# Factor analysis for the clustering of cardiometabolic risk factors and sedentary behavior: a VGH-HEALTHCARE substudy

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**Background:** Few studies have reported the clustering pattern of new CVD risk factors including sedentary behavior, systemic inflammation and cadiometabolic components in the general population.

**Purpose:** We aimed to explore the clustering pattern of CVD risk factors using exploratory factor analysis to investigate the underlying relationships between various CVD risk factors

**Methods:** A total of 5606 subjects (3157 male, 51.5±11.7y/o) were enrolled and 14 cardiovascular risk factors including sedentary behaviors and physical inactivity were analyzed in exploratory group (n=3926). The established model was validated with the validation group (n=1676).

**Results:** Five factor clusters had been identified to explained 69.4% of to-tal variance, including adiposity (BMI, TG, HDL, UA, and HsCRP 21.3%), lipid, (Total cholesterol, and LDL-cholesterol 14.0%), blood pressure (SBP & DBP 13.3%), glucose (HbA1C, fasting glucose 12.9%) and sedentary behavior (MET per week and sitting time per day 8.0%), respectively. HsCRP was clustered with adiposity factors, not other cardiometabolic risk factors. This clustering pattern was verified in the validation group.

**Conclusion:** Our current study confirmed the clustering structure of cardiometabolic risk factors including sedentary behavior in general population. hsCRP was clustered with adiposity factors while physical inactivity and sedentary behavior were clustered with each other.

### Table 1
#### Factor analysis of the training group

| | Component 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| BMI | .837 | | | | |
| WaistC | .827 | | | | |
| HDL | -.743 | | | | |
| Triglyceride | .503 | | | | |
| HS_CRP | .502 | | | | |
| Cholesterol | | .985 | | | |
| LDL | | .951 | | | |
| GLU | | | .916 | | |
| A1c | | | .912 | | |
| SBP | | | | .911 | |
| DBP | | | | .898 | |
| METs (per week) | | | | | .787 |
| sitting time (min per day) | | | | | -.721 |
| Eigenvalues | 3.542 | 1.938 | 1.446 | 1.378 | 1.073 |
| Rotation Sums of Squared Loadings(% of Variance) | 19.709 | 14.869 | 14.531 | 14.078 | 8.952 |
| Rotation Sums of Squared Loadings(Cumulative %) | 19.709 | 34.579 | 49.109 | 63.187 | 72.139 |

### Table 2
#### Factor analysis of the validation group

| | Component 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| WaistC | .808 | | | | |
| BMI | .797 | | | | |
| HDL | -.740 | | | | |
| UricAcid | .660 | | | | |
| Triglyceride | .504 | | | | |
| HS_CRP | .431 | | | | |
| Cholesterol | | .985 | | | |
| LDL | | .946 | | | |
| GLU | | | .914 | | |
| A1c | | | .908 | | |
| SBP | | | | .909 | |
| DBP | | | | .890 | |
| METs (per week) | | | | | .803 |
| sitting time (min per day) | | | | | -.677 |
| Eigenvalues | 3.762 | 1.962 | 1.483 | 1.403 | 1.118 |
| Rotation Sums of Squared Loadings(% of Variance) | 20.262 | 13.955 | 13.814 | 13.026 | 8.426 |
| Rotation Sums of Squared Loadings(Cumulative %) | 20.262 | 34.217 | 48.030 | 61.057 | 69.483 |