

Figure legends

Figure 1. Flowchart of the study design and participants excluded from the study

Figure 2. A smooth curve fitting for the relationship between bedtime at night and SBP.

Adjust for gender, age, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy. **Abbreviations:** SBP, systolic blood pressure; TPA, Total physical activity; GFR, glomerular filtration rate; UA, uric acid; BMI, body mass index; HDL, high-density lipoprotein; LDL, low-density lipoprotein; TC, total cholesterol.

Figure 3. A smooth curve fitting for the relationship between bedtime at night and SBP

based on different gender. Adjust for age, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy. **Abbreviations:** SBP, systolic blood pressure; TPA, Total physical activity; GFR, glomerular filtration rate; UA, uric acid; BMI, body mass index; HDL, high-density lipoprotein; LDL, low-density lipoprotein; TC, total cholesterol.

Figure 4. A smooth curve fitting for the relationship between bedtime at night and SBP

based on different age. Adjust for gender, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy. **Abbreviations:** SBP, systolic blood pressure; TPA, Total physical activity; GFR, glomerular filtration rate; UA, uric acid; BMI, body mass index; HDL, high-density lipoprotein; LDL, low-density lipoprotein; TC, total cholesterol.

Figure 5. A smooth curve fitting for the relationship between bedtime at night and SBP

based on different race. Adjust for gender, age, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy. **Abbreviations:** SBP, systolic blood pressure; TPA, Total physical activity; GFR, glomerular filtration rate; UA, uric acid; BMI, body mass index; HDL, high-density lipoprotein; LDL, low-density lipoprotein; TC, total cholesterol.

Figure 6. A smooth curve fitting for the relationship between bedtime at night and SBP

31 based on different BMI. Adjust for gender, age, race, alcohol consumption, smoke, TPA,
 32 GFR, UA, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or
 33 stop breathing, overly sleepy. **Abbreviations:** SBP, systolic blood pressure; TPA, Total
 34 physical activity; GFR, glomerular filtration rate; UA, uric acid; BMI, body mass index;
 35 HDL, high-density lipoprotein; LDL, low-density lipoprotein; TC, total cholesterol.
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37 **Table1. Description of 7642 participants included in the present study**

| | Total(n=7642) | Male(n=3717) | Female(n=3925) | P-value |
|---------------------------------|----------------|---------------|----------------|---------|
| Sociodemographic factors | | | | |
| Age(years) | | | | <0.001 |
| 18-44 | 4242 (55.51%) | 1993 (53.62%) | 2249 (57.30%) | |
| 45- 59 | 1737 (22.73%) | 830 (22.33%) | 907 (23.11%) | |
| ≥ 60 | 1663 (21.76%) | 894 (24.05%) | 769 (19.59%) | |
| Race | | | | 0.222 |
| Mexican American | 1332 (17.43%) | 636 (17.11%) | 696 (17.73%) | |
| White | 2516 (32.92%) | 1266 (34.06%) | 1250 (31.85%) | |
| Black | 1478 (19.34%) | 713 (19.18%) | 765 (19.49%) | |
| Other race | 2316 (30.31%) | 1102 (29.65%) | 1214 (30.93%) | |
| Lifestyle factors | | | | |
| Alcohol consumption | | | | <0.001 |
| No drinking | 1039 (13.60%) | 544 (14.64%) | 495 (12.61%) | |
| Drinking | 4981 (65.18%) | 2579 (69.38%) | 2402 (61.20%) | |
| Not recorded | 1622 (21.22%) | 594 (15.98%) | 1028 (26.19%) | |
| Smoke | | | | <0.001 |
| Smoking | 1422 (18.61%) | 859 (23.11%) | 563 (14.34%) | |
| No smoking | 1465 (19.17%) | 914 (24.59%) | 551 (14.04%) | |
| Not recorded | 4755 (62.22%) | 1944 (52.30%) | 2811(71.62%) | |
| TPA(minutes) | | | | <0.001 |
| <150 | 1212 (15.86%) | 465 (12.51%) | 747 (19.03%) | |
| ≥150, <300 | 340 (4.45%) | 135 (3.63%) | 205 (5.22%) | |
| ≥300, <450 | 289 (3.78%) | 134 (3.61%) | 155 (3.95%) | |
| ≥450 | 1779 (23.28%) | 1015 (27.31%) | 764 (19.46%) | |
| not recorded | 4022 (52.63%) | 1968 (52.95%) | 2054 (52.33%) | |
| Metabolic factors | | | | |
| GFR(ml/min/1.73m ²) | 100.35 ± 27.49 | 97.29 ± 25.07 | 103.24 ± 29.31 | <0.001 |

