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
sex	Pearson Correlation	.180**	1	-.064**	-.022	-.171**	.292**	-.075**	.263**	-.111**	.003	-.114**	-.192**	-.349**	-.133**
	Sig. (2-tailed)	.000		.000	.230	.000	.000	.000	.000	.000	.851	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
Glu-0	Pearson Correlation	.161**	-.064**	1	.173**	.231**	-.080**	.141**	.008	.203**	.182**	.278**	.273**	.243**	.499**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.656	.000	.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
TC	Pearson Correlation	.099**	-.022	.173**	1	.317**	.268**	.839**	.311**	.847**	.494**	.132**	.143**	.167**	.184**
	Sig. (2-tailed)	.000	.230	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
TG	Pearson Correlation	.010	-.171**	.231**	.317**	1	-.349**	.011	-.116**	.288**	.744**	.283**	.256**	.288**	.345**
	Sig. (2-tailed)	.579	.000	.000	.000		.000	.538	.000	.000	.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
HDL	Pearson Correlation	.085**	.292**	-.080**	.268**	-.349**	1	.207**	.764**	.009	-.061**	-.198**	-.241**	-.266**	-.247**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.623	.001	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
LDL	Pearson Correlation	.050**	-.075**	.141**	.839**	.011	.207**	1	.156**	.815**	.160**	.128**	.145**	.154**	.176**
	Sig. (2-tailed)	.006	.000	.000	.000	.538	.000		.000	.000	.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
APOA-1	Pearson Correlation	.166**	.263**	.008	.311**	-.116**	.764**	.156**	1	.093**	.136**	-.091**	-.140**	-.142**	-.113**
	Sig. (2-tailed)	.000	.000	.656	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
APOB	Pearson Correlation	.082**	-.111**	.203**	.847**	.288**	.009	.815**	.093**	1	.388**	.185**	.223**	.248**	.250**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.623	.000	.000		.000	.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
APOE	Pearson Correlation	.033	.003	.182**	.494**	.744**	-.061**	.160**	.136**	.388**	1	.245**	.190**	.191**	.285**
	Sig. (2-tailed)	.075	.851	.000	.000	.000	.001	.000	.000	.000		.000	.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
insulin-0	Pearson Correlation	-.064**	-.114**	.278**	.132**	.283**	-.198**	.128**	-.091**	.185**	.245**	1	.497**	.329**	.893**
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
BMI	Pearson Correlation	.006	-.192**	.273**	.143**	.256**	-.241**	.145**	-.140**	.223**	.190**	.497**	1	.541**	.539**
	Sig. (2-tailed)	.748	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
waist/hip	Pearson Correlation	.105**	-.349**	.243**	.167**	.288**	-.266**	.154**	-.142**	.248**	.191**	.329**	.541**	1	.395**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983
IR	Pearson Correlation	-.022	-.133**	.499**	.184**	.345**	-.247**	.176**	-.113**	.250**	.285**	.893**	.539**	.395**	1
	Sig. (2-tailed)	.238	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983	2983

**. Correlation is significant at the 0.01 level (2-tailed).

sTable 6. Result of Collinearity Diagnostics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-86.797	7.957		-10.908	.000		
	age	.109	.037	.047	2.917	.004	.867	1.154
	sex	-6.672	1.195	-.096	-5.585	.000	.759	1.318
	Glu-0	.737	.531	.027	1.387	.166	.580	1.723
	TC	-6.493	1.326	-.227	-4.896	.000	.104	9.629
	TG	1.540	.620	.068	2.485	.013	.298	3.361
	HDL	9.850	3.115	.090	3.162	.002	.277	3.615
	LDL	5.324	1.243	.165	4.282	.000	.151	6.634
	APOA-1	-6.395	3.577	-.045	-1.788	.074	.358	2.791
	APOB	14.791	5.377	.094	2.751	.006	.192	5.213
	APOE	.753	.453	.044	1.663	.096	.320	3.122
	insulin-0	.099	.128	.029	.773	.439	.163	6.143
	BMI	1.559	.144	.217	10.861	.000	.561	1.782
	waist/hip	51.655	8.509	.118	6.070	.000	.588	1.700
	ESS	1.139	.076	.244	15.067	.000	.855	1.170
	IR	4.490	1.686	.114	2.662	.008	.122	8.191

