



A pilot investigation of food insecurity among children seen in an outpatient pediatric nephrology clinic

Michelle C. Starr^{a,*}, Kelly Fisher^b, Kirsten Thompson^a, Kathryn Thurber-Smith^a, Sangeeta Hingorani^a

^a Department of Pediatrics, Division of Nephrology, Seattle Children's Hospital and University of Washington, Seattle, WA, USA

^b Department of Pediatrics, Division of Child Psychiatry, Seattle Children's Hospital and University of Washington, Seattle, WA, USA

ARTICLE INFO

Keywords:

Kidney disease
Pediatrics
Child
Healthcare utilization
Food insecurity
Nutritional status

ABSTRACT

Food insecurity (FI) is common - affecting one in six American households with children. FI is defined as limited or uncertain availability of nutritionally adequate and safe foods. Awareness of food insecurity and its impact on health has increased since the American Academy of Pediatrics 2015 policy statement, "Promoting Food Security for All Children." Though FI is frequently addressed in general pediatric primary care, it is not routinely identified in patients with chronic medical problems. Patients with complex care needs, prescription medication, or restrictive nutritional requirements may be at higher risk of food insecurity. The prevalence of FI in patients with chronic disease, including pediatric patients with kidney disease, remains unknown. We sought to determine the prevalence of FI among our pediatric nephrology clinic patients with a cross-sectional screening pilot study. Nearly 35% of 118 children seen in our pediatric nephrology outpatient clinic lived in food insecure households, a prevalence rate more than double the general pediatric population (16%). Barriers to food security were variable; common themes included challenges with restricted diet and available food, identifying and accessing community resources, and not qualifying for support. For physicians, dietitians, and other health providers that counsel patients with kidney disease on dietary interventions, it is important to be aware of food security status. To our knowledge, this is the first study to assess the prevalence of food insecurity in pediatric patients with kidney disease. Further studies of food insecurity and social determinants of health in this patient population are needed.

1. Introduction

Food insecurity (FI) is common, affecting 16.6% of American households with children and 7.8% of American children (Coleman-Jensen et al., 2016). FI is defined as limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire such foods in socially acceptable ways (Coleman-Jensen et al., 2016). Children living in homes with FI have increased risk of adverse health outcomes, both during childhood and into adulthood (Braveman and Gottlieb, 2014). FI is an essential social determinant of childhood health with significant health implications, including poorer overall levels of health, more frequent viral infections, chronic medical conditions, and lower levels of psychosocial and physical functioning (Cook et al., 2004; Rose-Jacobs et al., 2008; Eicher-Miller et al., 2009; Portrait et al., 2011).

As more evidence links food insecurity and health outcomes, evaluation of FI during pediatric primary care visits is increasingly

common (Burkhardt et al., 2012; Beck et al., 2016; Garg et al., 2015; Council on Community Pediatrics Committee on Nutrition, 2015). However, the prevalence and impact of FI in children receiving subspecialty care is unclear. In the few studies performed in pediatric subspecialty populations, FI was associated with decreased adherence to medication and preventive care, and FI negatively affected access to healthcare services (Ma et al., 2008).

We performed a pilot study to assess the prevalence of FI in our pediatric nephrology clinic, and to evaluate barriers to implementation of screening. The goal of this study was to assess the implementation of a food insecurity screening program in an outpatient clinic setting, inform ongoing quality improvement interventions, and provide guidance for future research. We hypothesized that the prevalence of food insecurity in our subspecialty patient population would be higher than rates reported in general pediatric populations.

* Corresponding author at: University of Washington/Seattle Children's Hospital, 4800 Sand Point Way NE, OC.9.830, Seattle, WA 98105, USA.
E-mail address: michelle.starr@seattlechildrens.org (M.C. Starr).

<https://doi.org/10.1016/j.pmedr.2018.02.019>

Received 12 October 2017; Received in revised form 26 February 2018; Accepted 28 February 2018

Available online 02 March 2018

2211-3355/ © 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2. Methods

2.1. Study design and participants

This was a single site, cross-sectional pilot study. Data were collected for two consecutive weeks during the spring of 2016. The Pediatric Nephrology clinic serves approximately 3400 patients per year with a wide variety of nephrology conditions; however, does not see patients with End-Stage Renal Disease (ESRD), who attend a separate clinic. This study was deemed exempt by the Institutional Review Board.