| | | | | |
|----------------|----------------|----------------|----------------|--------|
| UA(umol/L) | 313.49 ± 82.47 | 356.13 ± 75.89 | 273.19 ± 66.67 | <0.001 |
| TC(mmol/L) | 4.90 ± 1.06 | 4.88 ± 1.08 | 4.92 ± 1.04 | 0.080 |
| LDL(mmol/L) | 2.91 ± 0.90 | 2.95 ± 0.91 | 2.88 ± 0.90 | 0.013 |
| HDL(mmol/L) | 1.40 ± 0.42 | 1.26 ± 0.37 | 1.52 ± 0.43 | <0.001 |
| SBP(mmHg) | 121.59 ± 17.21 | 124.14 ± 16.32 | 119.18 ± 17.68 | <0.001 |
| BMI (kg/m2) | | | | <0.001 |
| <18.5 | 162 (2.12%) | 64 (1.72%) | 98 (2.50%) | |
| 18.5-24.9 | 2316 (30.31%) | 1091 (29.35%) | 1225 (31.21%) | |
| 25-29.9 | 2375 (31.08%) | 1309 (35.22%) | 1066 (27.16%) | |
| ≥30 | 2714 (35.51%) | 1210 (32.55%) | 1504 (38.32%) | |
| Not recorded | 75 (0.98%) | 43 (1.16%) | 32 (0.82%) | |
| Diabetes | | | | 0.026 |
| Yes/Borderline | 751 (9.83%) | 395 (10.63%) | 356 (9.07%) | |
| No | 6886 (90.11%) | 3321 (89.35%) | 3565 (90.83%) | |
| Not recorded | 5 (0.07%) | 1 (0.03%) | 4 (0.10%) | |

38 **Abbreviations:** GFR, glomerular filtration rate; UA, uric acid; SBP, systolic
39 blood pressure; BMI, body mass index; HDL, high-density lipoprotein; TC, total
40 cholesterol; LDL, low-density lipoprotein; TPA, Total physical activity.
41 Mean +/- SD for: GFR, UA, SBP, TC, LDL, HDL . P value was calculated by linear
42 regression model.
43 % for: race, alcohol consumption, smoke, age, BMI, diabetes, TPA. P value was
44 calculated by chi-square test.

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46 **Table2. Sleep factors description of 7642 participants included in the present**
47 **study**

| | Total(n=7642) | Male(n=3717) | Female(n=3925) | P-value |
|-----------------------|---------------|---------------|----------------|---------|
| Sleep factors | | | | |
| Sleep duration(hours) | | | | <0.001 |
| < 7 | 1688 (22.09%) | 934 (25.13%) | 754 (19.21%) | |
| ≥ 7 | 5946 (77.81%) | 2778 (74.74%) | 3168 (80.71%) | |
| Not recorded | 8 (0.10%) | 5 (0.13%) | 3 (0.08%) | |
| Snore | | | | <0.001 |
| No | 2138(27.98%) | 839 (22.57%) | 1299 (33.10%) | |
| Yes | 5013(65.60%) | 2644 (71.13%) | 2369 (60.36%) | |
| Not recorded | 491 (6.43%) | 234 (6.30%) | 257 (6.55%) | |
| Trouble sleeping | | | | <0.001 |
| Yes | 1695 (22.18%) | 723 (19.45%) | 972 (24.76%) | |
| No | 5943 (77.77%) | 2993 (80.52%) | 2950 (75.16%) | |

| | | | | |
|-------------------------|---------------|---------------|---------------|--------|
| Not recorded | 4 (0.05%) | 1 (0.03%) | 3 (0.08%) | |
| Snort or stop breathing | | | | <0.001 |
| No | 5678 (74.30%) | 2593 (69.76%) | 3085 (78.60%) | |
| Yes | 1611 (21.08%) | 948 (25.50%) | 663 (16.89%) | |
| Not recorded | 353 (4.62%) | 176 (4.74%) | 177 (4.51%) | |
| Overly sleepy | | | | <0.001 |
| No | 1365 (17.86%) | 739 (19.88%) | 626 (15.95%) | |
| Yes | 5946 (77.81%) | 2975 (80.04%) | 3296 (83.97%) | |
| Not recorded | 8 (0.10%) | 3 (0.08%) | 3 (0.08%) | |
| Bedtime | | | | <0.001 |
| 19pm | 56 (0.7%) | 33 (0.9%) | 23 (0.6%) | |
| 20 pm | 256 (3.3%) | 128 (3.4%) | 128 (3.3%) | |
| 21 pm | 1063 (13.91%) | 505 (13.59%) | 558 (14.22%) | |
| 22 pm | 2195 (28.72%) | 986 (26.53%) | 1209 (30.80%) | |
| 23 pm | 1941 (25.40%) | 928 (24.97%) | 1013 (25.81%) | |
| 0 am | 1136 (14.87%) | 569 (15.31%) | 567 (14.45%) | |
| 1 am | 431 (5.64%) | 228 (6.13%) | 203 (5.17%) | |
| 2 am | 267 (3.5%) | 150 (4.0%) | 117 (3.0%) | |
| 3am | 131 (1.7%) | 80 (2.2%) | 51 (1.3%) | |
| 4am | 64 (0.8%) | 40 (1.1%) | 24 (0.6%) | |
| 5am | 30 (0.4%) | 23 (0.6%) | 7 (0.2%) | |
| 6am | 30 (0.4%) | 21 (0.6%) | 9 (0.2%) | |
| 7am | 42 (0.5%) | 26 (0.7%) | 16 (0.4%) | |

