THE ASSOCIATION BETWEEN SERUM α1-AGP AND CHRONIC KIDNEY DISEASE AMONG US FEMALE AGES 20 TO 49 YEARS

Results from 2015-2018 National Health and Nutrition Survey

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Introduction

More than 1 in 7 US adults-about 35.5 million people have chronic kidney disease (CKD) , which increases the risk of many adverse events. α1-acid glycoprotein (AGP), has been associated with energy metabolism, which mitigates acute kidney injury (AKI) and its progression to CKD, and protect against renal fibrosis in animal studies. However, studies that used large population-based database research are limited. Therefore, this study aimed to investigate whether CKD prevalence is associated with serum α1-AGP levels in female adults in the US.

Methods

This nationally representative cross-sectional study used data on female adults in the US aged 20–49 years from the National Health and Nutrition Examination Survey 2015–2018 cycles. A total of 2,137 individuals were included in the study after excluding individuals without α1-AGP and urine albumin & creatinine data. Multivariate logistic regression models were used to evaluate the association between α1-AGP and CKD. Moreover, we performed stratified and interaction analyses to see if the relationship was stable in different subgroups.

Results

Among the 2,137 participants (mean age of 34.6 years), the mean eGFR was 111.7 (SD=17.9) mL/min/1.73m^2, and CKD was diagnosed in 8.8% of them (n=188). A negative relationship was observed between the occurrence of CKD and serum α1-AGP level. In the fully adjusted model, α1-AGP was negatively associated with CKD (CKD all, OR = 0.40, 95% CI 0.17-0.93, p = 0.034; CKD stage≥1, OR = 0.49, 95% CI 0.21-1.19, p = 0.115; CKD stage≥3, OR = 0.07, 95% CI 0-1.27, p = 0.072; ACR ≥ 30 mg/g, OR = 0.42, 95% CI 0.18-1, p = 0.051). And this trend was more obvious in the group with higher serum α1-AGP levels. Some differences in the association between α1-AGP and CKD were found in stratified analyses, however, these differences lacked statistical significance.

Conclusions:

Serum α1-AGP was negatively associated with the prevalence of CKD. However, the study participants were US female ages 20 to 49, further research is required to validate these findings in diverse populations.

Figure 1. Associations between serum α1-AGP and CKD in different subgroups

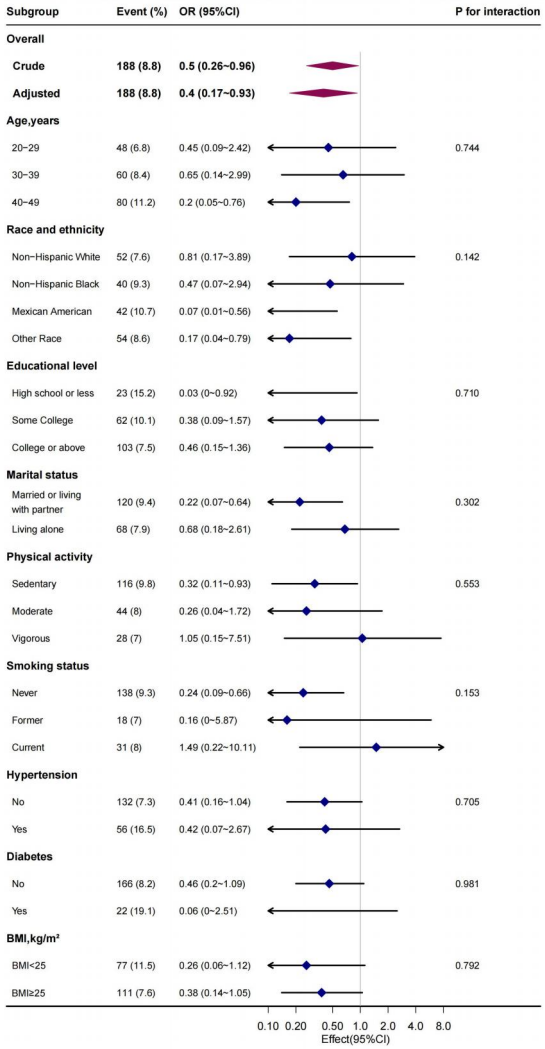

Table 1. Association between serum α1-AGP and CKD in the multiple regression model

