Association of Plasma Chemerin with All-Cause and Disease-Specific Mortality – Results from a Population-Based Study

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Background and Objectives

- Adipocytes are the main cellular component of adipose tissue (Fig. 1) [1].
- They are crucial for energy storage and endocrine activity of adipose tissue by releasing multiple bioactive substances, known as adipokines; e.g., leptin, adiponectin, resistin, chemerin [1].
- Previous studies have shown that chemerin is associated with an unfavorable inflammatory and metabolic profile [2, 3].
- Only few small and selected clinical studies focused on the associations between chemerin and mortality [4-7].
- Therefore, this study aimed to analyze the association between plasma chemerin concentrations and mortality in a well-characterized, large population-based study.

Fig. 1. Components of adipose tissue [1].

Study Design

Study of Health in Pomerania (Fig. 2): SHIP-START-1 (N = 2,903) + SHIP-TREND-0 (N = 4,111)

- Circulating chemerin concentrations were determined using enzyme-linked immunosorbent assay (ELISA) technique.
- The sex-specific distribution of chemerin concentration was visualized using histograms and boxplots.
- Vital status was acquired from the time of study enrollment until April 4th, 2019; causes of death were coded according to the International Classification of Diseases, 10th revision (ICD-10).
- Kaplan-Meier survival analyses and multivariable Cox proportional regression models were used to analyze the association between chemerin and mortality.
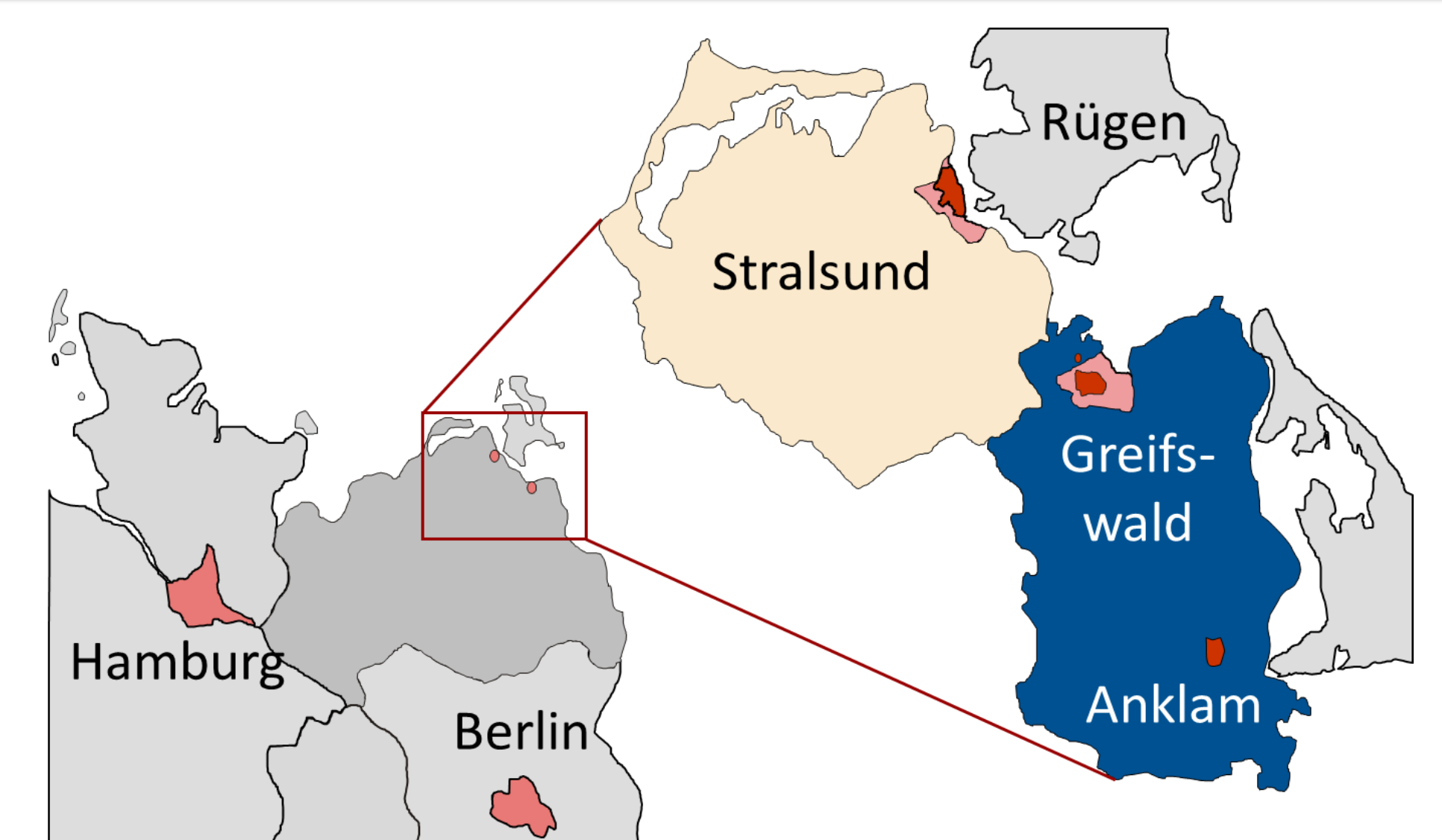