48 % for: sleep duration, snore, trouble sleeping, Snort or stop breathing, overly sleepy,
49 bedtime. P value was calculated by chi-square test.

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51 **Table 3. Univariate analysis for systolic blood pressure**

| | Statistics | β , (95%CI), P |
|------------------|---------------|------------------------------|
| Gender | | |
| Male | 3717 (48.64%) | Ref |
| Female | 3925 (51.36%) | -4.96 (-5.73, -4.20) <0.0001 |
| Race | | |
| White | 2516 (32.92%) | Ref |
| Mexican American | 1332 (17.43%) | -0.61 (-1.75, 0.53) 0.2927 |
| Black | 1478 (19.34%) | 3.79 (2.69, 4.89) <0.0001 |
| Other race | 2316 (30.31%) | -1.55 (-2.51, -0.58) 0.0017 |
| Age(years) | | |

| | | |
|---------------------------------|----------------|------------------------------|
| 18-44 | 4242 (55.51%) | Ref |
| 45- 59 | 1737 (22.73%) | 9.39 (8.52, 10.27) <0.0001 |
| ≥60 | 1663 (21.76%) | 17.30 (16.41, 18.19) <0.0001 |
| Alcohol consumption | | |
| No drinking | 1039 (13.60%) | Ref |
| Drinking | 4981 (65.18%) | -4.62 (-5.77, -3.47) <0.0001 |
| Not recorded | 1622 (21.22%) | -5.08 (-6.41, -3.75) <0.0001 |
| TPA(minutes) | | |
| <150 | 1212 (15.86%) | Ref |
| ≥150, <300 | 340 (4.45%) | -2.00 (-4.07, 0.06) 0.0572 |
| ≥300, <450 | 289 (3.78%) | -2.97 (-5.17, -0.77) 0.0082 |
| ≥450 | 1779 (23.28%) | -4.43 (-5.68, -3.18) <0.0001 |
| Not recorded | 4022 (52.63%) | -3.51 (-4.61, -2.40) <0.0001 |
| Smoke | | |
| Smoking | 1422 (18.61%) | Ref |
| No smoking | 1465 (19.17%) | 2.62 (1.38, 3.87) <0.0001 |
| Not recorded | 4755 (62.22%) | -3.05 (-4.06, -2.04) <0.0001 |
| BMI (kg/m ²) | | |
| 18.5-24.9 | 2316 (30.31%) | Ref |
| <18.5 | 162 (2.12%) | -3.84 (-6.54, -1.14) 0.0053 |
| 25-29.9 | 2375 (31.08%) | 3.72 (2.75, 4.69) <0.0001 |
| ≥30 | 2714 (35.51%) | 6.58 (5.64, 7.52) <0.0001 |
| Not recorded | 75 (0.98%) | 11.92 (8.02, 15.81) <0.0001 |
| Diabetes | | |
| No | 6886 (90.11%) | Ref |
| Yes/Borderline | 751 (9.83%) | 6.80 (5.51, 8.09) <0.0001 |
| Not recorded | 5 (0.07%) | -14.80 (-29.78, 0.18) 0.0529 |
| GFR(ml/min/1.73m ²) | 100.35 ± 27.49 | -0.13 (-0.15, -0.12) <0.0001 |
| UA(umol/L) | 313.49 ± 82.47 | 0.04 (0.04, 0.04) <0.0001 |
| TC(mmol/L) | 4.90 ± 1.06 | 2.87 (2.51, 3.24) <0.0001 |
| LDL(mmol/L) | 2.91 ± 0.90 | 3.08 (2.43, 3.73) <0.0001 |
| HDL(mmol/L) | 1.40 ± 0.42 | -0.94 (-1.87, -0.01) 0.0478 |
| Sleep duration(hours) | | |
| <7 | 1688 (22.09%) | Ref |
| ≥7 | 5946 (77.81%) | -2.22 (-3.15, -1.29) <0.0001 |
| Not recorded | 8 (0.10%) | -1.74 (-13.67, 10.20) 0.7756 |
| Snore | | |

