

Table S1. Sleep-related complaints depending on gender [Number (% whole cohort/%row category)]

Sleep complaint	Males (n=501)	Females (n=926)	P
Sleep-onset difficulties ≥ 3 times/week	66 (4.6%/25.8%)	190 (13.3%/74.2%)	$\chi^2=11.91$, p=0.001
Sleep-maintenance difficulties (midnight awakenings) ≥ 3 times/week	36 (2.5%/20.5%)	140 (9.8%/79.5%)	$\chi^2=18.92$, p<0.001
Both sleep-onset and sleep-maintenance problems ≥ 3 times/week	23 (1.6%/19.2%)	97 (6.8%/80.8%)	$\chi^2=14.62$, p<0.001
Either sleep-onset or sleep-maintenance problems ≥ 3 times/week	79 (5.5%/25.3%)	233 (16.3%/74.7%)	$\chi^2=16.79$, p<0.001
Daytime sleepiness ≥ 3 times/week	24 (1.7%/25.8%)	69 (4.9%/74.2%)	$\chi^2=3.79$, p=0.051
Any of insomnia complaints + daytime sleepiness ≥ 3 times/w	6 (0.4%/18.8%)	26 (1.8%/81.2%)	$\chi^2=3.85$, p=0.050
Any of insomnia complaints + short sleep <6h	10 (0.7%/34.5%)	19 (1.3%/65.5%)	p=0.94
Regular snoring	302 (21.2%/44.8%)	372 (26.1%/55.2%)	$\chi^2=52.74$, p<0.001
Sleep apneas	32 (2.2%/45.1%)	39 (2.7%/54.9%)	p=0.07
SDB (snoring or sleep apneas)	197 (13.8%/26.7%)	541 (37.9%/73.3%)	$\chi^2=47.51$, p<0.001
Intake of sleeping pills ≥ 3 times/week	6 (0.4%/15.0%)	34 (2.4%/85.0%)	$\chi^2=7.25$, p=0.007
Sleep duration:	28	45	p=0.028
Short (<6h)	(2.0%/38.4%)	(3.2%/61.6%)	
Normal (6-9h)	459 (32.2%/35.7%)	826 (57.9%/64.3%)	
Long (≥ 10 h)	14 (1.0%/20.3%)	55 (3.9%/79.7%)	

Table S2. Demographic and clinical characteristics of the groups depending on gender.

Parameter	Males (n=501)	Females (n=926)	P
Age, years	44±12	47±11	<0.001
BMI, kg/m ²	27.3±4.3	26.9±5.8	0.002
SBP/DBP, mmHg	133±18/82±12	126±21/78±12	<0.001
Hypertension, n (%whole cohort/% raw category)	210 (14.7%/38.7%)	332 (23.3%/61.3%)	$\chi^2=5.12$, p=0.023
Obesity, n (%whole cohort/% raw category)	121 (8.5%/32.7%)	249 (17.5%/67.3%)	0.25
Diabetes mellitus, n (%whole cohort/% raw category)	26 (1.8%/32.5%)	54 (3.8%/67.5%)	0.62
Dyslipidemia, n (%whole cohort/% raw category)	344 (24.1%/36.65)	597 (41.8%/63.4%)	0.11
Kidney dysfunction (eGFR<60 ml/min/1.73 m ²), n (%whole cohort/% raw category)	2 (0.1%/50%)	2 (0.1%/50%)	0.53
Low physical activity n (%whole cohort/% raw category)	347 (24.3%/34.4%)	663 (46.5%/65.6%)	0.35
Smoking, n (%whole cohort/% raw category)	335 (23.5%/47.5%)	370 (25.9%/52.5%)	$\chi^2=94.2$, p<0.001

Table S3. Laboratory parameters in the groups depending on sleep duration.

Parameter	Males (n=501)	Females (n=926)	P
Lipid profile			
TC, mmol/l	5.2 (2.6-8.4)	5.3 (2.8-10.8)	0.003
LDL, mmol/l	3.4 (1.2-6.4)	3.3 (0.6-8.0)	0.79
HDL, mmol/l	1.2 (0.6-2.7)	1.4 (0.5-3.4)	<0.001
TG, mmol/l	1.2 (0.4-7.5)	1.0 (0.2-16.1)	<0.001
TG/HDL	1.07 (0.23-8.5)	0.70 (0.16-17.5)	<0.001
Lp(a),g/l	0.09 (0.04-1.70)	0.11 (0.04-4.5)	0.012
ApoAI, g/l	1.4 (0.3-4.3)	1.65 (0.32-4.21)	<0.001
ApoB, g/l	1.0 (0.2-2.0)	1.0 (0.20-2.46)	0.10
ApoB/ApoAI	0.73 (0.05-1.60)	0.61 (0.05-1.65)	<0.001
Lp(a)≥0,5 g/l, n (%whole cohort/% raw category)	75(5.3%/32.8%)	154 (10.8%/67.2%)	0.42
Lp(a) ≥1,8 g/l, n (%whole cohort/% raw category)	1 (0.1%/10%)	9 (0.6%/90%)	0.10
TC ≥6.0 mmol/l, n (%whole cohort/% raw category)	116 (8.1%/28.9%)	285 (20%/71.1%)	$\chi^2=9.35$, p=0.002
LDL ≥3.0 mmol/l, n (%whole cohort/% raw category)	341 (23.9%/36.4%)	595 (41.7%/63.6%)	0.15
Glucose metabolism			
Glucose, mmol/l	5.2 (1.4-12.2)	5.0 (3.1-14.7)	<0.001
Insulin	64.5 (3.0-489.5)	56.4 (6.5-512.9)	0.01

HOMA-IR	2.52 (0.10-18.7)	2.11 (0.22-32.2)	<0.001
Kidney function			
Creatinine, mcmol/l	75±11	62±7	<0.001
eGFR, ml/min/1.73 m ²	107±13	101±12	<0.001

Table S4. The association between sleep duration and other factors, including hypnotics use (the multinomial logistic regression results).