Fig. 2. Study region of the Study of Health in Pomerania (SHIP)
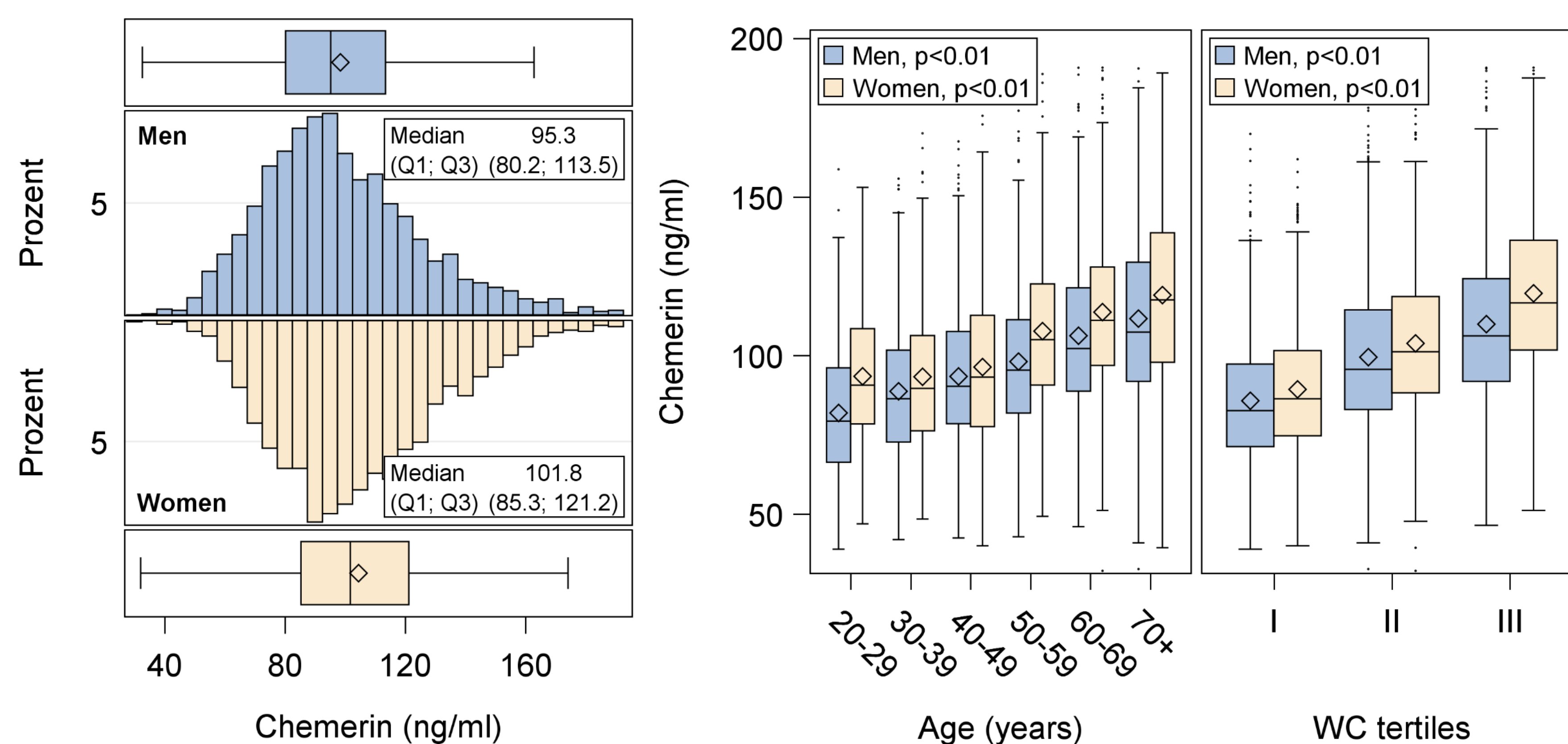
Results and Discussion

Fig. 3. Sex-specific histograms and boxplots of chemerin concentrations. Boxplots of chemerin are presented over groups of age and waist circumference (WC). Kruskal-Wallis test was used for group comparisons.