| | | |
|-------------------------|---------------|------------------------------|
| No | 2138(27.98%) | Ref |
| Yes | 5013(65.60%) | 4.38 (3.52, 5.25) <0.0001 |
| Not recorded | 491 (6.43%) | 6.24 (4.56, 7.91) <0.0001 |
| Trouble sleeping | | |
| Yes | 1695 (22.18%) | Ref |
| No | 5943 (77.77%) | -0.86 (-1.79, 0.07) 0.0707 |
| Not recorded | 4 (0.05%) | 0.08 (-16.81, 16.96) 0.9930 |
| Snort or stop breathing | | |
| No | 5678 (74.30%) | Ref |
| Yes | 1611 (21.08%) | 3.06 (2.11, 4.00) <0.0001 |
| Not recorded | 353 (4.62%) | 4.38 (2.54, 6.23) <0.0001 |
| Overly sleepy | | |
| No | 1365 (17.86%) | Ref |
| Yes | 5946 (77.81%) | -2.44 (-3.45, -1.43) <0.0001 |
| Not recorded | 8 (0.10%) | 13.19 (-0.58, 26.97) 0.0606 |
| Bedtime | 4.88 ± 1.76 | -0.56 (-0.78, -0.34) <0.0001 |

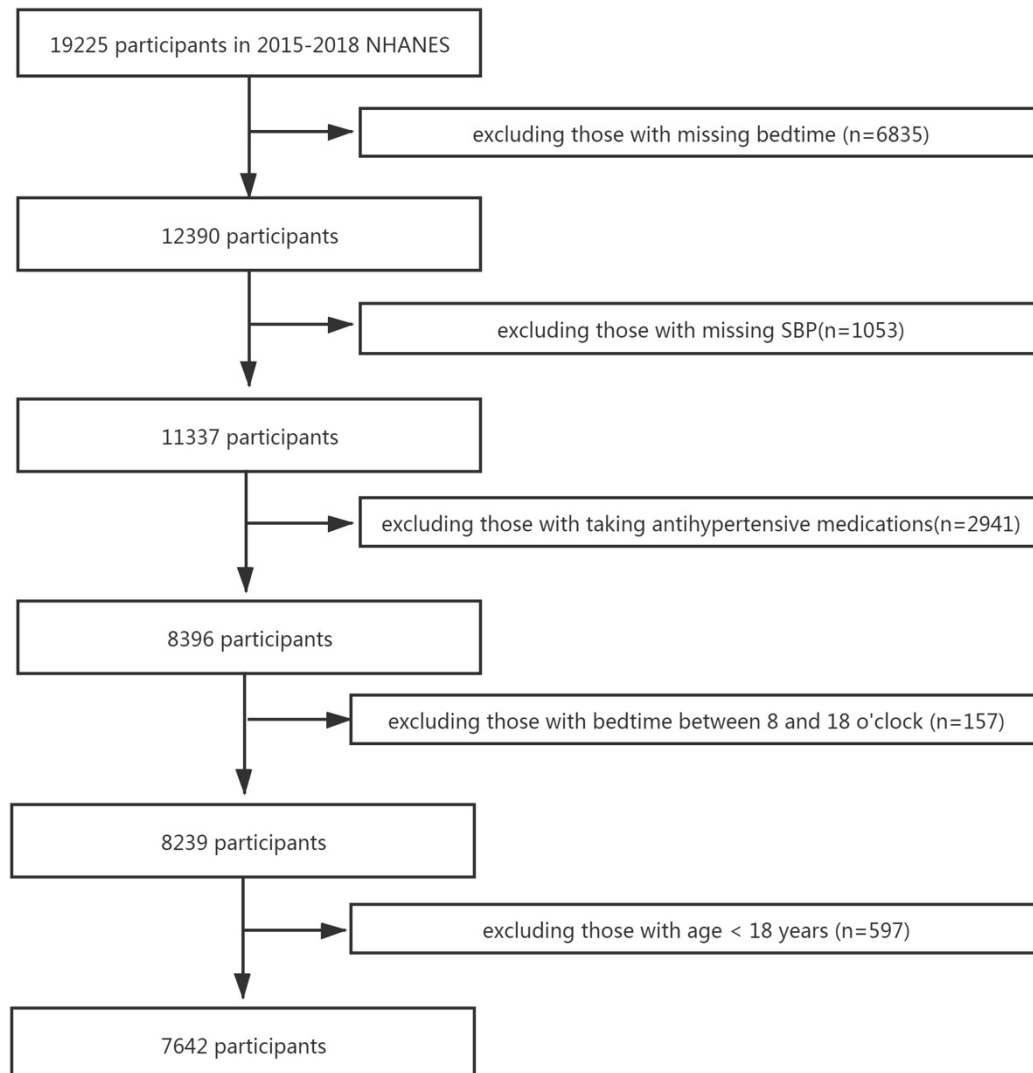
Abbreviations: Ref, reference; TPA, Total physical activity; BMI, body mass index; GFR, glomerular filtration rate; UA, uric acid; HDL, high-density lipoprotein; TC, total cholesterol; LDL, low-density lipoprotein.

