Alcohol drinking and cardiovascular risk factors in Korean adults: Age-period-cohort and association analyses

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Introduction:

- High-risk alcohol drinking is associated with an increased risk of cardiovascular disease (CVD). Few studies have comprehensively examined the nationwide trend in alcohol consumption and its dose-response relationships with CVD risk factors in Korean men and women.
- The decomposition of temporal trends in high-risk alcohol drinking into age, period, and cohort effects enables detailed interpretation of the dynamics of change in trends and possible adverse effect on CVD risk factors.

Objective
To investigate the age, period, and cohort effects in high-risk alcohol drinking and examine the associations of alcohol drinking with CVD risk factors among Korean men and women

Method:

- All analyses were stratified by sex and accounted for complex survey design

Age-period-cohort (APC) analysis

- **Study population**: *Korea National Health and Nutrition Examination Survey* (KNHANES) from 2005-2018, nationally representative samples of Korean adults (aged 30-79 years, n=26,887 men; 34,453 women)
- **High-Risk alcohol drinking**: Drinking alcohol more than 2 times a week and 7 glasses (5 glasses for women) at once (=over 80 glass/month)
- **Statistical analysis**: Hierarchical age-period-cohort cross-classified random effects models

Association analysis

- **Data:** KNHANES Ⅶ (2016-2018)
- **Exposure:** Mean alcohol consumption in glass/month
- **Outcome:** 7 CVD risk factors: HDL-cholesterol (mg/dL), LDL-cholesterol (mg/dL), triglyceride (TG) (mg/dL), BMI (kg/m^2), waist circumference (WC) (cm), blood pressure (BP) (mmHg), and fasting glucose (mg/dL)
- **Design:** Estimated β coefficients and 95% confidence intervals using multivariable linear regression models adjusting for age, income, education, smoking status, aerobic exercise, weight training, total calorie and dietary fat intake.
- **Exclusion:** Patients with cardiovascular disease, cancer and diabetes · Pregnant and breast-feeding women · Have missing information on BMI · Using cholesterol and blood pressure-lowering medications

Results:

Age-period-cohort (APC)

- Independent **age, period, and cohort effects** were observed in prevalence of high-risk alcohol drinking among both Korean men and women *(all p<0.05).*
  Period effect: An increasing trend in women and a little change (maintained high prevalence) in men
  Cohort effect: Higher prevalence of high-risk alcohol drinking in younger birth cohorts in both men and women

Linear regression analysis

- **High-risk alcohol drinking group** (>80 vs. 0 glass/month) showed **positive associations** with all CVD risk factors in both men and women, except for LDL-cholesterol in men and TG in women.
- **Moderate alcohol drinking** (1-11 vs. 0 glass/month) was associated with increased HDL-cholesterol in men & women, increased LDL-cholesterol, decreased SBP and decreased TG in women.
- Suggestive **nonlinear relationships** (J-shape or threshold effect) of alcohol consumption were observed with SBP, TG, BMI, and WC.

Results:

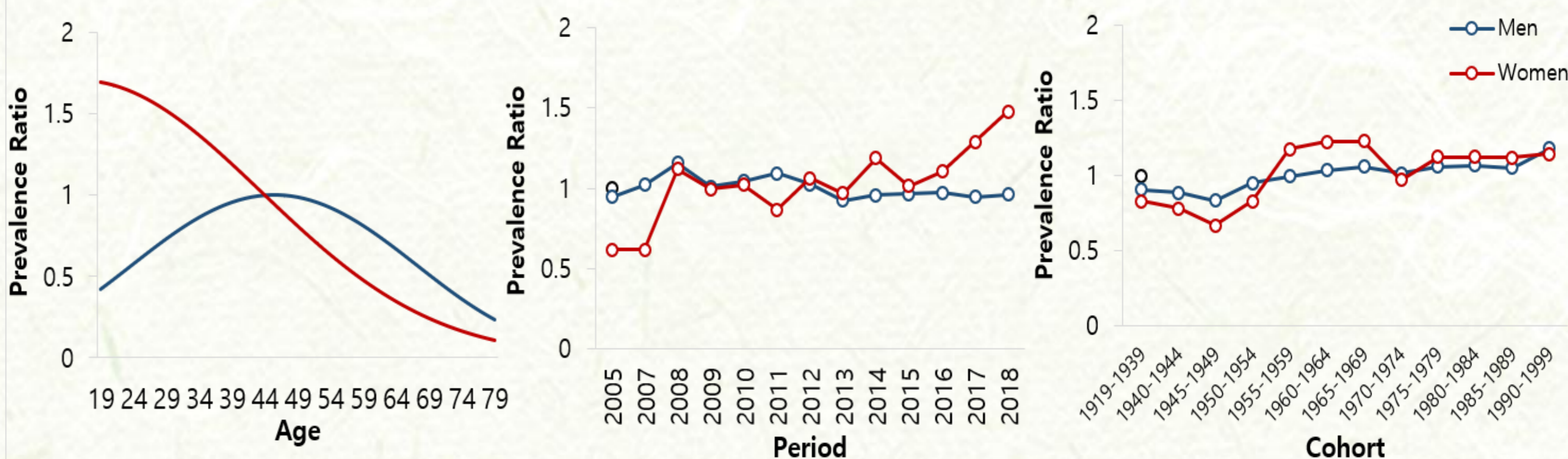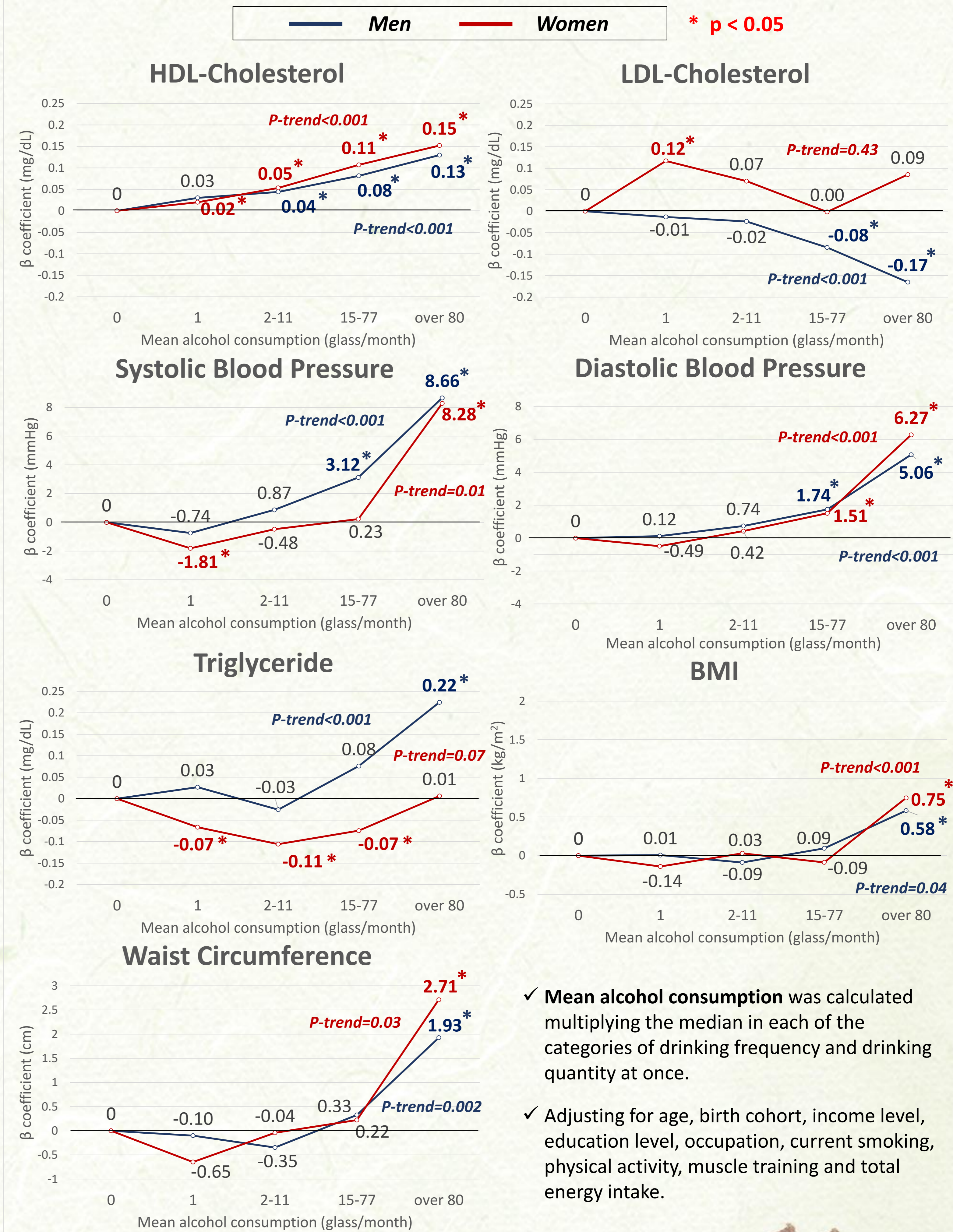**Figure 1. Age-period-cohort analysis of high-risk alcohol drinking**

Figure 2. Alcohol consumption and CVD-related risk factors

— Men — Women   * p < 0.05

✓ **Mean alcohol consumption** was calculated multiplying the median in each of the categories of drinking frequency and drinking quantity at once.

✓ Adjusting for age, birth cohort, income level, education level, occupation, current smoking, physical activity, muscle training and total energy intake.

Conclusion
Our data suggest an increased prevalence of high-risk alcohol drinking among younger birth cohorts of Korean men and women. Given the positive associations of high-risk alcohol drinking with CVD risk factors, preventive strategies should focus on reducing high-risk alcohol drinking in younger populations.