2.2. Food insecurity screening

Prior to this study in our Pediatric Nephrology clinic, families were not routinely screened for FI. The medical assistant conducted FI screening at the beginning of each clinic visit either by paper questionnaire distributed as part of the registration packet or by in-person screening. These two methods were performed to assess patient and family comfort with the screening process, with patients being screened by alternating modality depending on which medical assistant was assisting with the clinic visit. Recent studies have shown conflicting data as to whether in-person and paper-based screening have similar rates of food insecurity reporting and acceptability to families, with some studies describing similar rates independent of screening methodology, and some reporting that paper-based screening may have higher rates of reported food insecurity. Given the conflicting data, we utilized both methods for FI screening (Garg et al., 2015; Council on Community Pediatrics Committee on Nutrition, 2015). While various survey instruments are available to assess FI, we chose to use a two-question validated screening tool (Hager et al., 2010). This two-question survey is brief, but has high sensitivity, good specificity and has been validated in a variety of clinical settings, including outpatient pediatric clinics (Council on Community Pediatrics Committee on Nutrition, 2015).

Families were identified as food insecure if they answered sometimes true, often true, or rarely true to either of the two statements: 1) “Within the past 12 months [we] worried whether [our] food would run out before [we] got money to buy more”; and 2) “Within the past 12 months the food [we] bought just didn't last and [we] didn't have money to get more.” (Hager et al., 2010). If participants responded “Never True” to both questions, they were considered food secure. Families with FI were given information on food resources, and connected with community food programs by clinic staff.

2.3. Family phone survey

To better understand family experience with FI screening as well as barriers to food insecurity, families with FI were contacted by telephone. The same family member that provided in-clinic FI screening was contacted to complete the phone survey. For patients ages 18 and older, the screening and the follow-up phone survey was directed to the

patient. Families were contacted by one of the study investigators (KF) within two weeks of clinic visit and asked 6 questions (Supplemental Table 1). These semi-structured interviews were performed to allow families to provide feedback on a range of FI related topics. Existing literature on food insecurity was used to inform the development of the phone semi-structured interview, with questions designed to inform future interventions. These questions were developed to elicit opinions related to FI screening, and barriers to food security (Burkhardt et al., 2012; Garg et al., 2015; Ma et al., 2008). Questions included assessment of the FI screening process, available community resources, barriers to obtaining food security, and suggestions for interventions to improve food security.

2.4. Statistical analysis

Statistical analysis of food insecurity status was performed using descriptive statistics, including proportions. Data analysis was performed using Microsoft Excel (XP, Microsoft Corp., Redmond, WA). Differences between formats of the FI screening (in-person versus paper) were explored using Chi-square testing, with a significance level of 0.05. Qualitative data were analyzed using the constant comparative analysis method, and themes were identified using concepts of long-table approach (Corbin and Strauss, 2014).

3. Results

Of the 147 families seen in our Pediatric Nephrology clinic during this pilot study, 118 patients completed FI screening (response rate of 80%), with half (59 families) screened in-person and the other half by paper survey. Of these families, 40 of 118 (34%) seen in clinic reported experiencing food insecurity in the last 12 months. There was no significant difference in the prevalence of FI depending on the method of screening, with 19 of 59 families screened in-person reporting FI (32%) and 21 of 59 families screened by paper survey reporting FI (35%) ($\chi^2 = 0.15, p = 0.69$).

To understand barriers to food security as well as to ascertain feedback on the screening process, we attempted to contact all 40 families with positive screening for FI by phone. We were unable to contact one family, and 25 agreed to be interviewed (response rate of 63%). Phone interviews ranged in length from 3 min to 20 min. Interviewed families identified substantial and variable barriers to food security, including not being eligible for benefits (44%), challenges identifying or connecting with appropriate community resources (32%), and available food resources not being appropriate for their child's specific nutritional needs (24%). Table 1 includes examples of quotes that illustrate the major themes that emerged.

In addition, we sought to understand families' experience with screening for FI in an outpatient clinic setting. Almost all families (92%) were receptive to in-clinic screening for FI. Those reached by follow-up survey appreciated both in-person and paper-based screening, without a difference in acceptability between the two methods. Many families

Table 1
Interview themes and corresponding quotes from families.

Emergent theme	Illustrative quote
Ineligibility for benefits	“We know a lot about these resources, but we don't always qualify. Despite that... we really need the help.” “We don't qualify because of our income, but we still struggle.”
Challenges identifying and accessing community resources	“We get help, but not as much as we need.” “The resources available are a long way from me.” “It's hard to get to the places... that offer services.” “I've tried to find help, but I don't know what [my child] would qualify for.” “The system is too complicated, I don't know where to go”
Resources not specific for special nutritional needs	“I try and make special trips to the food banks when they have special items... but they don't often have the food we need.” “Because of my family's health problems the foods we can have is a lot to manage... not often at food bank”

noted that this was the first time that they had been asked about their food security status. All families with FI desired assistance and additional resources to achieve food security and address barriers.