Table 4. Relationship between bedtime at night and SBP in different models

| Exposure | Model I(β,95%CI,P) | Model II(β,95%CI,P) | Model III(β,95%CI,P) |
|-------------|------------------------------|-----------------------------|-----------------------------|
| Bedtime | | | |
| 4.88 ± 1.76 | -0.74 (-0.97, -0.51) <0.0001 | -0.26 (-0.47, -0.05) 0.0155 | -0.23 (-0.43, -0.02) 0.0292 |

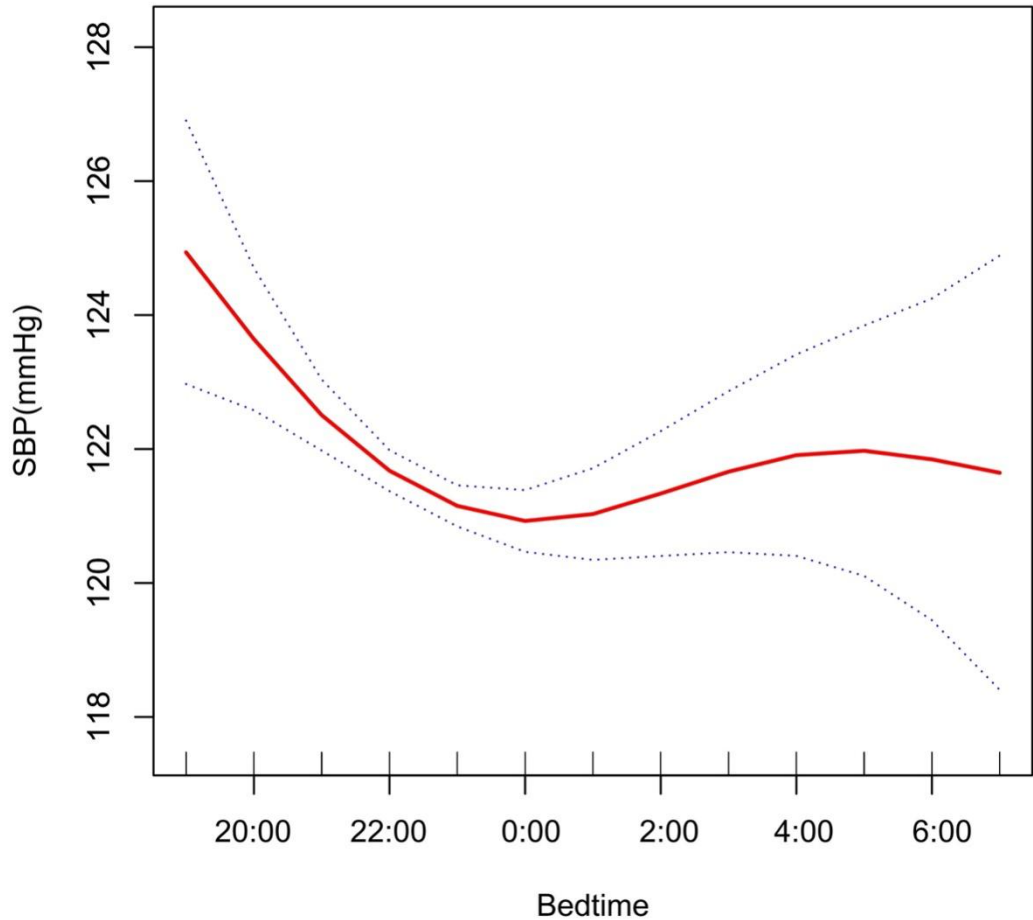
Abbreviations: SBP, systolic blood pressure.
Model I was adjusted for: sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy.
Model II was adjusted for: gender; race; age in addition to model I
Model III was adjusted for: alcohol consumption, smoke, TPA, GFR, UA, TC, LDL, HDL, BMI, diabetes in addition to model II

Figure 1. Flowchart of the study design and participants excluded from the study



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Figure 2. A smooth curve fitting for the relationship between bedtime at night and SBP. Adjust for gender, age, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy.



