Table 1. Baseline Characteristics of Participants With different pulse rhythms in NHANES 1999 to 2018.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | Total (49681) | Regular Pulse  (47911) | Irregular Pulse  (1770) | P-value |
| Age(years) | (49681) 47.0 (46.6 ,47.3) | (47911) 46.5 (46.1 ,46.9) | (1770) 63.2 (62.1 ,64.3) | <0.0001 |
| Poverty Income Ratio | (49681) 3.0 (2.9 ,3.0) | (47911) 3.0 (2.9 ,3.0) | (1770) 2.9 (2.8 ,3.0) | 0.2238 |
| Body Mass Index (kg/m2) | (49681) 28.8 (28.6 ,28.9) | (47911) 28.7 (28.6 ,28.9) | (1770) 29.5 (29.0 ,30.0) | 0.0048 |
| Waist Circumference (cm) | (49681) 98.3 (98.0 ,98.6) | (47911) 98.2 (97.9 ,98.5) | (1770) 102.7 (101.5 ,103.8) | <0.0001 |
| NT-proBNP | (11785) 135.7 (126.8 ,144.6) | (11158) 120.1 (111.1 ,129.1) | (627) 498.3 (399.3 ,597.3) | <0.0001 |
| 60-second pulse rate | (49681) 72.6 (72.4 ,72.8) | (47911) 72.7 (72.5 ,72.9) | (1770) 70.4 (69.5 ,71.2) | <0.0001 |
| Systolic Blood Pressure（mmHg） | (49681) 123.1 (122.8 ,123.5) | (47911) 122.9 (122.6 ,123.2) | (1770) 131.8 (130.3 ,133.2) | <0.0001 |
| Diastolic Blood Pressure（mmHg） | (49681) 71.1 (70.8 ,71.4) | (47911) 71.2 (70.9 ,71.5) | (1770) 67.3 (66.3 ,68.2) | <0.0001 |
| Average Alcoholic Drinks/Day (12 Mos) | (49681) 3.6 (3.3 ,3.9) | (47911) 3.5 (3.3 ,3.8) | (1770) 5.2 (2.5 ,7.9) | 0.2329 |
| Gender |  |  |  | <0.0001 |
| Female | (25697) 51.8 (51.3 ,52.2) | (24999) 52.0 (51.5 ,52.4) | (698) 44.8 (41.7 ,47.9) |  |
| Male | (23984) 48.2 (47.8 ,48.7) | (22912) 48.0 (47.6 ,48.5) | (1072) 55.2 (52.1 ,58.3) |  |
| Race |  |  |  | <0.0001 |
| Mexican American | (8684) 8.1 (7.1 ,9.2) | (8530) 8.3 (7.3 ,9.4) | (154) 3.1 (2.3 ,4.3) |  |
| Other Hispanic | (4055) 5.6 (4.7 ,6.5) | (3953) 5.6 (4.8 ,6.6) | (102) 3.6 (2.3 ,5.7) |  |
| Non-Hispanic White | (21994) 68.4 (66.4 ,70.4) | (20953) 68.1 (66.0 ,70.1) | (1041) 78.4 (75.3 ,81.2) |  |
| Non-Hispanic Black | (10440) 11.1 (10.1 ,12.3) | (10059) 11.1 (10.1 ,12.3) | (381) 10.6 (8.8 ,12.9) |  |
| Other Race | (4508) 6.8 (6.2 ,7.4) | (4416) 6.8 (6.3 ,7.5) | (92) 4.2 (3.2 ,5.5) |  |
| Education(years) |  |  |  | <0.0001 |
| Less Than 9th Grade | (5931) 5.9 (5.5 ,6.3) | (5636) 5.8 (5.4 ,6.2) | (295) 9.6 (7.9 ,11.6) |  |
| 9-11th Grade | (7444) 11.4 (10.8 ,12.0) | (7148) 11.3 (10.7 ,12.0) | (296) 13.2 (11.6 ,14.9) |  |
| High School Grad/GED or Equivalent | (11484) 24.0 (23.2 ,24.8) | (11064) 23.9 (23.1 ,24.7) | (420) 25.7 (22.9 ,28.7) |  |
| Some College or AA degree | (14059) 30.9 (30.1 ,31.6) | (13625) 30.9 (30.2 ,31.7) | (434) 29.5 (26.5 ,32.7) |  |
| College Graduate or above | (10699) 27.8 (26.4 ,29.2) | (10377) 28.0 (26.6 ,29.4) | (322) 21.9 (18.6 ,25.6) |  |
