

The joint effects of obesity and physical activity on all-cause and cardiovascular mortality among Korean adults: evaluation of the 'fat but fit' hypothesis



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INTRODUCTION

Fat but Fit?

- **Obesity** is associated with increased risks of cardiovascular diseases, the major causes of deaths worldwide.
- Engaging in **regular physical activity (PA)** is one of the preventive strategies to lower the risk of cardiovascular disease.
- **Fat but fit hypothesis** : Little is known about whether being physically fit and active is sufficient to counteract the negative health effects of obesity in Korean adults.

METHODS

- **Study Population** : 50,154 Korean adults (21,500 men & 28,654 women) aged 20-69 from 2007-2015 Korea National Health and Nutrition Examination Survey (KNHANES), average follow-up of 6.8 years
- **Exclusion**: With a history of cancer or cardiovascular disease, BMI<13 or BMI>50kg/m², WC<50 or WC>190cm, followed-up< 1 year
- **Exposure**: 1) **Physical activity**: High (≥150 min of moderate-intensity aerobic PA, or ≥75 min of vigorous-intensity PA, or ≥10 MET-h/wk) vs. Low (<10 MET-h/wk) based on self-reported data
2) **Predicted body fat mass**: Predicted based on age, sex, weight, height, waist circumference, and current smoking using validated prediction models
- **Outcome** : 1,748 all-cause and 351 cardiovascular mortality followed-up through Dec 31, 2019
- **Statistical analysis**: Cox proportional hazard models: hazard ratios (HRs) and 95% confidence intervals (CIs) for cross-classified categories between PA & predicted fat mass, adjusting for potential confounders and accounting for complex sampling design

RESULTS

Figure 1. Association of predicted fat mass with prevalence of dyslipidemia stratified by PA