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Figure 3. A smooth curve fitting for the relationship between bedtime at night and SBP based on different gender. Adjust for age, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy.

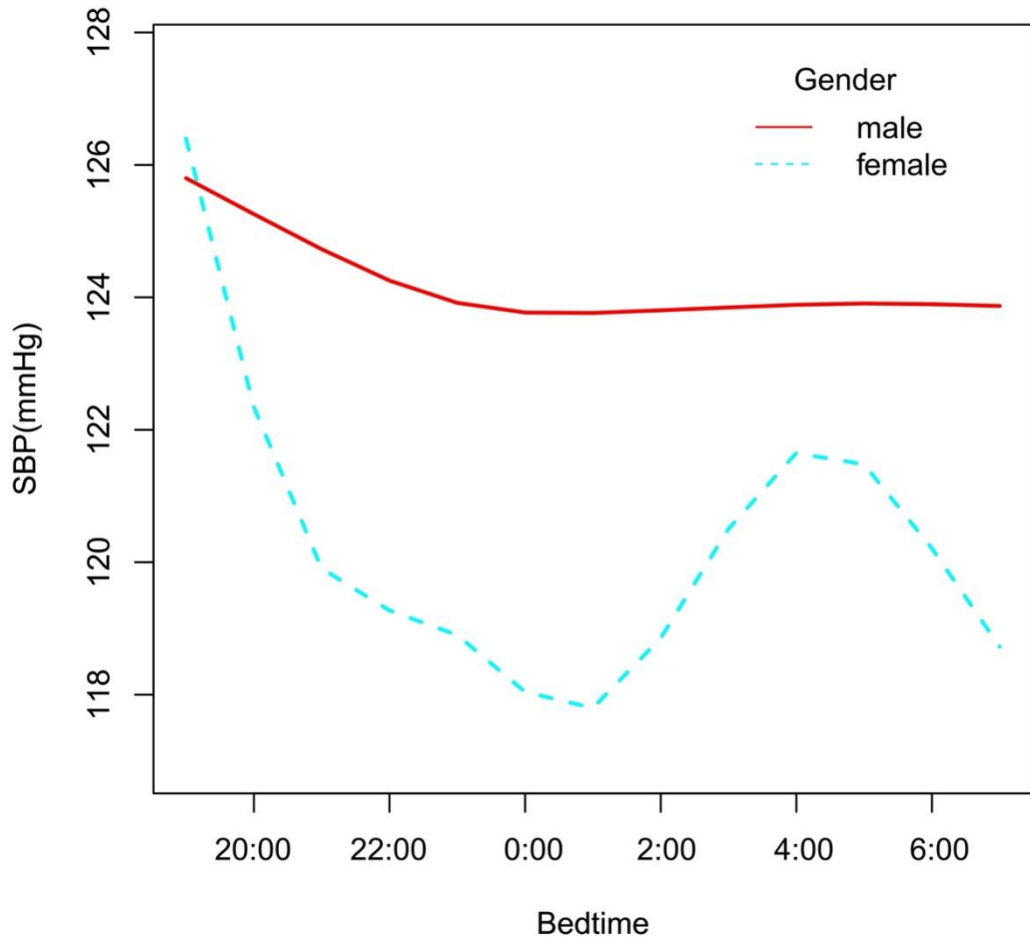


Figure 4. A smooth curve fitting for the relationship between bedtime at night and SBP based on different age. Adjust for gender, race, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy.

