**Table 1. Description of study variables**

|  |  |
| --- | --- |
| **Variables** | **Me [IQR] / N (%)** |
| Age, years | 33 [28; 38] |
| Body mass index | 24 [21.1; 27] |
| Work experience, years | 3 [2; 9] |
| Systolic blood pressure, mmHg | 110 [100; 120] |
| Diastolic blood pressure, mmHg | 70 [70; 80] |
| Fasting blood sugar, mg/dl | 80 [75; 87] |
| Triglyceride, mg/dl | 89 [67; 128.2] |
| High density lipoprotein, mg/dl | 47 [39; 53] |
| Waist circumference, cm | 92 [86; 102] |
| Pack year | 1.1 [0.5; 2.6] |
| Gender: |  |
| Female | 86 (9.1) |
| Male | 864 (90.9) |
| Marital status: |  |
| Single | 176 (18.5) |
| Married | 774 (81.5) |
| Smoking status: |  |
| Yes | 12 (1.3) |
| No | 938 (98.7) |
| Noise exposure: |  |
| Yes | 684 (72) |
| No | 266 (28) |
| Shiftwork: |  |
| Yes | 848 (89.3) |
| No | 102 (10.7) |
| Work demand: |  |
| Sedentary | 32 (3.4) |
| Light | 817 (86) |
| Medium | 85 (8.9) |
| Heavy | 16 (1.7) |
| Physical exercise: |  |
| Yes | 39 (4.1) |
| No | 911 (95.9) |
| Metabolic syndrome: |  |
| Yes | 103 (10.8) |
| No | 847 (89.2) |
| Triglyceride: |  |
| High | 196 (20.6) |
| Low | 754 (79.4) |
| Fasting blood sugar: |  |
| High | 85 (8.9) |
| Low | 865 (91.1) |
| Systolic blood pressure: |  |
| High | 66 (6.9) |
| Low | 884 (93.1) |
| Diastolic blood pressure: |  |
| High | 170 (17.9) |
| Low | 780 (82.1) |
| Waist circumference: |  |
| High | 308 (32.4) |
| Low | 642 (67.6) |
| High-density lipoprotein: |  |
| High | 628 (66.1) |
| Low | 322 (33.9) |

IQR, interquartile range; Me, median; N, patients’ number

**Table 2. Comparison of demographic and occupational characteristics between two groups with and without metabolic syndrome**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Metabolic syndrome, Me [IQR] / N (%)** | **P-value** | **OR [95% CI]** |
| **Yes** | **No** |
| Age, years | 36 [31; 41] | 33 [27; 37] | < 0.001 |  |
| Work experience, years | 3 [2; 11] | 3 [2; 8] | 0.046 |  |
| Gender: |  |  | 0.804 | 0.91 [0.45–1.83] |
| Female | 10 (11.6) | 76 (88.4) |  |  |
| Male | 93 (10.8) | 771 (89.2) |  |  |
| Marital status: |  |  | 0.031 | 2.02 [1.05–3.86] |
| Single | 11 (6.3) | 165 (93.8) |  |  |
| Married | 92 (11.9) | 682 (88.1) |  |  |
| Smoking status: |  |  | 0.772 | 1.34 [0.17–10.50] |
| Yes | 1 (8.3) | 11 (91.7) |  |  |
| No | 102 (10.9) | 836 (89.1) |  |  |
| Shiftwork |  |  | 0.185 | 0.67 [0.37–1.21] |
| Yes | 88 (10.4) | 760 (89.6) |  |  |
| No | 15 (14.7) | 87 (85.3) |  |  |
| Work demand: |  |  | 0.234 |  |
| Sedentary | 6 (18.8) | 26 (81.3) |  |  |
| Light | 90 (11) | 727 (89) |  |  |
| Medium | 5 (5.9) | 80 (94.1) |  |  |
| Heavy | 2 (12.5) | 14 (87.5) |  |  |
| Physical exercise: |  |  | 0.513 | 1.48 [0.44–4.89] |
| Yes | 3 (7.7) | 36 (92.3) |  |  |
| No | 11 (11) | 811 (89) |  |  |

CI, confidence interval; IQR, interquartile range; Me, median; N, patients’ number; OR, odds ratio

The Mann–Whitney U test was utilized for continuous variable analyses, and the chi-square and Fisher’s exact test for categorical variables.

