

SUPPLEMENTAL MATERIAL

Associations of impaired glucose tolerance and sleep disorders with mortality among the US general population

Online Supplemental Tables

1. Baseline characteristics among the NHANES 2005-2014 participants who were included and not included in the present study.
2. Number of all-cause and cause-specific mortality among the NHANES 2005-2014 participants through 2015.
3. The association of sleep disorder and sleep duration with all-cause mortality according to glucose tolerance status in NHANES 2005-2014 followed through 2015

Online Supplemental Figure

1. Associations between 2-h plasma glucose during the 75-g oral glucose tolerance test (OGTT) and all-cause mortality according to the presence of short or long sleep duration.

Online Supplemental Table S1. Baseline characteristics among the NHANES 2005-2014 participants who were included and not included in the present study.

Variables	Participants who were included in the present study	Participants who were not included in the present study	p-value
Total, n (%)	8795	111	-
Age (years)	55.1 ± 18.6	47.8 ± 17.5	<0.001
Sex (male), n (%)	4359 (49.6)	57 (51.4)	0.71
Race/ethnicity, n (%)			0.70
Non-Hispanic White	4165 (47.4)	48 (43.2)	
Non-Hispanic Black	1596 (18.2)	21 (18.9)	
Mexican-American	1410 (16.0)	17 (15.3)	
Others	1624 (18.5)	25 (22.5)	
Education status, n (%)			<0.001
Less than 9 th grade	838 (9.5)	24 (22.8)	
9 th -11 th grade	1268 (14.4)	12 (11.4)	
High school or GED	2013 (22.9)	19 (18.1)	
Higher than high school	4676 (53.2)	50 (47.6)	
Missing	-	6	
Married, n(%)	4662 (53.0)	54 (48.7)	0.36
Smoking, n (%)			0.75
Never	4877 (55.5)	55 (52.9)	
Current	1848 (21.0)	25 (24.0)	
Former	2070 (23.5)	24 (23.1)	
Missing	-	7	
BMI (kg/m ²)	27.6 ± 6.9	28.5 ± 6.6	0.38
Missing	-	70	
eGFR (mL/min/1.73 m ²)	95.9 ± 24.3	89.6 ± 27.5	0.007
Cancer, n (%)	740 (8.4)	13 (12.2)	<0.001
Missing	-	4	
Hypertension, n (%)	2729 (31.0)	42 (42.0)	0.02
Missing	-	11	
Cardiovascular disease, n (%)	487 (5.5)	14 (12.6)	0.001
Stroke, n (%)	235 (2.7)	7 (6.6)	0.01
Missing	-	5	
Statin prescription, n (%)	1200 (13.6)	10 (9.0)	0.15
Sleep disorder, n (%)	2141 (24.3)	42 (37.8)	0.001
Sleep duration	6.8 ± 1.4	6.7 ± 2.0	0.23
Missing	-	7	

Abbreviations: NHANES, National Health and Nutrition Examination Survey; GED, General Educational Development; HR, hazard ratio; CI, confidence interval; BMI, body mass index; eGFR, estimated glomerular filtration rate.

Online Supplemental Table S2. Number of all-cause and cause-specific mortality among the NHANES 2005-2014 participants through 2015.

Number of deaths	Total number of participants	Number of all-cause deaths (%)	Number of CVD deaths (%)	Number of Cancer deaths (%)
Sleep disorders				
NGT without sleep disorders	5128	164 (3.2)	33 (1.1)	46 (0.9)
NGT with sleep disorders	1626	89 (5.5)	17 (1.7)	22 (1.4)
IGT without sleep disorders	1107	103 (9.3)	19 (3.3)	16 (1.5)
IGT with sleep disorders	364	45 (12.4)	12 (3.3)	9 (2.5)
Diabetes without sleep disorders	419	80 (19.1)	14 (2.7)	20 (4.8)
Diabetes with sleep disorders	151	26 (17.2)	4 (1.1)	5 (3.3)
Sleep duration				
NGT with sleep duration \geq 7h	4148	153 (3.7)	25 (0.6)	49 (1.2)
NGT with sleep duration < 7h	2606	100 (3.8)	25 (1.0)	19 (0.7)
IGT with sleep duration \geq 7h	916	97 (10.6)	18 (2.0)	11 (1.2)
IGT with sleep duration < 7h	555	51 (9.2)	13 (2.3)	14 (2.5)
Diabetes with sleep duration \geq 7h	359	72 (20.1)	9 (2.5)	20 (5.6)
Diabetes with sleep duration < 7h	211	34 (16.1)	9 (4.3)	5 (2.4)

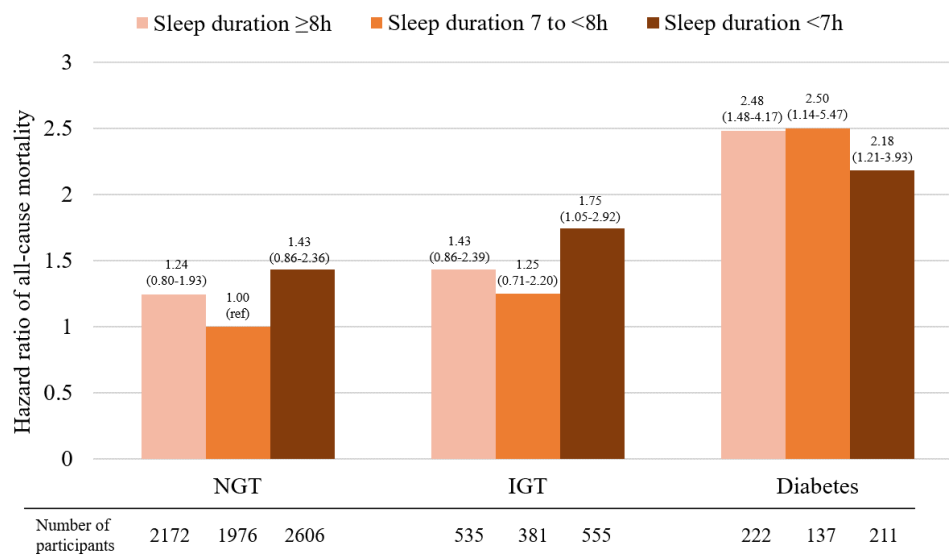
*Cause-specific mortality was defined based on ICD-10 code in National Death Index.

Online supplemental Table S3. The association of sleep disorder and sleep duration with all-cause mortality according to glucose tolerance status in NHANES 2005-2014 followed through 2015.

All-cause mortality	Adjusted hazard ratio (95% CI) ^a		
	NGT	IGT	Diabetes
Sleep disorders			
–	ref	ref	ref
+	1.60 (1.18 to 2.17)	1.89 (1.19 to 3.01)	0.98 (0.58 to 1.66)
Sleep duration			
≥ 7 hours	ref	ref	ref
<7 hours	1.24 (0.88 to 1.76)	1.28 (0.80 to 2.03)	0.94 (0.52 to 1.67)

^aAdjusted for age, sex, race/ethnicity, education status, marital status, smoking, BMI, eGFR, previous history of cancer, hypertension, cardiovascular disease, stroke, and statin prescription

Online Supplemental Figure S1. Associations between 2-h plasma glucose during the 75-g oral glucose tolerance test (OGTT) and all-cause mortality according to the presence of short or long sleep duration.



NGT, normal glucose tolerance; IGT, impaired glucose tolerance.

Y-axis shows HR of all-cause mortality adjusted for age, sex, race/ethnicity, education status, marital status, smoking, BMI, eGFR, previous history of cancer, hypertension, cardiovascular disease, stroke, and statin prescription.