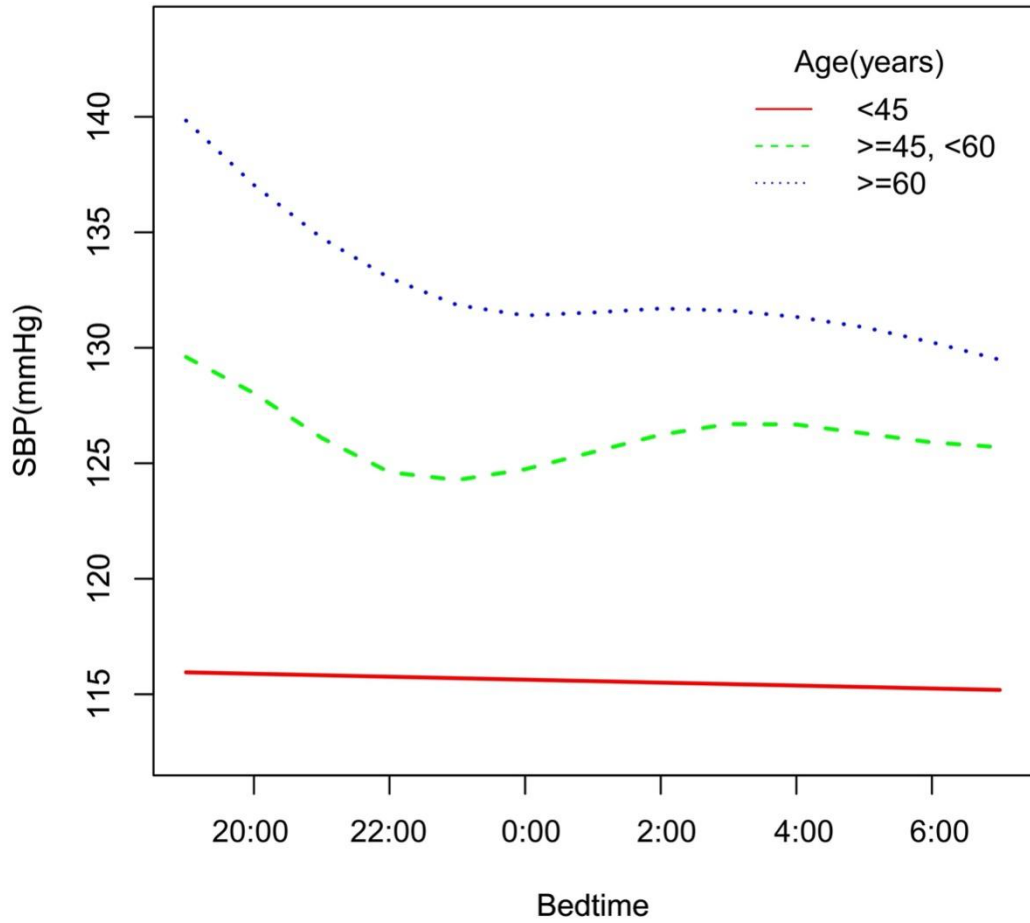
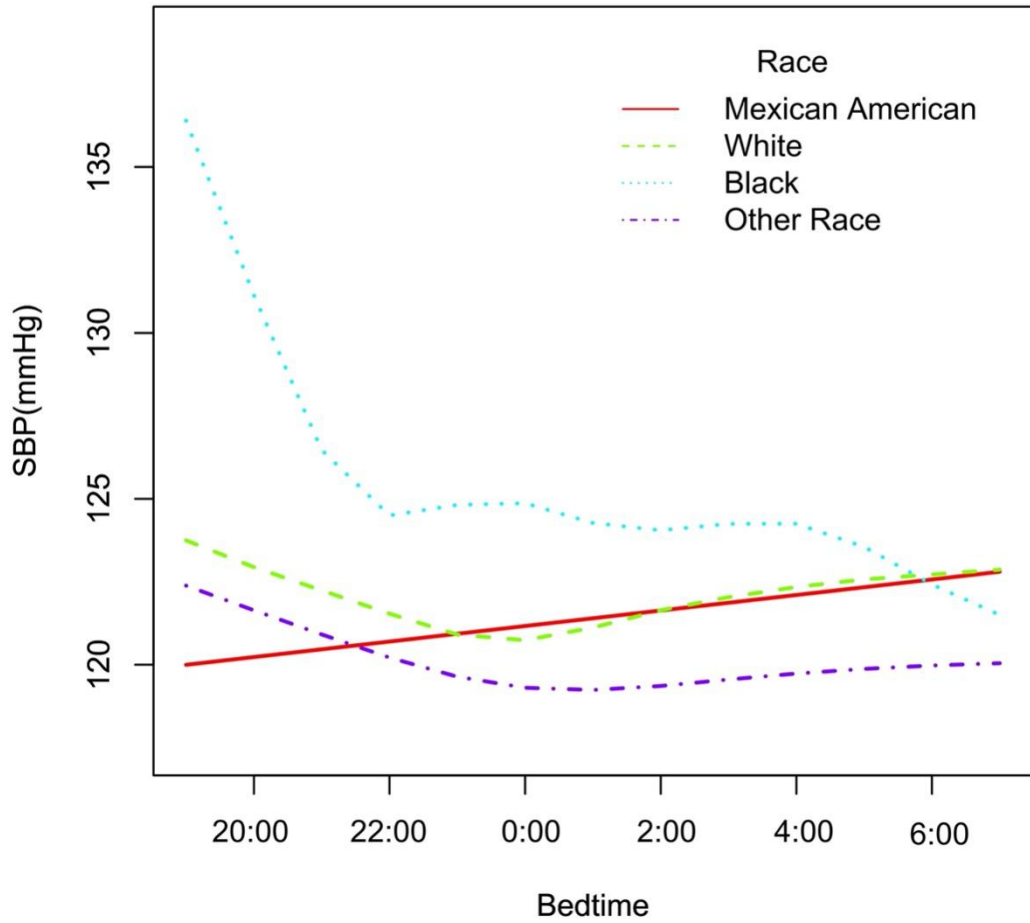