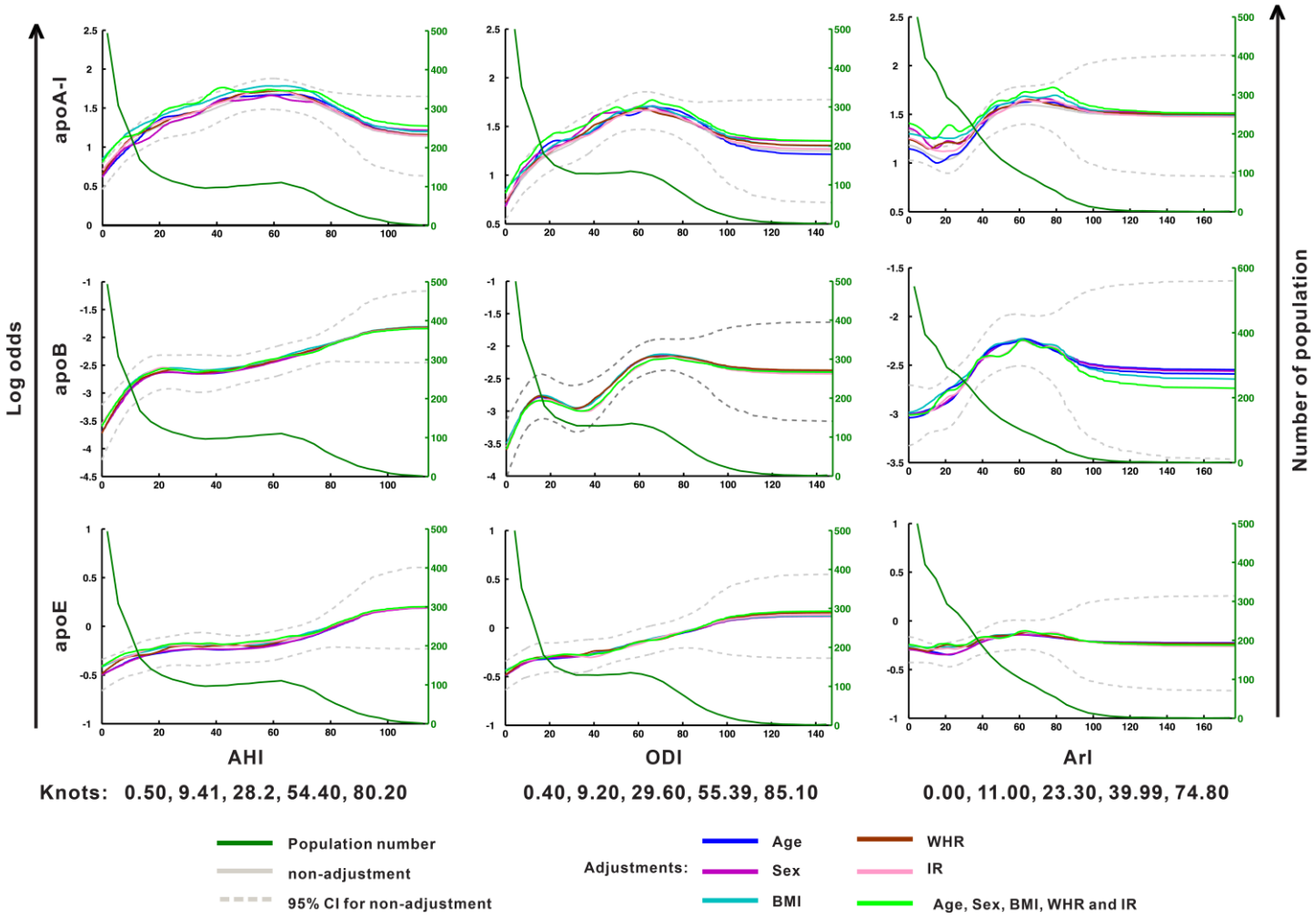
a. Dependent Variable: AHI/Total

sTable 7. Result of Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions														
				(Constant)	age	sex	Glu-0	TC	TG	HDL	LDL	APOA-1	APOB	APOE	insulin-0	BMI	waist/hip	ESS	IR
1	1	13.742	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.923	3.858	.00	.00	.51	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00
	3	.494	5.272	.00	.00	.23	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.03
	4	.284	6.959	.00	.00	.00	.00	.00	.17	.00	.00	.00	.00	.02	.00	.00	.00	.23	.00
	5	.258	7.294	.00	.00	.06	.00	.00	.04	.00	.00	.00	.00	.00	.01	.00	.00	.70	.01
	6	.089	12.450	.00	.16	.02	.01	.01	.00	.00	.04	.00	.01	.01	.00	.00	.00	.00	.00
	7	.062	14.885	.00	.30	.01	.01	.00	.00	.05	.01	.02	.01	.04	.06	.00	.00	.01	.03
	8	.043	17.908	.00	.37	.02	.13	.00	.00	.00	.00	.00	.00	.01	.27	.01	.00	.01	.13
	9	.037	19.228	.01	.11	.08	.00	.00	.05	.04	.00	.02	.00	.13	.12	.05	.01	.01	.17
	10	.028	22.136	.00	.00	.00	.00	.00	.61	.06	.01	.02	.00	.66	.00	.02	.00	.00	.00
	11	.015	30.768	.00	.00	.00	.67	.00	.00	.00	.00	.02	.00	.00	.43	.16	.00	.00	.41
	12	.009	39.905	.00	.02	.00	.01	.00	.03	.29	.13	.45	.24	.03	.00	.10	.00	.01	.01
	13	.007	44.998	.08	.00	.00	.14	.00	.00	.11	.02	.23	.02	.00	.05	.52	.06	.00	.16
	14	.006	49.066	.02	.00	.00	.01	.00	.00	.33	.41	.23	.48	.02	.00	.11	.03	.00	.00
	15	.003	66.781	.00	.00	.00	.00	.99	.09	.10	.37	.01	.23	.09	.00	.00	.00	.00	.00
	16	.001	97.231	.88	.02	.07	.02	.00	.00	.02	.00	.00	.00	.00	.02	.03	.89	.01	.04

a. Dependent Variable: AHI/Total

6. sFigure 1.


Log odds
apoA-I
apoB
apoE
Number of population
AHI
ODI
ArI
Knots: 0.50, 9.41, 28.2, 54.40, 80.20
0.40, 9.20, 29.60, 55.39, 85.10
0.00, 11.00, 23.30, 39.99, 74.80
Population number
non-adjustment
95% CI for non-adjustment
Adjustments:
Age
Sex
BMI
WHR
IR
Age, Sex, BMI, WHR and IR