Group (by sleep duration)	Variable	Coefficient	Standard error	z-statistic	OR (95%CI)	p-value
<6 h	Lp(a)	-1.25	0.59	-2.13	0.29 (0.09; 0.91)	0.033
	Sex (male)	0.10	0.27	0.36	1.10 (0.65; 1.88)	0.72
	Age	0.01	0.01	0.91	1.01 (0.99; 1.04)	0.36
	BMI	0.01	0.03	0.47	1.01 (0.96; 1.07)	0.64
	HOMA-IR	0.10	0.04	2.74	1.10 (1.03; 1.18)	0.0061
	Smoking (yes)	0.56	0.26	2.12	1.75 (1.04; 2.95)	0.034
	Physical activity (low)	-0.52	0.26	-2.01	0.60 (0.36; 0.99)	0.044
	HTN (yes)	-0.32	0.28	-1.13	0.73 (0.42; 1.26)	0.26
	DM (yes)	0.39	0.60	0.65	1.47 (0.45; 4.78)	0.52
	SDB (yes)	-0.35	0.28	-1.25	0.70 (0.41; 1.22)	0.21
	Hypnotics	1.89	0.43	4.39	6.65 (2.85; 15.47)	0.00001
	Lp(a)	0.46	0.28	1.65	1.59 (0.92; 2.74)	0.098
	Sex (male)	-0.75	0.32	-2.32	0.47 (0.25; 0.89)	0.021
	Age	0.00	0.01	-0.39	1.00 (0.97; 1.02)	0.69
	BMI	0.04	0.03	1.32	1.04 (0.98; 1.09)	0.19
≥10 h	HOMA-IR	0.04	0.05	0.87	1.04 (0.95; 1.14)	0.38
	Smoking (yes)	-0.01	0.26	-0.03	0.99 (0.59; 1.67)	0.98
	Physical activity (low)	-0.47	0.26	-1.76	0.63 (0.37; 1.05)	0.0778
	HTN (yes)	-0.69	0.30	-2.28	0.50 (0.28; 0.91)	0.022
	DM (yes)	0.50	0.77	0.65	1.66 (0.36; 7.51)	0.51
	SDB (yes)	0.11	0.29	0.40	1.12 (0.64; 1.97)	0.69
	Hypnotics	0.83	0.64	1.30	2.29 (0.66; 7.97)	0.19

Table S5. Parameters estimates (GAM) for categorical variables.

Group (by sleep duration)	Variable	Coefficient	Standard error	z-statistic	OR (95%CI)	p-value
<6 h	Sex (male)	0.09	0.27	0.34	1.10 (0.64; 0.64)	0.73
	Smoking (yes)	0.58	0.27	2.16	1.78 (1.05; 1.05)	0.031
	Physical activity (low)	-0.49	0.26	-1.91	0.61 (0.37; 0.37)	0.056
	HTN (yes)	-0.33	0.29	-1.14	0.72 (0.41; 0.41)	0.25
	DM (yes)	0.40	0.60	0.66	1.48 (0.46; 0.46)	0.51
	SDB (yes)	-0.35	0.28	-1.23	0.71 (0.41; 0.41)	0.22
	Hypnotics	1.92	0.44	4.38	6.79 (2.88; 2.88)	0.00001
	Sex (male)	-0.73	0.33	-2.24	0.48 (0.25; 0.25)	0.025
	Smoking (yes)	-0.01	0.26	-0.04	0.99 (0.59; 0.59)	0.97
≥10 h	Physical activity (low)	-0.45	0.26	-1.71	0.64 (0.38; 0.38)	0.087
	HTN (yes)	-0.69	0.30	-2.29	0.50 (0.28; 0.28)	0.022
	DM (yes)	0.56	0.77	0.73	1.75 (0.39; 0.39)	0.47
	SDB (yes)	0.13	0.29	0.44	1.13 (0.64; 0.64)	0.66
	Hypnotics	0.82	0.64	1.29	2.27 (0.65; 0.65)	0.19

Presented models were fitted using R version 3.6.3 environment for statistical computing, nnet 7.3-13 (multinomial logistic models) and mgcv 1.8-31 (generalized additive model with multinomial dependent variable) packages. In case of GAM smoothing functions were fitted using restricted maximum likelihood estimator for all quantitative variables.

Table S6. Nonlinear terms (GAM).

Group (by sleep duration)	Variable	Estimated degrees of freedom	χ^2	p-value
<6 h	s[Lp(a)]	1.0001	4.18	0.0408
	s[Age]	3.9329	11.75	0.0313
	s[BMI]	1.0002	0.25	0.62
	s[HOMA-IR]	1.0001	7.24	0.0071
≥10 h	s[Lp(a)]	1.0006	2.86	0.091
	s[Age]	1.0001	0.07	0.79
	s[BMI]	1.5486	2.56	0.33
	s[HOMA-IR]	1.9943	1.45	0.54

Presented models were fitted using R version 3.6.3 environment for statistical computing, nnet 7.3-13 (multinomial logistic models) and mgcv 1.8-31 (generalized additive model with multinomial dependent variable) packages. In case of GAM smoothing functions were fitted using restricted maximum likelihood estimator for all quantitative variables.