| **First Author, Year**  **Study Name**  **AHI Cutpoints** | **All-Cause Mortality, n Events, Adjusted HR/OR (95% CI)** | | **Cardiovascular Mortality, n Events, Adjusted HR/OR (95% CI)** | **Other Disease-Specific Mortality, n Events, Adjusted HR/OR (95% CI)** | **Covariates Included in the Final Adjusted Model (Other Covariates Considered in the Study that Were Not Included in the Final Model)** | |
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| Ensrud, 2012220  None  Severe: ≥30  Not Severe: < 30 | 180 deaths  Base Model  OR 1.88 (1.15, 3.08)  Multivariate model  OR 1.74 (1.04, 2.89) | | NR | NR | Base: age, race, clinic site, health status, and BMI  Multivariate: age, race, site, health status, BMI, education, social support, alcohol intake, smoking, antidepressant, benzodiazepine, nonbenzodiazepine sedative hypnotic use, medical conditions, cognition, and baseline frailty status. | |
| Gooneratne, 2011223  None  SDB+ (AHI ≥20)/EDS+  SBD-/EDS+  SDB+(AHI ≥20)/EDS- | 160 deaths  HR:  SDB-/EDS- = Ref  SDB+/EDS+ = 2.28 (1.46, 3.57)  SBD-/EDS+ = 1.11 (0.75, 1.63)  SDB+/EDS- = 0.74 (0.39, 1.38) | | NR | NR | Final model included age, male gender, African American race, history of angina, habitual self-reported sleep duration > 8.5 h (other covariates considered: smoking, alcohol intake, BMI, habitual sleep parameters [self-reported sleep duration, sleep latency, sleep ef­ficiency], polysomnography sleep parameters [sleep duration, sleep latency, wakefulness after sleep onset, sleep efficiency], oxyhemoglobin desaturation [nadir in REM and NREM sleep during polysomnography], and 22 medical conditions [diabetes, emphysema, high blood pressure, heart attack, stroke, heart failure, etc.]). | |
| Marin, 200550  Untreated mild to mod: AHI 5-30  Untreated Severe: AHI >30  Treated OSA with CPAP: Any AHI >5  Snorers: AHI <5  Healthy controls: AHI <5 | NR | | 81 fatal CV events (due to MI or stroke): 47 in untreated OSA participants; 13 in treated OSA group; 13 in simple snorers; and 8 in healthy men  Partial adjusted OR  Untreated mild to mod: 1.16 (0.55 to 2.11)  Untreated severe: 3.02 (1.44 to 7.33)  CPAP treated: 1.05 (0.45 to 2.09)  Snorers: 1.03 (0.41 to 1.46)  Fully adjusted OR  Untreated mild to mod: 1.15 (0.34 to 2.69)  Untreated severe: 2.87 (1.17 to 7.3)  CPAP treated: 1.05 (0.39 to 2.21)Snorers: 1.03 (0.31 to 1.84) | NR | Partial: Age, diagnostic group, diabetes, lipid disorders, smoking status, alcohol use, systolic and diastolic blood pressure, blood glucose, total cholesterol. Triglycerides, and current use of antihypertensive, lipid-lowering and antidiabetic drugs  Full: above plus hypertension and presence of cardiovascular disease—i.e., ischemic heart disease, congestive heart disease, or cerebrovascular disease.  Used matching for age and BMI |
| Marshall, 2008228  Marshall, 2014229  Busselton Health Study  *For 14 year followup*  RDI  No OSA: 0 to 4  Mild: 5 to <15  Mod to severe: ≥15  *For 20 year followup:*  Normal: < 5  Mild 5 to <15  Mod to severe: ≥15 | *For 14 year followup:*  33 deaths (by group: 22, 5, and 6, respectively)  Partially Adjusted HR  No OSA: Ref  Mild: 0.62 (0.23 to 1.69)  Mod to severe: 4.40 (1.48 to 13.07), P=0.008  Fully Adjusted HR  No OSA: Ref  Mild: 0.47 (0.17 to 1.29)  Mod to severe: 6.24 (2.01 to 19.39), P=0.002  *For 20 year followup:*  77 deaths  G1: Ref  G2: 0.51 (0.27 to 0.99)  G3: 4.2 (1.9 