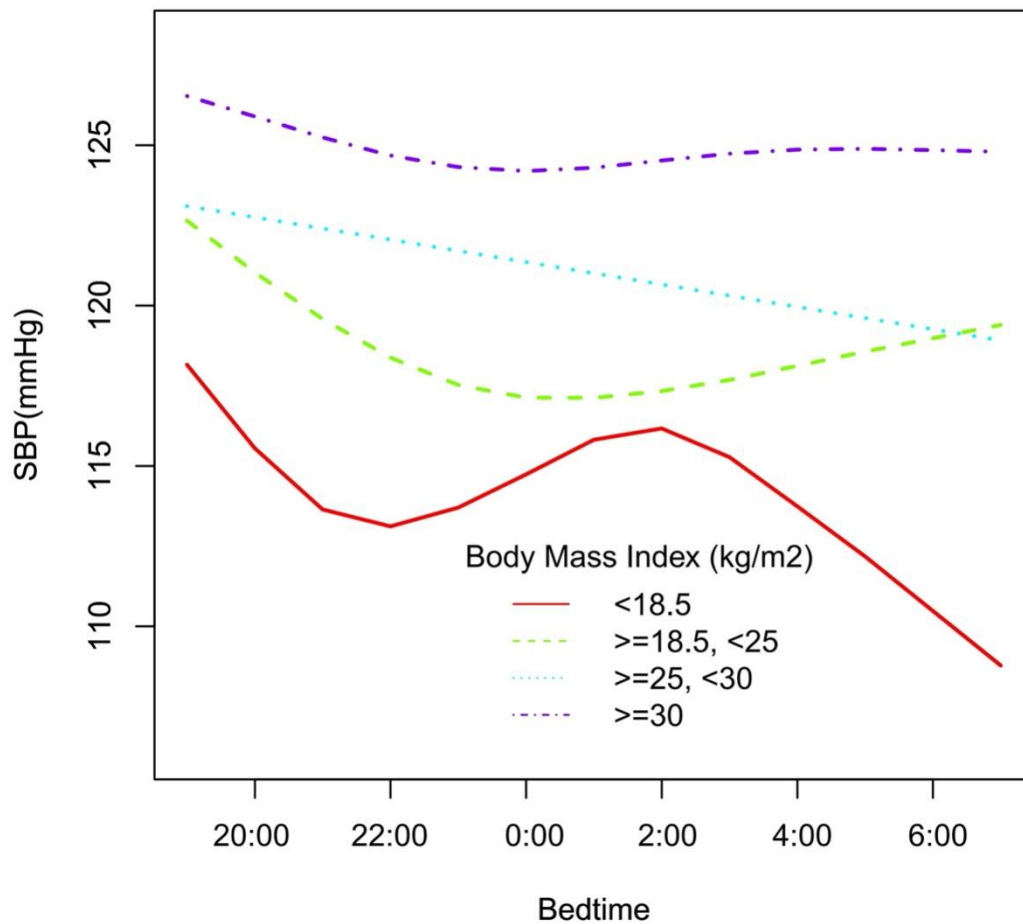
Figure 5. A smooth curve fitting for the relationship between bedtime at night and SBP based on different race. Adjust for gender, age, alcohol consumption, smoke, TPA, GFR, UA, BMI, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or stop breathing, overly sleepy.



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162 **Figure 6.** A smooth curve fitting for the relationship between bedtime at night and SBP
163 based on different BMI. Adjust for gender, age, race, alcohol consumption, smoke, TPA,
164 GFR, UA, diabetes, HDL, LDL, TC, sleep duration, snore, trouble sleeping, snort or
165 stop breathing, overly sleepy.



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