

PD35-05

**Associations between
socioeconomic status
and stone composition**

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Associations between socioeconomic status and stone composition

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Introduction

- Socioeconomic status (SES) is a known determinant of health with multiple studies demonstrating an inverse relationship between SES and health status.
- Little is known about the effect of SES on nephrolithiasis.

Objective

- To investigate the relationship between poverty level and income on stone composition and 24-hour urine composition in patients with a history of nephrolithiasis.

Methods

- A retrospective review was performed on patients with history of nephrolithiasis who presented to a single tertiary urology center over a one-year period.
- Patient demographics, medical characteristics, 24-hour urine characteristics and stone analysis were included in the analysis.

Methods

- Poverty level (percentage of individuals below poverty level) and median household income for each postal address was extracted from the U.S. Census Bureau data.
- Wilcoxon Rank sum, Kruskal-Wallis test and Pearson correlation coefficients were used to compare outcomes.

Results

- 439 patients were included in the analysis
- Median age was 61 years [IQR 22 years], 198 were women (44.2%), and the mean BMI was 23.03 ± 6.77
- Median poverty level was 6% (IQR = 3.8%)
- Median household income was \$97,583 (IQR = \$28,811)

Results

- There is significant association between type of stone and median income. Uric acid stone producers have a significantly lower median income when compared to calcium oxalate stone formers (Table 1).
- Otherwise, there is no significant association between patient demographics and income median level.

Table 1: Comparison of Demographics and Median Income

N=448	Median Income (IQR)	P-Value
Gender (8 missing)		
Male	97682 (27151)	0.1903
Female	97068 (28586)	
Race (7 missing)		
White/ Caucasian	97682 (30410)	0.1761
Other (Asian/Black)	79302 (34586)	
Ethnicity (7 missing)		
Non-Hispanic	97682 (30410)	0.2508
Hispanic	80840 (24552)	
BMI Categorized (8 missing)		
<25 (underweight/healthy)	97682 (31880)	0.2600
25-30 (overweight)	97632 (28646)	
> 30 (obese)	97068 (26895)	
Alcohol Exposure (8 missing)		
Never	97068 (20999)	0.5221
Former/Current	97682 (32045)	
Tobacco Exposure (8 missing)		
Never	97682 (30018)	0.2333
Former/ Current	97068 (19856)	
Diabetes (8 missing)		
No	97682 (30410)	0.2248
Yes	94042 (19922)	
Family History of Stones (8 missing)		
No	97682 (30507)	0.2925
Yes	94603 (18313)	
History of Stones (8 missing)		
No	97068 (19461)	0.6068
Yes	97682 (30575)	
Type of Stones (104 missing)		
Ammonium Acid Urate	96614 (50042)	0.0140
Calcium Oxalate	97682 (24251)	
Calcium phosphate	95946 (54056)	
Uric Acid	85913 (26673)	

Results

- There is a significant positive correlation between 24-hour urine volume and median income ($r = 0.097$, $p = 0.042$), and a significant negative correlation between 24-hour urine volume and poverty level ($r = -0.098$, $p = 0.038$).

Table 2: Univariate Generalized Linear Models for Median Income

24-hour Urine Endpoints:	Median Income			
	Intercept	Estimate	Standard Error	P-value
Age	93952	80.6	65.7	0.2203
BMI	106744	-277.3	155	0.0742
Volume	93519.7	2446.1	1199	0.0420
SS CaOx	98793.6	-31.7	75.4	0.6744
Urine Ca	97394.4	6.3	9.1	0.4889
Urine Oxalate	96214.3	63.8	51.5	0.2157
Urine Citrate	96672.7	3.3	3.1	0.2878
SSCap	100092	-1567.8	1200	0.1922
pH	97739.5	139.5	1683.9	0.9340
SSUA	99719.3	-1187.2	1138.5	0.2976
UA	100629.9	-3205	4290.7	0.4555

Table 3: Univariate Generalized Linear Models for % below poverty level

24-hour Urine Endpoints:	% below poverty level			
	Intercept	Estimate	Standard Error	P-value
Age	7.3	-0.017	0.010	0.0866
BMI	5.9	0.014	0.023	0.5450
Volume	7.1	-0.37	0.178	0.0381
SS CaOx	6.3	0.0012	0.011	0.9140
Urine Ca	6.6	-0.0013	0.001	0.3359
Urine Oxalate	6.3	0.0007	0.008	0.9315
Urine Citrate	6.4	-0.00007	0.0005	0.8752
SSCap	6.0	0.327	0.177	0.0659
pH	5.5	0.141	0.248	0.5710
SSUA	6.2	0.140	0.168	0.4059
UA	6.1	0.377	0.638	0.5550

Conclusion

- Patients with lower household income were more likely to develop uric acid stones.
- Increasing poverty level and decreasing household income were associated with decreased urinary volume.
- Decreased urinary volume is a risk factor for kidney impairment and kidney stone formation. Physicians should be aware of this potential disparity when counseling patients