

# Association of higher total bilirubin level with rheumatoid arthritis in the United States National Health and Nutrition Examination Survey 1999-2008

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**Introduction:** Low total bilirubin level and arthritis are risk factors for atherosclerosis and other related cardiovascular diseases (CVDs). However, there are limited studies on the relationship between total bilirubin level and arthritis in a national representative sample. We therefore investigated their relationship in the United States National Health and Nutrition Examination Survey 1999-2008.

**Methods:** A total of 12,229 subjects aged  $\geq 40$  years in the United States National Health and Nutrition Examination Survey 1999-2008 with valid data on self-reported arthritis and total bilirubin level were included in the analysis.

**Results:** Compared to subjects without arthritis (n=9,278), subjects with rheumatoid arthritis (n=1,190) and osteoarthritis (n=1,761) had significantly lower total bilirubin level (mean = 0.672 and 0.710 vs 0.739 mg/dl,  $P < 0.001$  and 0.047 respectively). In multiple logistic regression analysis, total bilirubin level was significantly associated with rheumatoid arthritis (OR [95% CI] = 0.84 [0.75-0.94] per SD increase,  $P = 0.004$ ), but not osteoarthritis ( $P = 0.119$ ) after adjusting for confounding factors. Total bilirubin showed significant interaction with age ( $P = 0.041$ ) and body mass index (BMI) ( $P = 0.017$ ). The association was significant only in subjects with BMI  $< 25.0$  kg/m<sup>2</sup> (OR = 0.66 per SD increase,  $P = 0.001$ ) or age 50-64 years (OR = 0.21 per SD increase,  $P = 0.021$ ).

**Conclusion:** Low total bilirubin level is significantly associated with rheumatoid arthritis, especially in lean subjects, but not osteoarthritis. This association may contribute to at least partly to the higher prevalence of cardiovascular diseases in subjects with rheumatoid arthritis.