- Analyses revealed higher plasma chemerin concentrations in women compared to men (Fig. 3).
- Plasma chemerin concentration increases with age and waist circumference (Fig. 3).
- Kaplan-Meier survival curves demonstrate that subjects with high chemerin have a lower survival function compared to those having lower chemerin concentrations (Fig, 4).
- Adjusted analyses using multivariable Cox proportional hazard models have shown that each increase of chemerin per 30 ng/mL was associated with a 23% higher risk of all-cause mortality.
- The effect estimates detected for cancer (hazard ratio 1.33) were greater than those for CVD (hazard ratio 1.23) as cause of death.
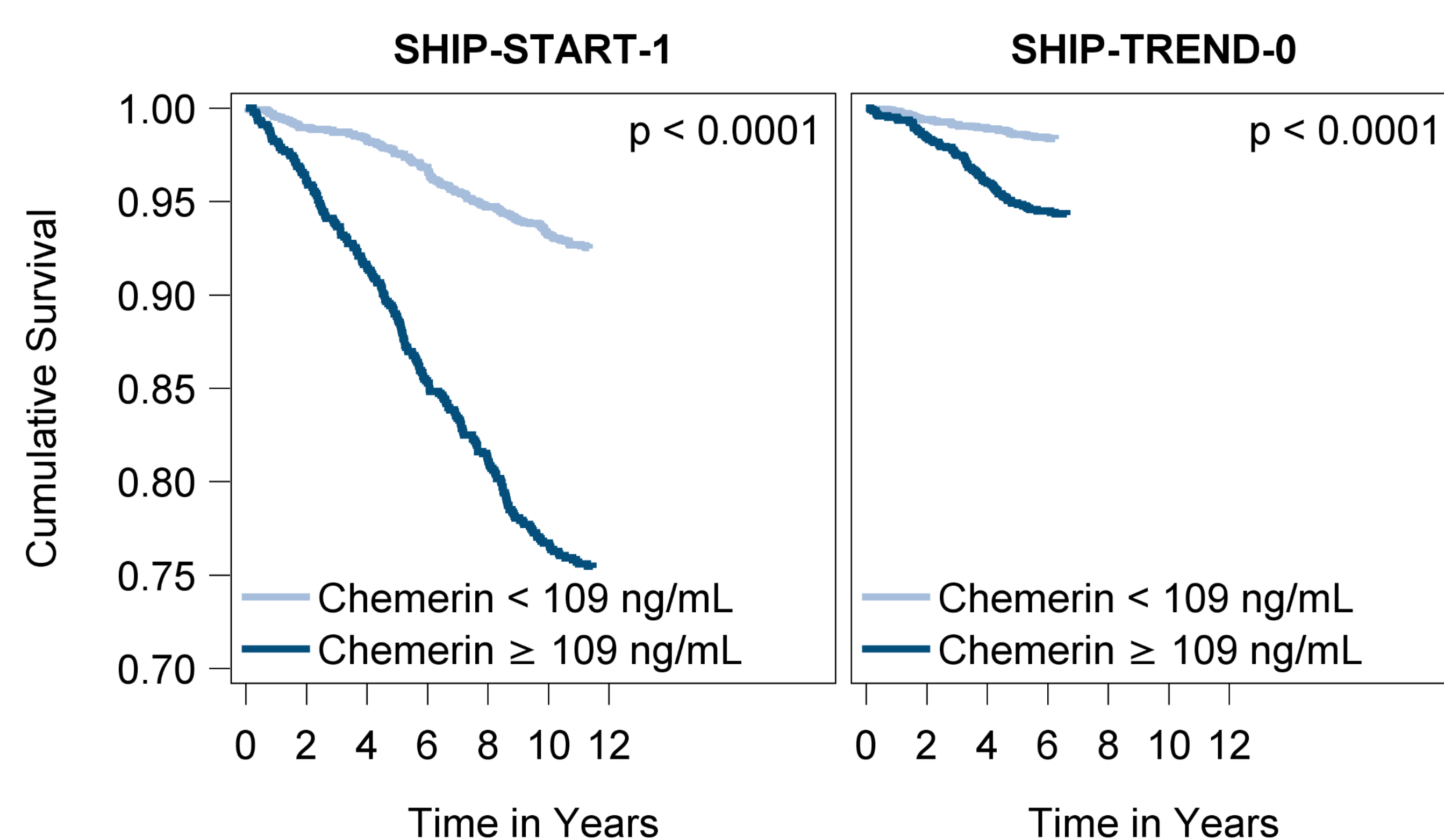

Fig. 4. Kaplan-Meier survival curves for all-cause mortality grouped by chemerin concentration. The study population was divided into two groups according 66.67%-percentile of chemerin. Log-rank test were used to compare subjects in the two groups.

Conclusion

- Chemerin concentrations are higher in women than in men and increase with age and waist cirumference.
- A high plasma chemerin concentration is associated with an increased risk of mortality in the general population.
- Cause-specific analyses have indicated that the association between chemerin and mortality is mainly attributed to cancer related death.
- However, effects between chemerin and cardiovascular mortality were also observed.

References   [1] Ouchi N et al., Nat Rev Immunol, 2011; [2] Zyllas S et al., Obesity (Silver Spring), 2017; [3] Gu P. et al., Clin Exp Hypertens, 2014; [4] Yamamoto T et al., Nephrol Dial Transplant, 2010; [5] Xu CH et al., Oncotarget, 2017; [6] Er LK et al., Int J Mol Sci, 2019; [7] Liu X et al., Biomed Res Int, 2022.