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Expansion of a Food Insecurity Scale in Primary Care

by

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Abstract

As a household-level economic and social condition defined by limited or uncertain access to inadequate food, food insecurity serves as a health threat. Food security impacts health by increasing the risk of cardiovascular disease, type 2 diabetes, stroke, and several cancers (WHO, 2005). Expansion of the two-item food insecurity screening to a six-item short-form (USDA 6-SF) screening in primary care has the potential to identify and categorize households into three categories of food security, high/marginal, low, or very low. By differentiating food insecurity categories, clients received more appropriate referrals to services aimed at improving food security. During a recent expansion from a two-item screen to the USDA 6-SF, there was an increase of 54 clients who received additional food resources.

Keywords: social conditions, food assistance, United States Department of Agriculture, evidence-based nursing

Expansion of a Food Insecurity Scale in Primary Care

While over 15 food and nutritional assistance programs provide support through the U.S. Department of Agriculture (USDA), resource gaps continue to exist, resulting in food insecure populations across America (Bhattarai et al., 2005; Daponte, 2000). "Federal nutrition assistance programs have largely eliminated severe hunger and malnutrition in the U.S., although more needs to be done to eliminate food insecurity" (Keith-Jennings et al., 2019, p. 1631). Food insecurity is defined by the USDA as "a household-level economic and social condition of limited or uncertain access to adequate food," (Coleman-Jensen et al., 2019). Individuals and households faced with job loss, inability to pay bills while working full time, limited geographic offerings of food, or limited geographic mobility also face increased risk of cardiovascular disease, type 2 diabetes, stroke, and several cancers (WHO, 2005). Associations with poor self-rated health, decreased intake of fruits and vegetables, increased smoking levels, and increased indicators of stress were reported with food insecurity (Laraia, 2013). Food insecurity over several months can cause a chronic stressor, which results in visceral fat accumulation and diet-induced obesity, which increases the risk of chronic disease (Laraia, 2013). Those with very low food security are 18% more likely to have a number of chronic conditions than those with high food security (Gregory & Coleman-Jensen, 2017). While there has been a decrease in food insecurity since its peak during the Great Recession, 11.1% (14.3 million) of households were identified as food insecure in 2018 (Coleman-Jensen et al., 2019). Households remain in need with the prevalence of very low food security reported within 4.3% (5.6 million) of those households (Coleman-Jensen et al., 2019). The current economic uncertainty surrounding COVID-19 serves not only as a great risk to the economic progress made over the past several months but also to the health of millions of individuals and households. Individuals employed in

service occupations or the leisure and hospitality industries who have observed increases in closures and layoffs, face an elevated risk of food insecurity (Feeding America, 2020). Demand for charitable food assistance has increased, with expectations of continued increases in demand for the foreseeable future (Feeding America, 2020). If levels of unemployment and poverty meet or exceed that of the Great Recession, it is estimated that individuals experiencing food insecurity could rise anywhere from 9.9 million to 17.1 million (Feeding America, 2020).

Nutrition assistance programs aim to mitigate hunger and increase adequate nutrition. Of the 15 food and nutritional assistance programs provided and support by the USDA, one or more programs were utilized by 56% of food insecure households in 2018 (Coleman-Jensen et al., 2019). Established by the USDA in 1964, the Supplemental Nutrition Assistance Program (SNAP) is used by low income households for nutrition assistance. It has grown in significance in recent years and experienced record-high levels of participation during the Great Recession (Mabli & Worthington, 2017). While the allotments from SNAP aim to mitigate hunger and increase adequate nutrition, food insecurity remains for some SNAP-recipient households. In a study by Mabli and Worthington, 76% of households using pantries when entering the SNAP program continued using pantries six months later, underscoring SNAP benefits inadequacy (2017). While sufficient for some households, barriers and gaps result in unresolved food insecurity. SNAP "assumes families will spend a significant amount of time preparing meals from scratch and are able to consume a diet that differs significantly from actual consumption" (Keith-Jennings et al., 2019, p. 1638). The program does not allow spending variation based on family composition nor does it adequately account for medically necessary dietary needs and restriction (Keith-Jennings et al., 2019). Additionally, there are environmental barriers, such as geographic location and food deserts, along with a lack of financial assistance consideration

