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The Role of Adverse Childhood Events on the Progression of Chronic Kidney Disease in Children: A CKiD Study

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Background

- Adverse childhood events (ACEs) are exposures to potentially traumatic events or environmental factors that occur prior to age 18 and have been linked to multiple chronic diseases.
- ACEs were validated in children in the 2011-2012 National Survey of Children's Health (NSCH).
- Studies have demonstrated that ACEs are associated with the development of chronic kidney disease (CKD) in adults, although they remain unstudied in children.

Aims

- Determine the prevalence of ACEs in children with mild to moderate chronic kidney disease.
- Characterize disease progression amongst those who experienced ACEs compared to those who have not.

Methods

- Analysis conducted using data from the multicenter, prospective Chronic Kidney Disease in Children (CKiD) cohort study.
- Subject criteria for current analysis: > 12 yo and older, enrolled in CKiD, and no missing data related to ACEs exposures.
- A total of 350 subjects were included.
- Prevalence of ACEs compared to 2011-2012 NSCH survey results (nationally representative population response data).
- Generalized gamma model to predict relative time to Kidney Replacement Therapy (KRT) or 50% decline in eGFR, adjusted for traditional CKD progression risk factors.

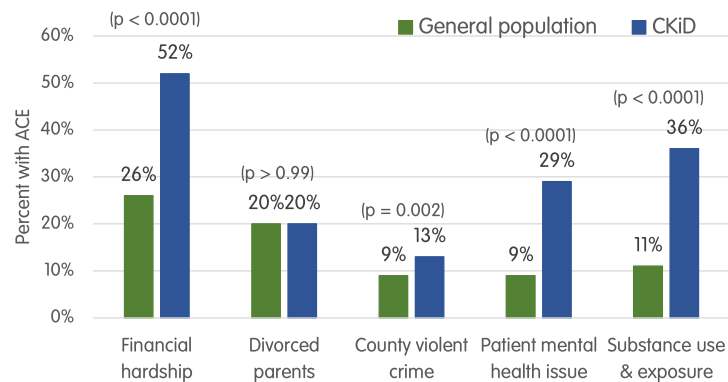
Disclosures - CKiD is funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the National Institute of Child Health and Human Development (NICHD), and the National Heart, Lung, and Blood Institute (NHLBI): U01DK066143, U01DK066174, U24DK082194 and U24 DK066116

Results

Table 1. Description of subjects (n=350) at baseline

Characteristic	Median [IQR] or n (%)
Age, years	13.9 [12.7, 15.8]
Male sex	198 (57%)
Glomerular diagnosis	106 (30%)
U25eGFR, ml/min/1.73m ²	45.8 [33.4, 59.7]
Urine protein/ creatinine ratio	0.37 [0.13, 1.14]
Blood pressure stage:	
Normal	230 (68%)
Elevated	39 (11%)
Stage 1 HTN	63 (19%)
Stage 2 HTN	8 (2%)
Antihypertensive medications	250 (71%)
ACEs and outcomes:	
Financial hardship	182 (52%)
Divorced parents	70 (20%)
County violence rate (per zip code)	47 (13%)
Positive patient mental health issue	102 (29%)
Substance use & exposure	125 (36%)
Number of ACEs:	
0	67 (19%)
1	116 (33%)
2	100 (29%)
3	58 (17%)
4	9 (3%)
5	0 (0%)
KRT or 50% decline in eGFR observed	155 (44%)

Figure 1. Prevalence of ACEs in CKiD and general population

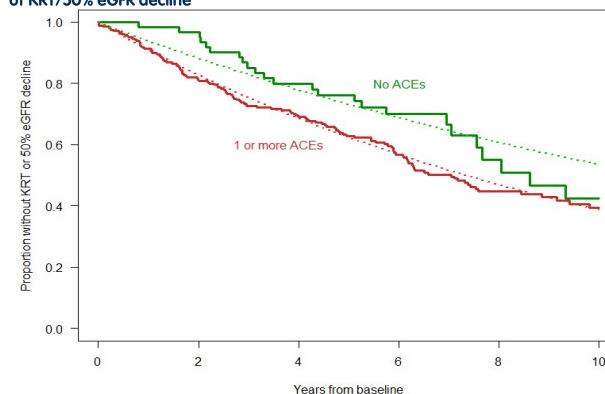


Results

Table 2. Generalized gamma model for time for KRT or 50% decline in eGFR

Predictor	Relative time (95% CI)	p-value
<i>Unadjusted model</i>		
1 or more ACEs	0.663 (0.426, 1.031)	0.07
<i>Adjusted model</i>		
1 or more ACEs	0.737 (0.526, 1.031)	0.08
Age, per year	1.076 (1.006, 1.151)	0.03
Male sex	1.078 (0.832, 1.397)	0.57
Glomerular dx	0.645 (0.479, 0.869)	0.004
Hypertension (stage 1 or 2)	0.809 (0.599, 1.094)	0.17
Antihypertensive med use	0.748 (0.550, 1.017)	0.06
U25eGFR, per 10% lower	0.839 (0.806, 0.874)	<0.0001
Urine Pr/Cr, per doubling	0.690 (0.617, 0.771)	<0.0001

Figure 2. Kaplan-Meier and Generalized Gamma estimates of survival-free of KRT/50% eGFR decline



Conclusion

- The majority of the ACEs analyzed have a higher prevalence in the CKiD cohort compared with the general pediatric population. This is supported by p values < 0.05.
- Having one or more ACEs is associated with a more rapid CKD progression compared to those with no ACEs though this association did not quite reach statistical significance. (p=0.08)

