Anger Across the Life-Course and Implications for Inflammation

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Results

Aging, Gender, and Anger
• Older adults report experiencing less angry feelings, are less likely to have an angry temperament or angry reactions, and are less likely to suppress anger or outwardly express anger compared to younger adults

• The decrease in outwardly expressing anger with age is stronger for females than males

• Females are more likely than males to have angry reactions and are less likely than males to control their anger

Inflammation
• Being able to control anger is linked with lower levels of CRP and IL-6
• Expressing anger outwardly is linked with higher levels of CRP and IL-6
• Having angry reactions are linked with higher levels of IL-6

Conclusions
• Individuals experience anger differently as they age
• Health outcomes (i.e., inflammation) associated with anger vary depending on age
• Having strong angry reactions is linked with higher inflammatory markers, especially in females
• Being able to control anger is health protective, especially in middle aged and older adults
• Teaching anger control/management may offer older individuals protection against increased inflammation, which is involved in many age-related diseases6

Introduction

• Anger is a commonly experienced emotion, ranging in intensity from mild irritation to strong fury or rage1

• Some ways of expressing anger (acting out on angry feelings, suppressing anger) are associated with poor health outcomes, like higher risk of coronary heart disease2 and stroke1, while being able to control one’s anger is linked with better health outcomes, like lower risk of cardiovascular events3 and faster wound healing4

• C-Reactive Protein (CRP) and interleukin-6 (IL-6) are markers of inflammation, which is an important biological process that contributes to aging and is involved in many disease processes6

Study Aims

• To examine age differences in the frequency of feeling angry and the manner in which anger is expressed
• To assess whether anger was related to inflammation differently for individuals of different ages
• To test whether males and females differ in these effects

Methods

Sample
• Survey of Mid-life Development in the United States (MIDUS) participants (N = 1054) who completed biological data collection
  • Age Range = 35-86, M = 58.0, SD = 11.6
  • Gender: 54.7% female
  • Marital Status: 72.2% married
  • Education: 24% High School or Less, 29% Some College, 47% College Degree

Procedure and Measures
• Self administered questionnaires completed by mail and at General Clinic Research Center (GCRC)
  • Trait anger scale1 and anger expression scales7 (outward expression, anger suppression, controlling anger)
  • Medical history, physical exam, medication inventory, fasting blood draw (for CRP and IL-6) completed at GCRC

Statistical Analyses
• Two types of multiple regressions: main effects and interactions examined
  ① Predictor Variables: Age, Gender
  Outcome: Anger (separate models for each scale)
  ② Predictor Variables: Age, Gender, Anger
  Outcome: CRP and IL-6 (separate models for each marker)
• Control variables (for interactions predicting inflammation only): educational attainment, smoking status, alcohol consumption, minutes of physical activity per week, body mass index, waist-to-hip ratio, medications (blood pressure, cholesterol, depression, and corticosteroid), and chronic health conditions

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35-49 50-65 66-86
Age

Females Males

This graph shows that males aged 66 or older that control their anger well have lower IL-6 than those who do not control anger as effectively.

Females Males

This graph shows that females over the age of 66 that experience frequent anger have higher CRP than older females who report less anger.

Females Males

This graph shows that males aged 66 or older that control their anger well have lower IL-6 than those who do not control anger as effectively.