Variable	n.event%	Crude	*P*	Model 1	*P*	Model 2	*P*	Model 3	*P*
CKD all	188 (8.8)	0.50(0.26~0.96)	0.038	0.48 (0.25~0.94)	0.031	0.39(0. 02~0.78)	0.007	0.40 (0.17~0.93)	0.034
AGP Q1	54 (10.1)	1(Ref)		1(Ref)		1(Ref)		1(Ref)	
AGP Q2	53 (10. 0)	0.99 (0.66~1.48)	0.96	0.97 (0.65~1.45)	0.878	0.97 (0.64~1.46)	0.878	1.11 (0.72~1.72)	0.636
AGP Q3	45 (8.4)	0.81 (0.54~1.23)	0.324	0.79 (0.52~1.20)	0.27	0.73 (0.47~1.12)	0.146	0.89 (0.55~1.42)	0.615
AGP Q4	36 (6.7)	0.64 (0.41~0.99)	0.047	0.64 (0.41~0.99)	0.045	0.58 (0.37~0.92)	0.019	0.61 (0.35~1.07)	0.084
CKD≥1	169 (7.9)	0.61 (0.31~1.20)	0.153	0.59 (0.30~1.17)	0.133	0.50 (0.25~1. 00)	0.049	0.49(0.21~1.19)	0.115
AGP Q1	47 (8.8)	1(Ref)		1(Ref)		1(Ref)		1(Ref)	
AGP Q2	45 (8.5)	0.96 (0.63~1.48)	0.864	0.94 (0.61~1.45)	0.793	0.95 (0.61~1.47)	0.809	1.09 (0.68~1.72)	0.729
AGP Q3	42 (7.8)	0.88 (0.57~1.35)	0.555	0.86 (0.55~1.33)	0.486	0.80(0.51~1.25)	0.320	0.97 (0.60~1.59)	0.918
AGP Q4	35 (6.5)	0.72 (0.46~1.14)	0.164	0.72 (0.46~1.14)	0.16	0.67 (0.42~1.07)	0.096	0.72 (0.40~1.27)	0.251
CKD≥3	19 (0.9)	0.09 (0.01~0.81)	0.031	0.08 (0.01~0.77)	0.029	0.06(0.01~0.61)	0.017	0.07(0. 00~1.27)	0.072
AGP Q1	7 (1.3)	1(Ref)		1(Ref)		1(Ref)		1(Ref)	
AGP Q2	8 (1.5)	1.16 (0.42~3.21)	0.781	1.12 (0.40~3.13)	0.823	1.13 (0.39~3.24)	0.818	1.38 (0.44~4.25)	0.580
AGP Q3	3 (0.6)	0.42 (0.11~1.64)	0.213	0.41 (0.11~1.60)	0.2	0.36 (0.09~1.41)	0.142	0.38 (0.08~1.75)	0.214
AGP Q4	1 (0.2)	0.14 (0.02~1.15)	0.067	0.14 (0.02~1.14)	0.066	0.12 (0.01~0.99)	0.049	0.09 (0.01~1.14)	0.063
ACR≥30	175 (8.2)	0.55 (0.28~1.07)	0.076	0.53 (0.27~1.05)	0.067	0.44(0.22~0.87)	0.019	0.42(0.18~1. 00)	0.051
AGP Q1	51 (9.6)	1(Ref)		1(Ref)		1(Ref)		1(Ref)	
AGP Q2	47 (8.9)	0.92 (0.61~1.40)	0.708	0.90(0.60~1.37)	0.637	0.90 (0.59~1.39)	0.638	1.02 (0.65~1.61)	0.921
AGP Q3	42 (7.8)	0.80(0.52~1.23)	0.311	0.78 (0.51~1.2)	0.264	0.72 (0.46~1.12)	0.145	0.86 (0.53~1.39)	0.537
AGP Q4	35 (6.5)	0.66 (0.42~1.04)	0.071	0.66 (0.42~1.04)	0.071	0.61 (0.38~0.97)	0.035	0.63 (0.36~1.10)	0.106

Model 1: Age, Educational level
Model 2: Model 1+ BMI, SBP, DBP, Hypertension, Diabetes, physical activity
Model 3: Model 2+ Cholesterol, uric acid, HSCRP, Ferritin, Vitamin D, HbA1c, Folate, HGB