World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

The Association between C-Reactive Protein and Hypertension with Different US Participants Ethnicity-Findings from National Health and Nutrition Examination Survey 1999-2010

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Abstract : The main objective of this study was to examine the association between the elevated level of CRP and incidence of hypertension before and after adjusting by age, BMI, gender, SES, smoking, diabetes, cholesterol LDL and cholesterol HDL and to determine whether the association were differ by race. Method: Cross sectional data for participations from age 17 to age 74 years who included in The National Health and Nutrition Examination Survey (NHANES) from 1999 to 2010 were analysed. CRP level was classified into three categories (> 3mg/L, between 1mg/LL and 3mg/L, and < 3 mg/L). Blood pressure categorization was done using JNC 7 algorithm Hypertension defined as either systolic blood pressure (SBP) of 140 mmHg or more and disystolic blood pressure (DBP) of 90mmHg or greater, otherwise a self-reported prior diagnosis by a physician. Pre-hypertension was defined as (139 > SBP > 120 or 89 > DPB > 80). Multinominal regression model was undertaken to measure the association between CRP level and hypertension. Results: In univariable models, CRP concentrations > 3 mg/L were associated with a 73% greater risk of incident hypertension compared with CRP concentrations < 1 mg/L (Hypertension: odds ratio [OR] = 1.73; 95% confidence interval [CI], 1.50-1.99). Ethnic comparisons showed that American Mexican had the highest risk of incident hypertension (odds ratio [OR] = 2.39; 95% confidence interval [CI], 2.21-2.58).This risk was statistically insignificant, however, either after controlling by other variables (Hypertension: OR = 0.75; 95% CI, 0.52-1.08,), or categorized by race [American Mexican: odds ratio [OR] = 1.58; 95% confidence interval [CI], 0,58-4.26, Other Hispanic: odds ratio [OR] = 0.87; 95% confidence interval [CI], 0.19-4.42, Non-Hispanic white: odds ratio [OR] = 0.90; 95% confidence interval [CI], 0.50-1.59, Non-Hispanic Black: odds ratio [OR] = 0.44; 95% confidence interval [CI], 0.22-0,87]. The same results were found for pre-hypertension, and the Non-Hispanic black showed the highest significant risk for Pre-Hypertension (odds ratio [OR] = 1.60; 95% confidence interval [CI], 1.26-2.03). When CRP concentrations were between 1.0-3.0 mg/L, in an unadjusted models prehypertension was associated with higher likelihood of elevated CRP (OR = 1.37; 95% CI, 1.15-1.62). The same relationship was maintained in Non-Hispanic white, Non-Hispanic black, and other race (Non-Hispanic white: OR = 1.24; 95% CI, 1.03-1.48, Non-Hispanic black: OR = 1.60; 95% CI, 1.27-2.03, other race: OR = 2.50; 95% CI, 1.32-4.74) while the association was insignificant with American Mexican and other Hispanic. In the adjusted model, the relationship between CRP and prehypertension were no longer available. In contrary, Hypertension was not independently associated with elevated CRP, and the results were the same after grouped by race or adjusted by the confounder variables. The same results were obtained when SBP or DBP were on a continuous measure. Conclusions: This study confirmed the existence of an association between hypertension, prehypertension and elevated level of CRP, however this association was no longer available after adjusting by other variables. Ethic group differences were statistically significant at the univariable models, while it disappeared after controlling by other variables.

Keywords : CRP, hypertension, ethnicity, NHANES, blood pressure
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020