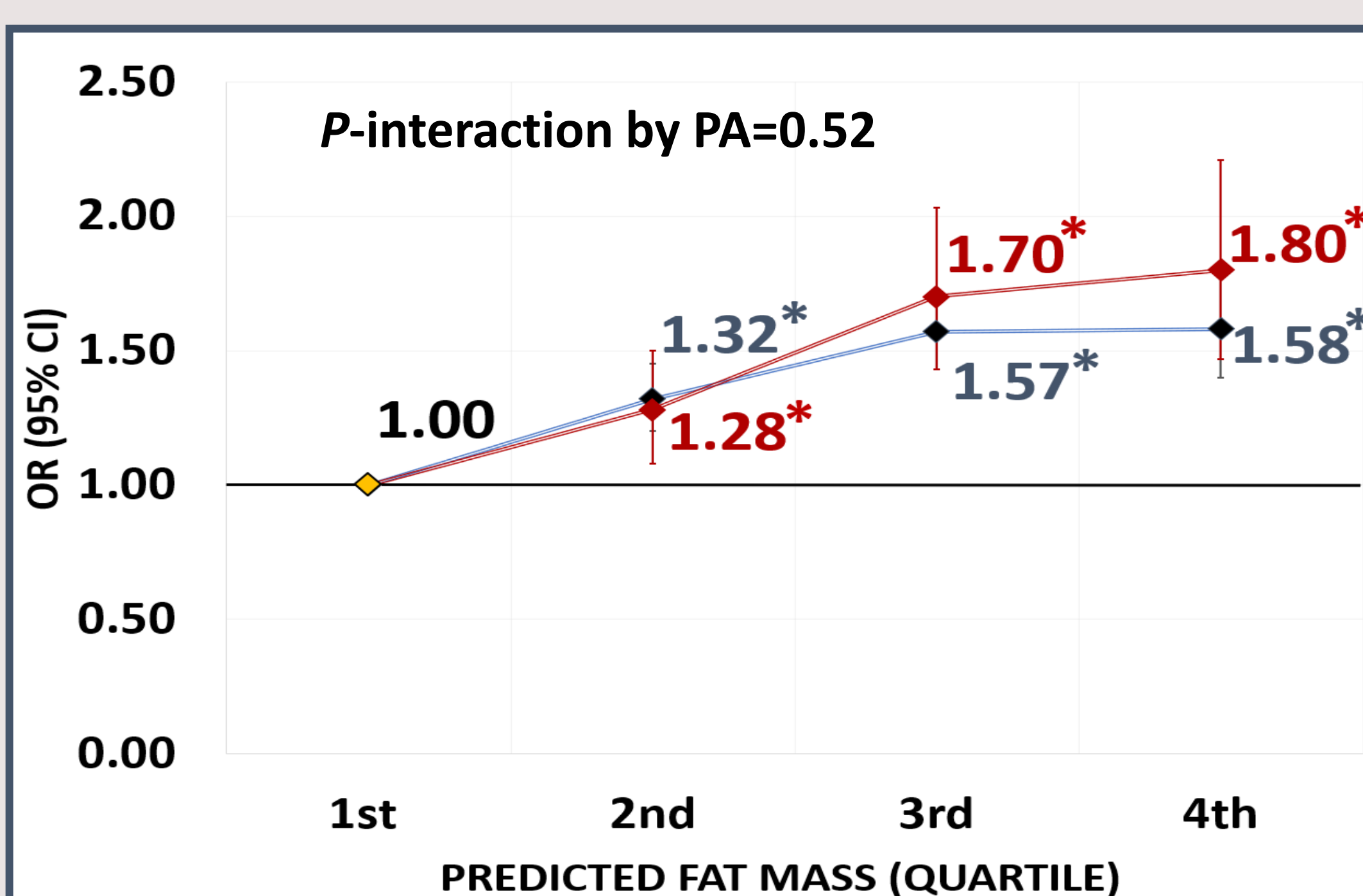


Figure 2. Association of predicted fat mass with prevalence of type 2 diabetes stratified by PA

