***Impact of Sleep Duration on Mortality and Quality of Life in Chronic Kidney Disease: Results from the 2007–2015 KNHANES***

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Supplemental Table 1. Univariable analysis of all-cause mortality according to sleep duration

|  |  |  |
| --- | --- | --- |
| Characteristic | Hazard ratio (95% CI) | *P* value |
| Sleep duration, h/day |  |  |
| <6 | 1.12 (0.91–1.39) | 0.273 |
| 6–8 | 1.00 (reference) | reference |
| >8 | 1.62 (1.26–2.09) | <0.0001 |
| Age, years |  | <0.0001 |
| 19–59 | 1.00 (reference) | reference |
| 60–69 | 2.35 (1.24–4.46) | 0.009 |
| 70–79 | 6.46 (3.53–11.81) | <0.0001 |
| ≥80 | 11.79 (6.38–21.79) | <0.0001 |
| Men | 1.44 (1.21–1.73) | <0.0001 |
| Body mass index, kg/m2 | 0.90 (0.87–0.92) | <0.0001 |
| CKD stage |  |  |
| Stage 3 | 1.00 (reference) | reference |
| Stage 4–5 | 1.98 (1.45–2.70) | <0.0001 |
| Former or current smoker | 1.65 (1.38–1.98) | <0.0001 |
| Education (high school or higher) | 0.74 (0.59–0.92) | 0.006 |
| Income (lowest quartile) | 1.08 (0.88–1.32) | 0.454 |
| Living with a spouse | 0.73 (0.61–0.88) | 0.001 |
| Occupation | 0.54 (0.43–0.69) | <0.0001 |
| Regular exercise | 0.54 (0.40–0.73) | <0.0001 |
| Anemia | 1.65 (1.37–1.98) | <0.0001 |
| Hypertension | 1.05 (0.86–1.28) | 0.643 |
| Diabetes | 1.30 (1.09–1.55) | 0.004 |
| Cardiovascular disease | 1.19 (0.96–1.47) | 0.117 |
| Cancer | 1.86 (1.35–2.58) | <0.0001 |
| Depression | 0.86 (0.57–1.28) | 0.453 |

Data were analyzed with Cox proportional hazard models and are presented as unadjusted hazard ratio (95% confidence interval).

CKD, chronic kidney disease; CI, confidence interval

Supplemental Table 2. Subgroup analysis of the association between sleep duration and all-cause mortality

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subgroup | Sleep duration (h/day) | | | P for interaction |
| <6 | 6–8 | >8 |
| Sex |  |  |  | 0.72 |
| Men (n=884) | 1.05 (0.77–1.41) | 1.00 (reference) | 1.08 (0.77–1.53) |  |
| Women (n=899) | 0.86 (0.63–1.17) | 1.00 (reference) | 1.15 (0.76–1.74) |  |
| Age, years |  |  |  | 0.07 |
| <65 (n=337) | 1.69 (0.56–5.06) | 1.00 (reference) | 2.32 (0.66–8.17) |  |
| ≥65 (n=1446) | 0.96 (0.77–1.20) | 1.00 (reference) | 1.11 (0.85–1.45) |  |
| CKD stage |  |  |  | 0.67 |
| Stage 3 (n=1677) | 1.00 (0.80–1.25) | 1.00 (reference) | 1.21 (0.92–1.60) |  |
| Stage 4–5 (n=106) | 0.83 (0.33–2.10) | 1.00 (reference) | 1.18 (0.44–3.21) |  |
| Anemia |  |  |  | 0.32 |
| Yes (n=519) | 1.00 (0.70–1.42) | 1.00 (reference) | 0.95 (0.61–1.48) |  |
| No (n=1264) | 0.93 (0.71–1.22) | 1.00 (reference) | 1.35 (0.97–1.87) |  |
| Hypertension |  |  |  | 0.65 |
| Yes (n=1303) | 1.03 (0.80–1.32) | 1.00 (reference) | 1.15 (0.85–1.55) |  |
| No (n=480) | 0.82 (0.53–1.25) | 1.00 (reference) | 1.36 (0.81–2.31) |  |
| Diabetes |  |  |  | 0.10 |
| Yes (n=785) | 1.19 (0.88–1.60) | 1.00 (reference) | 1.09 (0.76–1.55) |  |
| No (n=998) | 0.77 (0.57–1.06) | 1.00 (reference) | 1.39 (0.94–2.05) |  |
| Cardiovascular disease |  |  |  | 0.89 |
| Yes (n=367) | 0.85 (0.54–1.35) | 1.00 (reference) | 1.19 (0.69–2.06) |  |
| No (n=1416) | 1.00 (0.78–1.27) | 1.00 (reference) | 1.12 (0.83–1.51) |  |
| Cancer |  |  |  | 0.80 |
| Yes (n=117) | 1.14 (0.48–2.74) | 1.00 (reference) | 1.93 (0.70–5.30) |  |
| No (n=1666) | 0.97 (0.78–1.21) | 1.00 (reference) | 1.11 (0.84–1.45) |  |
| Depression |  |  |  | 0.63 |
| Yes (n=106) | 0.38 (0.10–1.42) | 1.00 (reference) | 1.08 (0.20–5.83) |  |
| No (n=1677) | 0.99 (0.80–1.24) | 1.00 (reference) | 1.16 (0.89–1.51) |  |

Data were analyzed with Cox proportional hazard models with adjustment for the covariates in model 4, and are presented as adjusted hazard ratio (95% confidence interval).