4. Discussion

This study describes the implementation of a food insecurity screening pilot program in a Pediatric Nephrology clinic. One in three patients seen in our pediatric nephrology clinic live in food insecure households. This is higher than rates observed in pediatric primary care and higher than pediatric subspecialty patient populations with diabetes and epilepsy (Burkhardt et al., 2012; Garg et al., 2015; O'Malley et al., 2017). To our knowledge, this is the first study to assess food insecurity in this patient population, and suggests that food insecurity may be highly prevalent in pediatric patients with kidney disease.

Awareness of food insecurity and its impact on health has increased since the 2015 American Academy of Pediatrics (AAP) policy statement, "Promoting Food Security for All Children," which urged all clinicians to screen children for food insecurity, not just at primary care visits but with each interaction with the health care system (Council on Community Pediatrics Committee on Nutrition, 2015). Screening should be coupled with timely and appropriate referrals to food resources including Supplemental Nutrition Assistance Program (SNAP), local food banks, Women Infants and Children (WIC), and free or reduced-price school lunch programs (Garg et al., 2015). Physicians, dietitians, and other health providers often counsel patients with kidney disease on dietary interventions; therefore, awareness of food security status is important. Many interventions and recommendations (e.g. phosphorus restriction, low-salt diet) may be challenging or impossible to implement for families who are food insecure.

This study highlights the need to evaluate for food insecurity, as it is likely under-recognized and under-treated. Children with chronic medical conditions, such as those with kidney disease, may be at higher risk of FI given their frequent health care utilization and high medical expenditures. Families with FI described difficulty identifying community resources and qualifying for services as barriers to becoming food secure. Families commonly cited the restrictive diet often prescribed to patients with kidney disease as a barrier to food security. This finding mirrors results in adult ESRD patients where dietary restriction led to poor nutrition by exacerbating issues of food security (Wilson et al., 2006). A recent report showed that two-thirds of families with FI chose between paying for medical care or food within the past year (NS et al., 2014). Many of these barriers may be modifiable with focused interventions.

While our study did not assess the association of FI with clinical outcomes, in other sub-specialty pediatric populations, food insecurity influences clinical outcomes. Among children with diabetes seen at safety-net clinics, food insecure patients had worse glycemic control, and in children with epilepsy healthcare utilization rate was higher (Seligman et al., 2012). In those with kidney disease, especially chronic kidney disease, food insecurity appears to accelerate disease progression, and may increase the risk of ESRD (Wilson et al., 2006; Banerjee et al., 2017).

As many families of pediatric patients with complex chronic medical conditions consider subspecialty clinics their medical homes, screening has added importance given the relevance of FI to chronic disease management. Our pilot study suggests that simple screening interventions can be effectively implemented in an outpatient subspecialty clinic and can be used to identify children at risk. While this study was performed at a tertiary care center, the process would be adaptable to other outpatient settings. We recognize that screening may not be possible in all clinic settings; however, provider awareness of FI is the first step toward implementing FI-targeted interventions.

There are several limitations of this pilot project. First, we conducted the study over a short period in a convenience sample of patients, and therefore the data may not be reflective of general

demographics of our clinic. Secondly, families may have reasons not to disclose FI, including social stigma, fear of intervention from social services, and ongoing relationships with the care team. However, despite these limitations, these findings motivate us to pursue additional studies to further understand food insecurity in our patients and assess the impact on clinical outcomes. We plan to expand our evaluation to our ESRD population, and explore the impact of FI on clinical outcomes. We are also working to address food insecurity in this patient population, including providing food and assisting families with developing community connections to access additional resources. Understanding the prevalence and impact of FI in our patient population is the next step in developing and evaluating FI-targeted interventions.

In conclusion, FI was highly prevalent among children seen in our Pediatric Nephrology clinic. Barriers to obtaining food security are variable, but include difficulty identifying and connecting with community resources as well as challenges implementing dietary restrictions. Further studies of food insecurity and social determinants of health in this patient population are needed.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmedr.2018.02.019>.

Contributions

Research idea and study design: MS, KF, SH; data acquisition: KF, KT, KTS; data analysis and interpretation: MS, KF, SH; data analysis: MS, KF; supervision or mentorship: SH. Each author contributed important intellectual content during manuscript drafting or revision and accepts accountability for the overall work. MS takes responsibility that this study is reported honestly, accurately, and transparently; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Support and acknowledgements

We would like to thank Lindsay Smires and other members of our clinic staff for assistance with this project. The authors would like to thank the patients and families who participated in this pilot study for their participation. This work was supported by the National Institutes of Health (T32DK007662 to MS). The authors declare that they have no relevant financial interests.