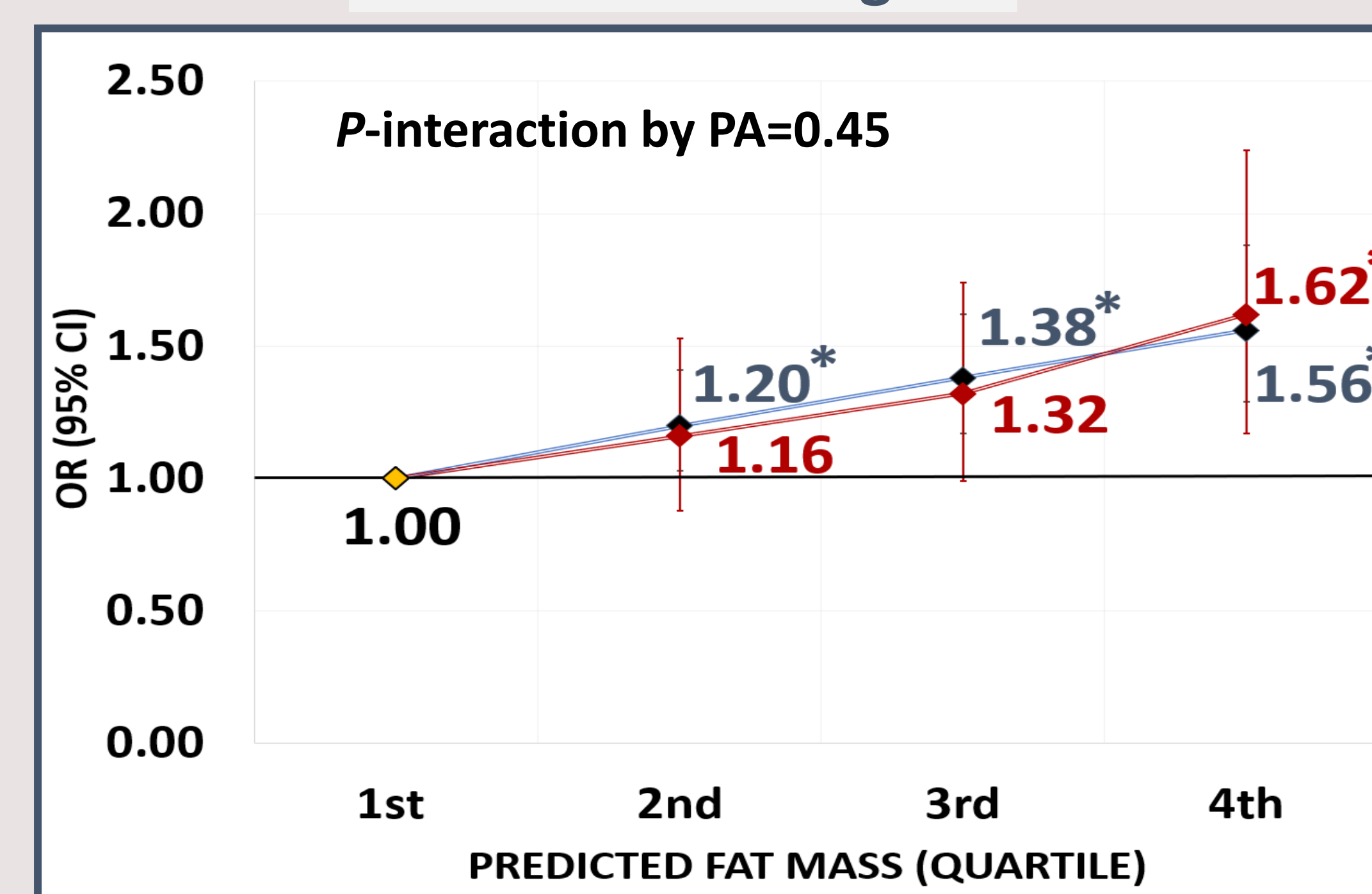


Figure 3. Association of predicted fat mass with prevalence of metabolic syndrome stratified by PA