| Missing | (64) 0.1 (0.1 ,0.1) | (61) 0.1 (0.1 ,0.1) | (3) 0.1 (0.0 ,0.5) |  |
| Marriage |  |  |  | <0.0001 |
| Married | (25924) 55.4 (54.3 ,56.5) | (25013) 55.4 (54.3 ,56.5) | (911) 57.3 (53.6 ,60.8) |  |
| Widowed | (4226) 6.0 (5.7 ,6.3) | (3842) 5.6 (5.4 ,5.9) | (384) 16.8 (14.7 ,19.3) |  |
| Divorced | (5040) 9.8 (9.4 ,10.3) | (4842) 9.8 (9.4 ,10.2) | (198) 10.9 (8.8 ,13.3) |  |
| Separated | (1650) 2.5 (2.3 ,2.7) | (1596) 2.5 (2.3 ,2.7) | (54) 2.2 (1.6 ,3.2) |  |
| Never married | (8687) 17.7 (16.9 ,18.6) | (8544) 18.0 (17.1 ,18.9) | (143) 8.9 (7.2 ,11.0) |  |
| Living with partner | (3664) 7.5 (7.0 ,7.9) | (3609) 7.6 (7.2 ,8.1) | (55) 2.5 (1.8 ,3.5) |  |
| Missing | (490) 1.1 (0.6 ,1.9) | (465) 1.1 (0.6 ,1.9) | (25) 1.4 (0.5 ,3.3) |  |
| Diabetes |  |  |  | <0.0001 |
| No | (42679) 89.4 (89.0 ,89.7) | (41268) 89.6 (89.2 ,89.9) | (1411) 82.8 (80.4 ,85.0) |  |
| Yes | (5975) 8.8 (8.4 ,9.1) | (5671) 8.6 (8.3 ,9.0) | (304) 14.2 (12.2 ,16.4) |  |
| Borderline | (1000) 1.8 (1.7 ,2.0) | (948) 1.8 (1.6 ,1.9) | (52) 2.8 (2.0 ,3.9) |  |
| Missing | (27) 0.0 (0.0 ,0.1) | (24) 0.0 (0.0 ,0.1) | (3) 0.2 (0.1 ,0.7) |  |
| Smoking |  |  |  | <0.0001 |
| Not at all | (12268) 24.8 (24.1 ,25.5) | (11572) 24.4 (23.7 ,25.1) | (696) 37.3 (34.0 ,40.8) |  |
| Some days | (1929) 3.7 (3.5 ,3.9) | (1879) 3.8 (3.5 ,4.0) | (50) 2.3 (1.5 ,3.3) |  |
| Every day | (8431) 17.7 (17.0 ,18.4) | (8204) 17.8 (17.1 ,18.6) | (227) 13.9 (11.9 ,16.3) |  |
| Missing | (27053) 53.8 (52.9 ,54.7) | (26256) 54.0 (53.1 ,55.0) | (797) 46.5 (43.2 ,49.7) |  |
| Heart Failure |  |  |  | <0.0001 |
| No | (48116) 97.7 (97.5 ,97.9) | (46538) 97.9 (97.8 ,98.1) | (1578) 90.5 (88.7 ,92.1) |  |
| Yes | (1565) 2.3 (2.1 ,2.5) | (1373) 2.1 (1.9 ,2.2) | (192) 9.5 (7.9 ,11.3) |  |
| Coronary Heart Disease |  |  |  | <0.0001 |
| No | (47667) 96.6 (96.3 ,96.9) | (46115) 96.9 (96.6 ,97.1) | (1552) 88.3 (86.3 ,90.1) |  |
| Yes | (2014) 3.4 (3.1 ,3.7) | (1796) 3.1 (2.9 ,3.4) | (218) 11.7 (9.9 ,13.7) |  |
| Heart Attack |  |  |  | <0.0001 |
| No | (47618) 96.8 (96.5 ,97.0) | (46055) 97.0 (96.7 ,97.2) | (1563) 89.9 (87.9 ,91.6) |  |
| Yes | (2063) 3.2 (3.0 ,3.5) | (1856) 3.0 (2.8 ,3.3) | (207) 10.1 (8.4 ,12.1) |  |
| Stroke |  |  |  | <0.0001 |
| No | (47827) 97.3 (97.1 ,97.4) | (46222) 97.4 (97.2 ,97.6) | (1605) 92.6 (91.1 ,93.9) |  |
| Yes | (1854) 2.7 (2.6 ,2.9) | (1689) 2.6 (2.4 ,2.8) | (165) 7.4 (6.1 ,8.9) |  |
| Angina Pectoris |  |  |  | <0.0001 |
| No | (48292) 97.6 (97.4 ,97.8) | (46630) 97.7 (97.5 ,97.9) | (1662) 94.4 (92.6 ,95.7) |  |