CKD, chronic kidney disease

Supplemental Table 3. Univariable analysis of the European Quality of Life-5 Dimensions index according to sleep duration

|  |  |  |
| --- | --- | --- |
| Characteristic | Linear regression coefficient (95% CI) | P value |
| Sleep duration, h/day |  |  |
| <6 | –0.05 (–0.08 to –0.02) | 0.001 |
| 6–8 | 0.00 (reference) | reference |
| >8 | –0.08 (–0.12 to –0.04) | <0.0001 |
| Age, years |  |  |
| 19–59 | 0.00 (reference) | reference |
| 60–69 | –0.04 (–0.09 to –0.001) | 0.043 |
| 70–79 | –0.11 (–0.15 to –0.07) | <0.0001 |
| ≥80 | –0.17 (–0.22 to –0.13) | <0.0001 |
| Men | 0.08 (0.06 to 0.10) | <0.0001 |
| Body mass index, kg/m2 | –0.002 (–0.005 to 0.002) | 0.325 |
| CKD stage |  |  |
| Stage 3 | 0.00 (reference) | reference |
| Stage 4–5 | –0.06 (–0.11 to –0.01) | 0.021 |
| Former or current smoker | 0.03 (0.004 to 0.05) | 0.02 |
| Education (high school or higher) | 0.03 (0.004 to 0.06) | 0.025 |
| Income (lowest quartile) | –0.08 (–0.10 to –0.05) | <0.0001 |
| Living with a spouse | 0.09 (0.07 to 0.12) | <0.0001 |
| Occupation | 0.12 (0.09 0.15) | <0.0001 |
| Regular exercise | 0.07 (0.03 to 0.10) | <0.0001 |
| Anemia | –0.06 (–0.08 to –0.03) | <0.0001 |
| Hypertension | 0.01 (–0.02 to 0.03) | 0.543 |
| Diabetes | –0.02 (–0.04 to 0.01) | 0.156 |
| Cardiovascular disease | –0.07 (–0.10 to –0.04) | <0.0001 |
| Cancer | –0.36 (–0.40 to –0.32) | <0.0001 |
| Depression | –0.12 (–0.17 to –0.07) | <0.0001 |

Data were analyzed with linear regression and are presented as linear regression coefficient (95% confidence interval).

CKD, chronic kidney disease; CI, confidence interval

Supplemental Table 4. Subgroup analysis of the association between sleep duration and the European Quality of Life-5 Dimensions index

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subgroup | Sleep duration (h/day) | | | P for interaction |
| <6 | 6–8 | >8 |
| Sex |  |  |  | 0.08 |
| Men (n=884) | 0.004 (–0.03 to 0.04) | 0.00 (reference) | –0.07 (–0.12 to –0.03) |  |
| Women (n=899) | –0.03 (–0.06 to 0.01) | 0.00 (reference) | –0.02 (–0.07 to 0.03) |  |
| Age, years |  |  |  | 0.72 |
| <65 (n=337) | –0.01 (–0.06 to 0.04) | 0.00 (reference) | –0.02 (–0.10 to 0.05) |  |
| ≥65 (n=1446) | –0.02 (–0.05 to 0.01) | 0.00 (reference) | –0.06 (–0.10 to –0.02) |  |
| CKD stage |  |  |  | 0.32 |
| Stage 3 (n=1677) | –0.01 (–0.04 to 0.01) | 0.00 (reference) | –0.05 (–0.09 to –0.02) |  |
| Stage 4–5 (n=106) | –0.10 (–0.24 to 0.05) | 0.00 (reference) | –0.01 (–0.16 to 0.14) |  |
| Anemia |  |  |  | 0.66 |
| Yes (n=519) | –0.002 (–0.05 to 0.05) | 0.00 (reference) | –0.02 (–0.08 to 0.04) |  |
| No (n=1264) | –0.01 (–0.04 to 0.01) | 0.00 (reference) | –0.06 (–0.10 to –0.02) |  |
| Hypertension |  |  |  | 0.31 |
| Yes (n=1303) | –0.03 (–0.06 to 0.001) | 0.00 (reference) | –0.05 (–0.09 to –0.01) |  |
| No (n=480) | 0.01 (–0.04 to 0.06) | 0.00 (reference) | –0.06 (–0.14 to 0.01) |  |
| Diabetes |  |  |  | 0.86 |
| Yes (n=785) | –0.02 (–0.06 to 0.02) | 0.00 (reference) | –0.06 (–0.11 to –0.01) |  |
| No (n=998) | –0.01 (–0.04 to 0.03) | 0.00 (reference) | –0.04 (–0.08 to 0.01) |  |
| Cardiovascular disease |  |  |  | 0.42 |
| Yes (n=367) | –0.01 (–0.07 to 0.06) | 0.00 (reference) | –0.08 (–0.16 to 0.004) |  |
| No (n=1416) | –0.02 (–0.04 to 0.01) | 0.00 (reference) | –0.04 (–0.07 to –0.001) |  |
| Cancer |  |  |  | <0.001 |
| Yes (n=117) | 0.17 (–0.0003 to 0.35) | 0.00 (reference) | 0.02 (–0.18 to 0.23) |  |
| No (n=1666) | –0.03 (–0.06 to –0.01) | 0.00 (reference) | –0.05 (–0.08 to –0.02) |  |
| Depression |  |  |  | 0.76 |
| Yes (n=106) | –0.04 (–0.15 to 0.06) | 0.00 (reference) | 0.01 (–0.15 to 0.18) |  |
| No (n=1677) | –0.01 (–0.04 to 0.01) | 0.00 (reference) | –0.05 (–0.08 to –0.02) |  |

Data were analyzed with linear regression with adjustment for the covariates in model 4, and are presented as linear regression coefficient (95% confidence interval).

CKD, chronic kidney disease