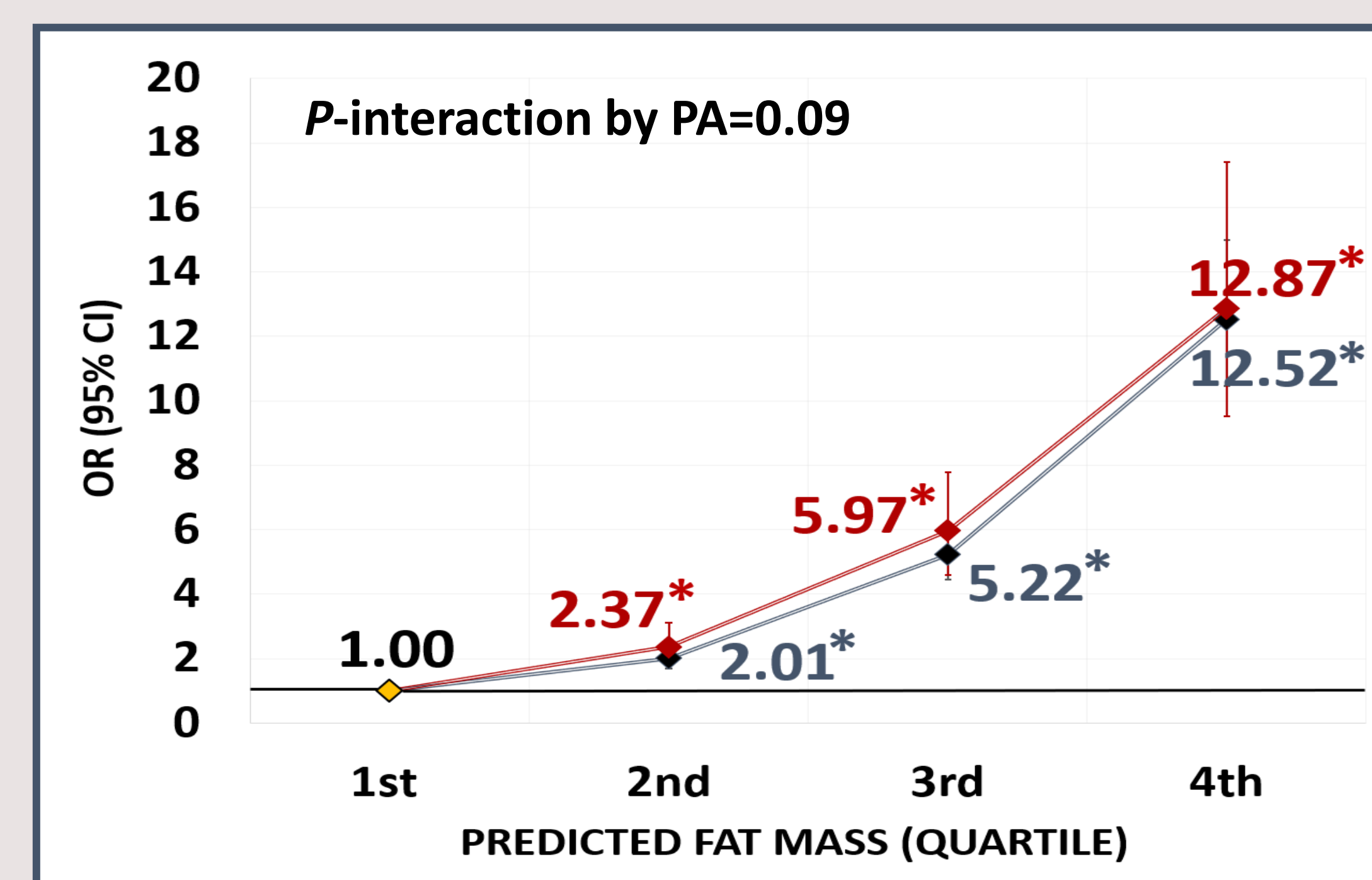


Figure 4. Associations of PA and predicted fat mass with All-cause mortality

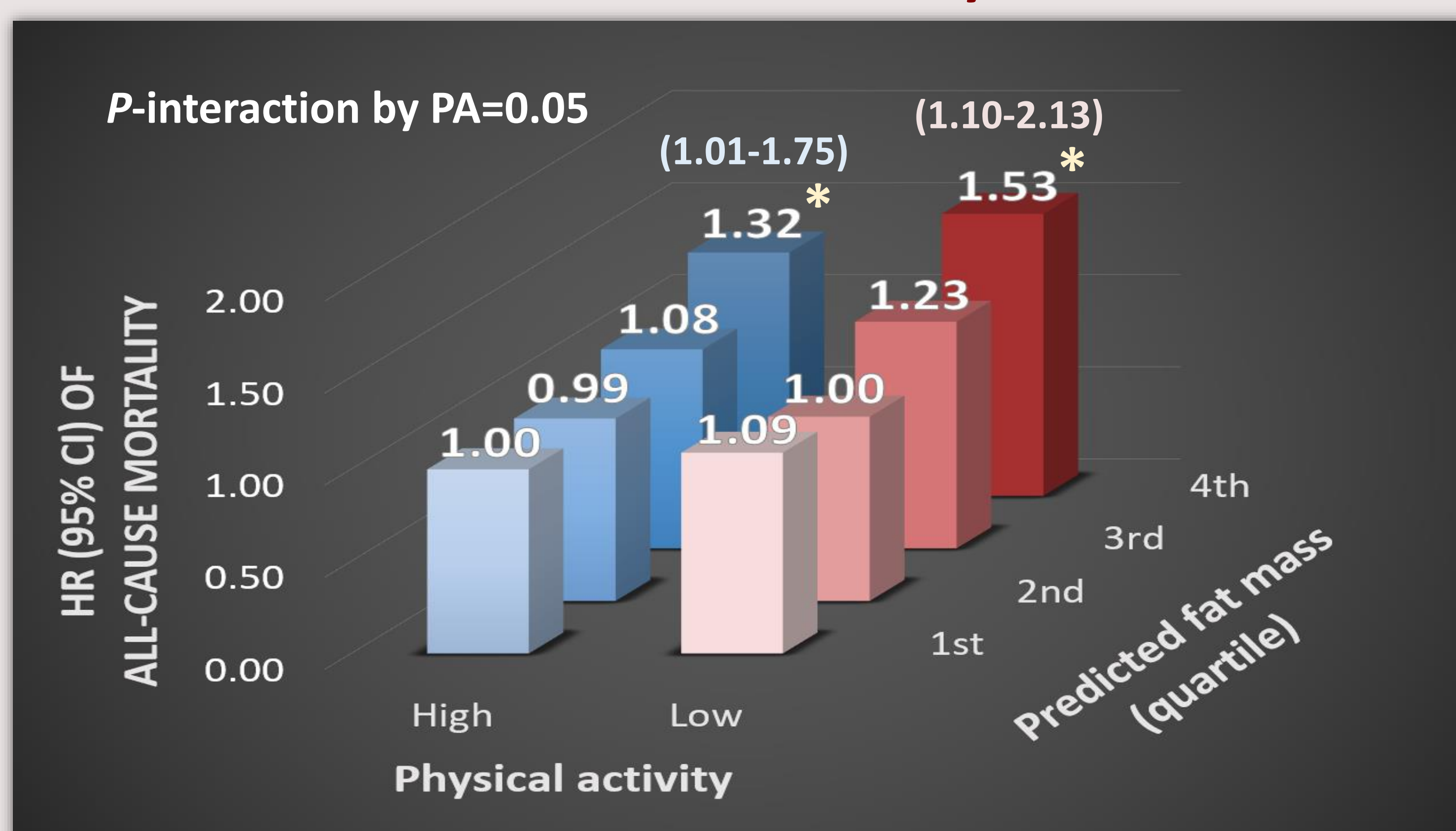
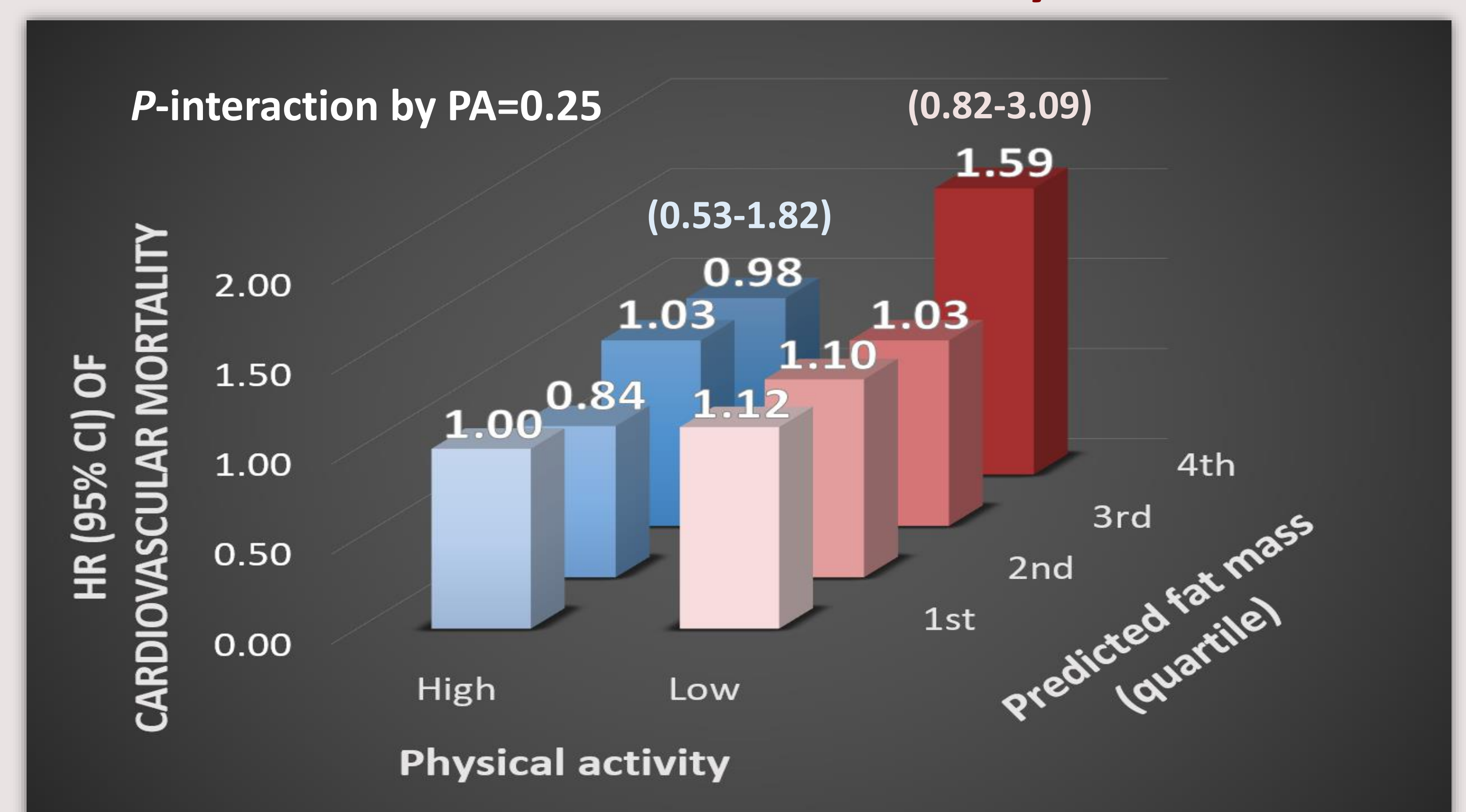


Figure 5. Associations of PA and predicted fat mass with Cardiovascular mortality



(Adjusted for age, sex, marital status, region, education, income, occupation, smoking, drinking, predicted fat-free mass, and height)

CONCLUSION

- High predicted body fat is associated with higher prevalence of cardiometabolic conditions and increased risk of all-cause mortality, regardless of the engagement in PA.
- Our data suggest that PA cannot completely offset the risk of all-cause death attributable to increased body fat.
- To prevent premature death, preventive strategies should emphasize the reduction of body fat mass as well as regular PA.