**Table 3. Comparison of metabolic syndrome and its components between two groups with and without exposure to noise**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Noise exposure, N (%)** | **P-value** | **OR [CI 95%]** |
| **Yes** | **No** |
| Metabolic syndrome: |  |  | 0.908 | 1.04 [0.66–1.65] |
| Yes | 75 (72.8) | 28 (27.2) |  |  |
| No | 609 (71.9) | 238 (28.1) |  |  |
| Fasting blood glucose: |  |  | 0.900 | 1.05 [0.63–1.73] |
| High | 62 (72.9) | 23 (27.1) |  |  |
| Low | 622 (71.9) | 243 (28.1) |  |  |
| Diastolic blood pressure: |  |  | 0.295 | 1.22 [0.83–1.79] |
| High | 128 (75.3) | 42 (24.7) |  |  |
| Low | 556 (71.3) | 224 (28.7) |  |  |
| Systolic blood pressure: |  |  | 0.474 | 0.82 [0.48–1.40] |
| High | 45 (68.2) | 21 (31.8) |  |  |
| Low | 639 (93.4) | 245 (27.7) |  |  |
| Triglyceride: |  |  | < 0.001 | 2.03 [1.36–3.02] |
| High | 161 (82.1) | 35 (17.9) |  |  |
| Low | 523 (69.4) | 231 (30.6) |  |  |
| Waist circumference: |  |  | 0.002 | 1.61 [1.20–2.17] |
| High | 201 (65.3) | 107 (34.7) |  |
| Low | 483 (75.2) | 159 (24.8) |  |
| High-density lipoprotein: |  |  | < 0.001 | 1.71 [1.28–2.29] |
| High | 476 (75.8) | 152 (24.2) |  |
| Low | 208 (64.6) | 114 (35.4) |  |

CI, confidence interval; N, patients’ number; OR, odds ratio

The chi-square and Fisher’s exact test were utilized for categorical variable analyses.

**Table 4. Logistic regression analysis with adjustment of contextual variables for assessment the effects of noise exposure**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **β** | **P-value** | **OR [CI 95%]** |
| Age | -0.060 | < 0.001 | 0.94 [0.91–0.96] |
| Marital status | -0.034 | 0.876 | 0.96 [0.63–1.48] |
| Work experience | 0.030 | 0.075 | 1.03 [0.99–1.06] |
| Triglyceride | 0.839 | < 0.001 | 2.31 [1.50–3.54] |
| Waist circumference | 0.522 | 0.001 | 1.68 [1.22–2.31] |
| High-density lipoprotein | 0.440 | 0.005 | 1.55 [1.14–2.11] |

CI, confidence interval; OR, odds ratio

**Table 5. Relationship between hearing loss and metabolic syndrome**

|  |  |  |
| --- | --- | --- |
| **P-value** | **Metabolic syndrome, Me [IQR] / N (%)** | **Hearing threshold** |
| **No** | **Yes** |
| Right ear: |  |  | 0.070 |
| Low PTA | 10 [10; 11.6] | 10 [10; 10] |  |
| High PTA | 16.6 [13.3; 20] | 15 [13.3; 18.3] | 0.031 |
| Left ear: |  |  | 0.188 |
| Low PTA | 10 [10; 10] | 10 [10; 10] |  |
| High PTA | 16.6 [13.3; 20] | 15 [13.3; 20] | 0.042 |
| Total hearing loss:\* |  |  | 0.689 |
| Low PTA | 2 (12.5) | 14 (87.5) |  |
| High PTA | 25 (15.2) | 140 (84.8) | 0.054 |

IQR, interquartile range; Me, median; N, patients’ number; PTA, pure tone audiometry

The Mann–Whitney U test was utilized for continuous variable analyses, and the chi-square test for categorical variable.

\* The total hearing loss is the mean hearing threshold exceeding 25 dB in either or both ears within the relevant frequency ranges (yes/no).

**Table 6. Relationship between components of metabolic syndrome and other variables with hearing loss**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **RLPTA** | **RHPTA** | **LLPTA** | **LHPTA** |
| **P-value** |
| Fasting blood sugar | 0.120 | 0.003 | 0.553 | 0.023 |
| Diastolic blood pressure | 0.569 | 0.007 | 0.240 | 0.006 |
| Systolic blood pressure | 0.569 | 0.880 | 0.240 | 0.624 |
| Triglyceride | 0.214 | 0.010 | 0.914 | 0.005 |
| Waist circumference | 0.013 | 0.095 | 0.001 | 0.075 |
| High-density lipoprotein | 0.473 | 0.022 | 0.770 | 0.006 |
| Age\* | 0.021 | < 0.001 | 0.078 | < 0.001 |
| Work experience\*\* | 0.031 | < 0.001 | 0.186 | < 0.001 |
| Gender | < 0.001 | 0.008 | 0.005 | < 0.001 |
| Marital status | 0.196 | < 0.001 | 0.895 | < 0.001 |
| Smoking status | 0.752 | 0.010 | 0.709 | 0.003 |
| Shiftwork | 0.447 | 0.810 | 0.859 | 0.436 |
| Work demand | 0.017 | 0.273 | 0.054 | 0.324 |
| Physical exercise | < 0.001 | 0.601 | < 0.001 | 0.758 |

LHPTA, left high pure tone audiometry; LLPTA, left low pure tone audiometry; RHPTA, right high pure tone audiometry; RLPTA, right low pure tone audiometry

Here, hearing loss is considered a quantitative variable and its relationship with qualitative variables is examined through Mann-Whitney U test and with qualitative variables (age and work experience) through correlation.

\* The correlation coefficient for age and hearing loss is 0.07, 0.25, 0.05, and 0.23, respectively.

\*\* The correlation coefficient for work experience and hearing loss is 0.07, 0.24, 0.04, and 0.22, respectively.