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| **Supplementary Material 2. Multivariable logistic regression analysis on low handgrip strength associated with levels of physical activity** |
|  | **Aerobic exercise\*** | **Muscle strengthening exercise** | **Walking exercise\*** |
|  | **Highly active**  | **Active**  | **Inactive** | **Highly active** | **Active**  | **Inactive** | **Highly active** | **Active**  | **Inactive** |
|  | **Odds Ratio (95% confidence interval)** |
| **Total** |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.42(1.27-1.59) | 1.60(1.46-1.76) | 1 | 1.09(0.92-1.30) | 1.66(1.46-1.90) | 1 | 1.19(1.08-1.30) | 1.28(1.18-1.40) |
| Model 1 | 1 | 1.33(1.19-1.49) | 1.40(1.27-1.54) | 1 | 1.15(0.96-1.37) | 1.71(1.49-1.96) | 1 | 1.19(1.08-1.31) | 1.19(1.08-1.30) |
| Model 2 | 1 | 1.33(1.19-1.49) | 1.38(1.26-1.52) | 1 | 1.17(0.98-1.39) | 1.68(1.46-1.93) | 1 | 1.19(1.08-1.31) | 1.16(1.06-1.27) |
| Model 3 | 1 | 1.33(1.18-1.49) | 1.37(1.25-1.51) | 1 | 1.17(0.98-1.39) | 1.68(1.46-1.93) | 1 | 1.19(1.08-1.30) | 1.16(1.06-1.27) |
| Men1 |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.48(1.26-1.74) | 1.49(1.30-1.70) | 1 | 1.17(0.94-1.46) | 1.72(1.45-2.04) | 1 | 1.14(0.99-1.31) | 1.10(0.96-1.25) |
| Model 1 | 1 | 1.37(1.16-1.62) | 1.28(1.12-1.47) | 1 | 1.21(0.97-1.51) | 1.72(1.45-2.05) | 1 | 1.13(0.98-1.31) | 1.00(0.87-1.14) |
| Model 2 | 1 | 1.37(1.16-1.62) | 1.28(1.11-1.47) | 1 | 1.25(0.99-1.56) | 1.74(1.46-2.08) | 1 | 1.14(0.99-1.32) | 0.99(0.86-1.13) |
| Model 3 | 1 | 1.36(1.15-1.61) | 1.27(1.11-1.46) | 1 | 1.25(0.99-1.57) | 1.74(1.46-2.07) | 1 | 1.14(0.99-1.32) | 0.99(0.86-1.13) |
| Women1 |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.40(1.21-1.63) | 1.76(1.55-1.99) | 1 | 0.97(0.73-1.30) | 1.62(1.29-2.03) | 1 | 1.24(1.10-1.41) | 1.50(1.34-1.67) |
| Model 1 | 1 | 1.33(1.14-1.55) | 1.54(1.35-1.75) | 1 | 1.03(0.77-1.38) | 1.65(1.31-2.07) | 1 | 1.24(1.09-1.41) | 1.39(1.24-1.55) |
| Model 2 | 1 | 1.33(1.14-1.55) | 1.50(1.32-1.71) | 1 | 1.04(0.78-1.39) | 1.58(1.25-1.99) | 1 | 1.24(1.09-1.41) | 1.36(1.21-1.52) |
| Model 3 | 1 | 1.32(1.13-1.55) | 1.50(1.31-1.71) | 1 | 1.04(0.78-1.39) | 1.58(1.26-1.99) | 1 | 1.24(1.09-1.41) | 1.36(1.21-1.52) |
| **Age groups** |  |  |  |  |  |  |  |  |  |
| 19-39 |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.52(1.27-1.83) | 1.33(1.13-1.58) | 1 | 1.15(0.83-1.60) | 1.74(1.33-2.27) | 1 | 1.15(0.97-1.36) | 1.11(0.93-1.32) |
| Model 1 | 1 | 1.44(1.19-1.73) | 1.18(0.99-1.42) | 1 | 1.17(0.84-1.63) | 1.86(1.41-2.45) | 1 | 1.12(0.94-1.33) | 1.00(0.84-1.20) |
| Model 2 | 1 | 1.44(1.19-1.74) | 1.17(0.97-1.40) | 1 | 1.21(0.86-1.68) | 1.94(1.47-2.57) | 1 | 1.12(0.94-1.33) | 0.97(0.81-1.17) |
| Model 3 | 1 | 1.43(1.18-1.73) | 1.17(0.97-1.40) | 1 | 1.20(0.86-1.68) | 1.93(1.46-2.57) | 1 | 1.13(0.95-1.34) | 0.98(0.82-1.18) |
| 40-59 |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.45(1.21-1.73) | 1.66(1.44-1.92) | 1 | 1.03(0.78-1.35) | 1.33(1.08-1.65) | 1 | 1.25(1.08-1.45) | 1.26(1.10-1.46) |
| Model 1 | 1 | 1.41(1.18-1.69) | 1.58(1.36-1.83) | 1 | 1.05(0.80-1.39) | 1.38(1.12-1.71) | 1 | 1.27(10.9-1.48) | 1.24(1.07-1.44) |
| Model 2 | 1 | 1.40(1.17-1.68) | 1.55(1.33-1.80) | 1 | 1.08(0.82-1.43) | 1.34(1.08-1.67) | 1 | 1.28(1.10-1.49) | 1.22(1.05-1.41) |
| Model 3 | 1 | 1.40(1.17-1.67) | 1.54(1.32-1.79) | 1 | 1.09(0.83-1.44) | 1.35(1.09-1.67) | 1 | 1.27(1.09-1.48) | 1.22(1.05-1.41) |
| 60+ |  |  |  |  |  |  |  |  |  |
| Crude | 1 | 1.17(0.95-1.43) | 1.72(1.46-2.03) | 1 | 1.10(0.79-1.52) | 2.18(1.78-2.68) | 1 | 1.18(1.01-1.38) | 1.55(1.35-1.77) |
| Model 1 | 1 | 1.05(0.85-1.29) | 1.43(1.21-1.70) | 1 | 1.17(0.83-1.64) | 2.14(1.73-2.64) | 1 | 1.14(0.97-1.34) | 1.33(1.15-1.53) |
| Model 2 | 1 | 1.03(0.84-1.27) | 1.35(1.14-1.60) | 1 | 1.19(0.85-1.65) | 1.92(1.54-2.39) | 1 | 1.15(0.98-1.35) | 1.26(1.09-1.45) |
| Model 3 | 1 | 1.03(0.83-1.26) | 1.33(1.12-1.59) | 1 | 1.20(0.86-1.67) | 1.91(1.53-2.37) | 1 | 1.15(0.98-1.35) | 1.25(1.09-1.44) |

The data were presented as odds ratio (95% confidence interval).

Model 1: adjusted for age, BMI.

Model 2: further adjusted for education level, household income, smoking status, frequency of alcohol drinking.

Model 3: further adjusted for comorbidities (hypertension, diabetes, musculoskeletal disease, hypercholesterolemia, and hypertriglyceridemia).

\*We adjusted muscle strengthening exercise which could be influenced on an association between physical activity and handgrip strength.