References

- Banerjee, T., Crews, D.C., Wesson, D.E., et al., 2017. Food insecurity, CKD, and subsequent ESRD in US adults. *Am. J. Kidney Dis.* 70, 38–47. <http://dx.doi.org/10.1053/j.ajkd.2016.10.035>.
- Beck, A.F., Tschudy, M.M., Coker, T.R., et al., 2016. Determinants of health and pediatric primary care practices. *Pediatrics* 137, e20153673. <http://dx.doi.org/10.1542/peds.2015-3673>.
- Braveman, P., Gottlieb, L., 2014. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep.* 129 (Suppl. 2), 19–31. <http://dx.doi.org/10.1177/00333549141291S206>.
- Burkhardt, M.C., Beck, A.F., Conway, P.H., et al., 2012. Enhancing accurate identification of food insecurity using quality-improvement techniques. *Pediatrics* 129, e504–10. <http://dx.doi.org/10.1542/peds.2011-1153>.
- Coleman-Jensen, A., Rabbitt, M.P., Gregory, C., Singh, A., 2016. Household food security in the United States in 2015. *SSRN J.* <http://dx.doi.org/10.2139/ssrn.2504067>.
- Cook, J.T., Frank, D.A., Berkowitz, C., et al., 2004. Food insecurity is associated with adverse health outcomes among human infants and toddlers. *J. Nutr.* 134, 1432–1438. <http://dx.doi.org/10.1377/hlthaff.2015.0626>.
- Corbin, J., Strauss, A., 2014. Basics of qualitative research (4th ed.): techniques and procedures for developing grounded. *Theory* 4. <http://dx.doi.org/10.4135/9781452230153>.
- Council on Community Pediatrics Committee on Nutrition, 2015. Promoting food security for all children. *Pediatrics* 136, e1431–8. <http://dx.doi.org/10.1542/peds.2015-3301>.
- Eicher-Miller, H.A., Mason, A.C., Weaver, C.M., et al., 2009. Food insecurity is associated with iron deficiency anemia in US adolescents. *Am. J. Clin. Nutr.* 90, 1358–1371. <http://dx.doi.org/10.3945/ajcn.2009.27886>.
- Garg, A., Toy, S., Tripodis, Y., et al., 2015. Addressing social determinants of health at well child care visits: a cluster RCT. *Pediatrics* 135, e296–304. <http://dx.doi.org/10.1542/peds.2015-3301>.

- 1542/peds.2014-2888.
- Hager, E.R., Quigg, A.M., Black, M.M., et al., 2010. Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics* 126, e26–32. <http://dx.doi.org/10.1542/peds.2009-3146>.
- Ma, C.T., Gee, L., Kushel, M.B., 2008. Associations between housing instability and food insecurity with health care access in low-income children. *Ambul. Pediatr.* 8, 50–57. <http://dx.doi.org/10.1016/j.ambp.2007.08.004>.
- NS, W., Mills, G., Borger, C., 2014. *Hunger in America 2014. National Report, Chicago.*
- O'Malley, J.A., Klett, B.M., Klein, M.D., et al., 2017. Revealing the prevalence and consequences of food insecurity in children with epilepsy. *J. Community Health* 32, 381. <http://dx.doi.org/10.1007/s10900-017-0372-1>.
- Portrait, F., Teeuwiszen, E., Deeg, D., 2011. Early life undernutrition and chronic diseases at older ages: the effects of the Dutch famine on cardiovascular diseases and diabetes. *Soc. Sci. Med.* 73, 711–718. <http://dx.doi.org/10.1016/j.socscimed.2011.04.005>.
- Rose-Jacobs, R., Black, M.M., Casey, P.H., et al., 2008. Household food insecurity: associations with at-risk infant and toddler development. *Pediatrics* 121, 65–72. <http://dx.doi.org/10.1542/peds.2006-3717>.
- Seligman, H.K., Jacobs, E.A., Lopez, A., et al., 2012. Food insecurity and glycemic control among low-income patients with type 2 diabetes. *Diabetes Care* 35, 233–238. <http://dx.doi.org/10.2337/dc11-1627>.
- Wilson, G., Molaison, E.F., Pope, J., et al., 2006. Nutritional status and food insecurity in hemodialysis patients. *J. Ren. Nutr.* 16, 54–58. <http://dx.doi.org/10.1053/j.jrn.2005.10.009>.