to 9.2) | NR | | NR | *For 14 year followup:*  Partially adjusted for age, gender, BMI, smoking status, total cholesterol, HDL cholesterol, diabetes (yes/no), doctor diagnoses angina  Fully adjusted: Everything in the partially adjusted model plus mean arterial pressure  *For 20 year followup:*  Adjusted for age, gender, body mass index (normal, overweight, obese), smoking status (never, ex, current), total cholesterol, high density lipoprotein cholesterol, mean arterial pressure, diabetes (yes/no), doctor-diagnosed angina (yes/no), and in mortality, stroke, and CHD models a history of cardiovascular disease (via record linkage yes/no). |
| Nieto, 2012221  WSCS  Normal: <5  Mild: 5 to <15:  Mod: 15 to <30  Severe: ≥30 | 112 deaths  HR:  Normal: Ref  Mild: 1.8 (1.1 to 2.8)  Mod: 1.1 (0.5 to 2.5)  Severe: 3.4 (1.7 to 6.7) |  | | 50 cancer-related deaths  HR:  Mild: 1.1 (0.5 to 2.7)  Mod: 2.0 (0.7 to 5.5)  Severe: 4.8 (1.7 to 13.2) | age, sex, BMI, smoking (analyses also with stratification for sleepiness and obesity; additional adjustment for alcohol use, physical activity, educational status, diabetes, waist circumference, and sleep duration did not materially change results [data NR]; analyses removing those treated with CPAP resulted in slightly increased HRs [data NR]) | |
| Punjabi, 2009227  SHHS  No SDB: <5  Mild: 5-<15  Mod: 15 to <30  Severe: ≥30 | 1047 deaths  Deaths by AHI:  No SDB: 477  Mild: 319  Mod: 165  Severe: 86  All participants  Adjusted HR: Model 1  No SDB: ref  Mild: 0.90 (0.78 to 1.04)  Mod: 1.16 (0.97 to 1.39)  Severe: 1.30 (1.03 to 1.64)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.93 (0.80 to 1.07)  Mod: 1.20 (1.00 to 1.44)  Severe: 1.38 (1.08 to 1.75)  Adjusted HR: Model 3  No SDB: ref  Mild: 0.93 (0.80 to 1.08)  Mod: 1.17 (0.97 to 1.42)  Severe: 1.46 (1.14 to 1.86)  Men- all ages  Adjusted HR: Model 1  No SDB: ref  Mild: 0.94 (0.78 to 1.15)  Mod: 1.23 (0.98 to 1.54)  Severe: 1.30 (0.98 to 1.72)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.99 (0.81 to 1.20)  Mod: 1.30 (1.03 to 1.64)  Severe: 1.42 (1.06 to 1.90)  Adjusted HR: Model 3  No SDB: ref  Mild: 1.01 (0.83 to 1.24)  Mod: 1.27 (1.00 to 1.65)  Severe: 1.54 (1.15 to 2.08)  Men- ≤70 yrs  Adjusted HR: Model 1  No SDB: ref  Mild: 1.10 (0.81 to 1.48)  Mod: 1.37 (0.96 to 1.95)  Severe: 1.67 (1.09 to 2.55)  Adjusted HR: Model 2  No SDB: ref  Mild: 1.16 (0.85 to 1.58)  Mod: 1.44 (1.00 to 2.08)  Severe: 1.88 (1.19 to 2.95)  Adjusted HR: Model 3  No SDB: ref  Mild: 1.24 (0.90 to 1.71)  Mod: 1.45 (0.98 to 2.14)  Severe: 2.09 (1.31 to 3.33)  Men- >70 yrs  Adjusted HR: Model 1  No SDB: ref  Mild: 0.86 (0.67 to 1.11)  Mod: 1.18 (0.87 to 1.58)  Severe: 1.16 (0.80 to 1.69)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.89 (0.69 to 1.16)  Mod: 1.25 (0.92 to 1.70)  Severe: 1.25 (0.85 to 1.83)  Adjusted HR: Model 3  No SDB: ref  Mild: 0.92 (0.70 to 1.20)  Mod: 1.23 (0.90 to 1.68)  Severe: 1.27 (0.86 to 1.86)  Women – all ages  Adjusted HR: Model 1  No SDB: ref  Mild: 0.84 (0.68 to 1.04)  Mod: 1.05 (0.77 to 1.42)  Severe: 1.34 (0.86 to 2.07)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.85 (0.68 to 1.06)  Mod: 1.06 (0.78 to 1.43)  Severe: 1.37 (0.88 to 2.13)  Adjusted HR: Model 3  No SDB: ref  Mild: 0.83 (0.66 to 1.04)  Mod: 1.01 (0.73 to 1.38)  Severe: 1.40 (0.89 to 2.22)  Women- ≤70 yrs  Adjusted HR: Model 1  No SDB: ref  Mild: 1.00 (0.68 to 1.45)  Mod: 