| Yes | (1389) 2.4 (2.2 ,2.6) | (1281) 2.3 (2.1 ,2.5) | (108) 5.6 (4.3 ,7.4) |  |
| Cardiovascular Disease (CVD) |  |  |  | <0.0001 |
| No | (44333) 91.6 (91.2 ,92.0) | (43075) 92.1 (91.7 ,92.4) | (1258) 74.9 (72.2 ,77.4) |  |
| Yes | (5348) 8.4 (8.0 ,8.8) | (4836) 7.9 (7.6 ,8.3) | (512) 25.1 (22.6 ,27.8) |  |

Table 2. Associations of different pulse rhythms with Various CVD Subgroups Among Participants in NHANES 1999-2018.

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Odds Ratio (95% CI) | | p-value |
| Regular Pulse | Irregular Pulse |
| **Heart Failure** |  |  |  |
| Model 1 | 1.00 [Reference] | 4.96(4.03, 6.09) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.71(1.35, 2.17) | <0.001 |
| Model 3 | 1.00 [Reference] | 1.75(1.37, 2.24) | <0.001 |
| **Coronary Heart Disease** |  |  |  |
| Model 1 | 1.00 [Reference] | 4.08(3.37, 4.94) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.27(1.01, 1.58) | 0.039 |
| Model 3 | 1.00 [Reference] | 1.27(1.01, 1.60) | 0.044 |
| **Angina Pectoris** |  |  |  |
| Model 1 | 1.00 [Reference] | 2.55(1.93, 3.37) | <0.001 |
| Model 2 | 1.00 [Reference] | 0.92(0.69, 1.24) | 0.6 |
| Model 3 | 1.00 [Reference] | 0.92(0.68, 1.23) | 0.6 |
| **Heart Attack** |  |  |  |
| Model 1 | 1.00 [Reference] | 3.59(2.90, 4.45) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.18(0.93, 1.51) | 0.2 |
| Model 3 | 1.00 [Reference] | 1.19(0.93, 1.52) | 0.2 |
| **Stroke** |  |  |  |
| Model 1 | 1.00 [Reference] | 2.99(2.41, 3.71) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.13(0.91, 1.40) | 0.3 |
| Model 3 | 1.00 [Reference] | 1.16(0.93, 1.44) | 0.2 |
| **Cardiovascular Disease (CVD)** |  |  |  |
| Model 1 | 1.00 [Reference] | 3.89(3.40, 4.46) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.34(1.14, 1.57) | <0.001 |
| Model 3 | 1.00 [Reference] | 1.34(1.14, 1.58) | <0.001 |

Table 3. Hazard Ratios for All-Cause and CVD Mortality Among Participants With different pulse rhythms in NHANES 1999 to 2018.

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Hazard ratio(95% CI) | | p-value |
| Regular Pulse | Irregular Pulse |
| **All-cause mortality** |  |  |  |
| Total deaths, No. | 6841 of 47911 | 853 of 1770 | NA |
| Model 1 | 1.00 [Reference] | 4.32(3.86, 4.84) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.30(1.18, 1.42) | <0.001 |
| Model 3 | 1.00 [Reference] | 1.29(1.17, 1.42) | <0.001 |
| **CVD mortality** |  |  |  |
| Total deaths, No. | 2064 of 47911 | 338 of 1770 | NA |
| Model 1 | 1.00 [Reference] | 5.94(5.20, 6.79) | <0.001 |
| Model 2 | 1.00 [Reference] | 1.53(1.31, 1.80) | <0.001 |
| Model 3 | 1.00 [Reference] | 1.53(1.30, 1.81) | <0.001 |