ASSOCIATION BETWEEN HEMOGLOBIN A1C (HbA1c) AND CARDIOVASCULAR FITNESS IN HEALTHY ADULTS: DATA FROM NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 1999-2004

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Sunday, March 25, 2012, 11:00 a.m.-Noon

Session Title: Prevention: Clinical: Updates in Prevention
Abstract Category: 9. Prevention: Clinical
Presentation Number: 1187-420

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Cardiovascular fitness is an important predictor of cardiovascular morbidity and mortality. Hemoglobin A1c (HbA1c) has been shown to be an adverse predictor for cardiovascular health. We aimed to determine the relationship between low cardiovascular fitness and HbA1c.

Methods: Pooled data from NHANES 1999-2004 was utilized. Cardiovascular fitness was assessed in healthy adults 12-49 years old using submaximal exercise per standardized treadmill protocol. The primary outcome was the estimated maximal oxygen uptake (VO2max). Poor cardiovascular fitness was defined as VO2max below the 20th percentile of age and gender specific subgroup. HbA1c was divided into five categories: <5 %, 5-6%, 6-7%, 7-8% and >8%. Multivariate survey logistic regression adjusting for demographic and clinical characteristics was utilized in order to obtain adjusted national estimates.

Results: Data from 3145 individuals (representative of 58 million US residents) was available for analysis. 21.2% (95% CI: 19.4-23.1%) individuals were estimated to have poor cardiovascular fitness. The proportion of individuals with poor cardiovascular fitness increased progressively across the HbA1c categories. The proportion of individuals with poor cardiovascular fitness was 17.5%, 21.9%, 27.8%, 35.5% and 43.1% across the rising HbA1c categories respectively. Using multivariate logistic regression analysis, we observed that the odds of poor cardiovascular fitness increased in a dose-response fashion with increasing HbA1c. In comparison to individuals with HbA1c <5%, the odds ratio (95% CI) for HbA1c 5-6%, 6-7%, 7-8% and >8% were 1.3(0.9 - 1.8), 1.7 (0.8 - 3.6), 3.1 (1.3 - 7.5) and 3.4 (1.2 - 10.1) respectively.

Conclusions: In a large nationally representative database of healthy individuals aged 12-49 years, there was a significant association between poor cardiovascular fitness and increasing HbA1c. Individuals with HbA1c >7% had statistically significant higher odds of poor cardiovascular fitness.