1.11 (0.63 to 1.96)  Severe: 1.73 (0.84 to 3.58)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.99 (0.66 to 1.47)  Mod: 1.12 (0.62 to 2.02)  Severe: 1.75 (0.82 to 3.74)  Adjusted HR: Model 3  No SDB: ref  Mild: 0.97 (0.64 to 1.48)  Mod: 1.15 (0.63 to 2.11)  Severe: 1.76 (0.77 to 3.95)  Women- >70 yrs  Adjusted HR: Model 1  No SDB: ref  Mild: 0.77 (0.60 to 1.00)  Mod: 0.98 (0.68 to 1.40)  Severe: 1.09 (0.62 to 1.89)  Adjusted HR: Model 2  No SDB: ref  Mild: 0.78 (0.60 to 1.02)  Mod: 0.99 (0.69 to 1.42)  Severe: 1.10 (0.63 to 1.92)  Adjusted HR: Model 3  No SDB: ref  Mild: 0.77 (0.58 to 1.00)  Mod: 0.89 (0.61 to 1.31)  Severe: 1.14 (0.65 to 2.01) | | CAD-specific mortality  220 deaths  Limited data reported. In men, AHI ≥15 had a fully adjusted HR 1.69 (1.13 to 2.52). In women, an association was not identified between SDB and CAD-related deaths | NR | Sex was included in all models that used all participants  Model 1: Age (continuous) and race  Model 2: Age (continuous), race, BMI  Model 3: Age (continuous), race, BMI, smoking status (current, never, former), systolic and diastolic blood pressure, prevalent hypertension, diabetes, and CV disease |
| Young, 2008226  WSCS  No SDB:<5  Mild: 5 to <15  Mod: 15 to <30  Severe: ≥30 | 80 deaths  Adjusted HR:  No SDB: ref  Mild: 1.6 (0.9 to 2.8)  Mod: 1.4 (0.6 to 3.3)  Severe: 3.0 (1.4 to 6.3)  Adjusted HR accounting for comorbidity:  No SDB: ref  Mild: 1.5 (0.8 to 2.8)  Mod: 1.3 (0.5 to 3.2)  Severe: 2.7 (1.3 to 5.7)  Adjusted HR excluding those treated with CPAP (n=1396):  No SDB: ref  Mild: 1.4 (0.7 to 2.6)  Mod: 1.7 (0.7 to 4.1)  Severe: 3.8 (1.6 to 9.0) | | 25 deaths  Adjusted HR:  No SDB: ref  Mild: 1.8 (0.7 to 4.9)  Mod: 1.2 (0.3 to 5.8)  Severe: 2.9 (0.8 to 10.0)  Fully adjusted HR:  Severe: 5.9 (2.6 to 13.3)  Adjusted HR excluding those treated with CPAP (n=1396):  No SDB: ref  Mild: 1.3 (0.4 to 4.1)  Mod: 1.5 (0.3 to 7.3)  Severe: 5.2 (1.4 to 19.2) |  | Adjusted HRs: Age, age-squared, sex, BMI, BMI-squared  Fully adjusted HR: Age, age-squared, sex, BMI, BMI-squared, smoking, alcohol use, general health status, educational status, neck girth, waist-hip ratio, sleep duration, and total cholesterol (authors did not consider this model robust for several reasons, including multicollinearity and potential model instability due to outliers and influential points which was of concern with a small number of outcomes; they just show this model to show that the adjusted HRs did not overestimate the HRs—if anything, they seem to underestimate them)  Adjusted HRs also accounting for comorbidity: Age, age-squared, sex, BMI, BMI-squared, hypertension/use of HTN meds, self-reported diabetes, coronary artery disease, cardiovascular disease, heart failure, myocardial infarction, cardiac surgery, and stroke |

**Abbreviations:** AHI=apnea-hypopnea index; BMI=body mass index; CAD=coronary artery disease; CI=confidence interval; CPAP=continuous positive airway pressure; CV=cardiovascular; EDS=excessive daytime sleepiness; HDL=high-density lipoprotein; HR=hazard ratio; HTN=hypertension; mod=moderate; MI=myocardial infarction; Mod=moderate; n=number; NR=not reported; NREM=non-rapid eye movement; OR=odds ratio; OSA=obstructive sleep apnea; RDI=respiratory disturbance index; Ref=reference; REM=rapid eye movement; SDB=sleep disordered breathing; SHHS=Sleep Heart Health Study; WSCS=Wisconsin Sleep Cohort Study.