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Diet Soda Consumption and Risk of  
Incident End Stage Renal Disease

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## Abstract

**Background and objectives** Diet soda consumption is common in the United States and is associated with impaired glucose metabolism, diabetes, and metabolic syndrome.

**Design, setting, participants, & measurements** We prospectively analyzed diet soda consumption, assessed by food frequency questionnaire at baseline (1987-1989) and a follow-up examination (1993-1995), and incident ESRD through December 31, 2012 in the Atherosclerosis Risk in Communities study ( $n=15,368$ ).

**Results** Baseline mean age of participants was 54 years, 55% were female, and 27% were black. The majority of participants (43.5%) consumed <1 glass/wk of diet soda; 17.8% consumed 1-4 glasses/wk; 25.3% consumed 5-7 glasses/wk; and 13.5% consumed >7 glasses/wk. Over a median follow-up of 23 years, 357 incident ESRD cases were observed. Relative to <1 glass/wk of diet soda, consuming 1-4 glasses/wk, 5-7 glasses/wk, and >7 glasses/wk, respectively, was associated with 1.08-times (95% confidence interval [95% CI], 0.75 to 1.55), 1.33-times (95% CI, 1.01 to 1.75), and 1.83-times (95% CI, 1.01 to 2.52) higher risk of ESRD after adjusting for age, sex, race-center, education level, smoking status, physical activity, total caloric intake, eGFR, body mass index category, diabetes, systolic BP, and serum uric acid ( $P$  value for trend <0.001). Results were similar after additional adjustment for dietary acid load, diet quality, dietary sodium, dietary fructose, sugar-sweetened beverages, and dietary phosphorus. Risk estimates were similar by body mass index category ( $P$  value for interaction = 0.82), but the association between diet soda and ESRD was only significant for those who were overweight or obese at baseline. Sugar-sweetened beverage consumption was not significantly associated with ESRD in the fully adjusted model.

**Conclusions** Diet soda consumption was associated with higher ESRD risk in this general population sample. Further research is necessary to validate these findings in other study populations and to examine potential mechanisms through which diet soda could impact kidney disease.

atherosclerosis beverages blood pressure body mass index  
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fructose glomerular filtration rate glucose kidney failure, chronic  
metabolic syndrome X motor activity obesity overweight  
phosphorus, dietary smoking sodium, dietary  
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