despite the differences in pricing that may be encountered across differing localities (Mabli & Worthington, 2017). To adequately address barriers and gaps resulting in unresolved food insecurity, additional steps are needed to gain specific feedback for unique situations where individuals and households may be at risk for food insecurity.

To categorize food insecurity levels and more accurately identify clients who may be at risk of food insecurity, clinicians can utilize food screening tools during client encounters. Increased sensitivity in clinician screenings can more accurately identify clients at risk of food insecurity. To gauge food insecurity severity, categorizations of high or marginal, low, or very low have been established. Marginal food security is defined as "one or two indications of anxiety over food sufficiency or shortage with little or no indication of changes in diet or intake" (Coleman-Jensen et al., 2019). Categorization of food insecurity as low or very low indicates "reduced quality, variety, or desirability of diet or multiple indications of disrupted eating patterns and reduced food intake" (Coleman-Jensen et al., 2019). Very low food security is specified as "food intake of household members was reduced, and eating patterns were disrupted because the household lacked money and other resources for food" (Coleman-Jensen et al., 2019). When the severity of food insecurity can be more accurately assessed and categorized for a client, clinicians can better assist the patient in receiving the resources and care needed for specific situations.

Problem Statement

Kentucky's percentage of very low food security is 5.7% as compared with the national percentage of 4.6% (Coleman-Jensen et al., 2019). Dare to Care (DtC), in partnership with the Family Health Center (FHC), utilizes the Prescriptive Pantry Program for food insecure clients. The Prescriptive Pantry Program aims to ensure distributed food meets adequate nutritional

guidelines. Current practice at FHC of Fairdale is to provide one bag of food to any medical client who screens positive for food insecurity with a two-item brief assessment screening.

A brief assessment tool, which screens all clients for food insecurity, can help connect food insecure clients to resources within their communities (Hager et al., 2010). The USDA two-item screen consists of two statements that measure food insecurity:

1) Within the last 12 months, we worried whether food would run out before we got money to buy more.
2) Within the past 12 months, the food we bought just didn't last, and we didn't have money to get more.

These two statements are from the 18-item USDA Household Food Security Survey Module, which is considered the gold standard for measuring household food security (Bickel et al., 2000). The two items from the 18-item USDA Household Food Security Survey Module represent the most "frequently endorsed" statements among food insecure families and utilized in many primary care offices for their brevity (Hager et al., 2010). Clients have the option to respond *never, sometimes true,* or *often true*. Clients who answer affirmatively with *often true* or *sometimes true* are considered food insecure. Food insecure clients received referrals to services and nutritional items which promote the attainment of food security.

Two-item screening tools are valid, sensitive, and specific for the dichotomy of being food secure or insecure (Hager et al., 2010). However, the two-item screen lacks the specificity to categorize either low or very low food security, leaving some clients with inadequate assistance. Increased sensitivity in clinician screenings can more accurately identify clients at risk of food insecurity. During times when individuals and households may be confronted by unforeseen financial and economic constraints, and to adequately address barriers and gaps

resulting in unresolved food insecurity, additional steps are needed to gain specific feedback for unique situations where individuals and households may be at risk for food insecurity. Because of its ability to differentiate between low and very low food security, the six-item short form of food security (USDA 6-SF, 2012) provides greater clarity of food insecurity and improved use of resources (Torres et al., 2017). Through the addition of four questions, clinicians can more effectively gauge the severity of food insecurity specifically related to the frequency of limited food availability and financial constraints. Those with very low food security are 18% more likely to have several chronic conditions than those with high food security (Gregory & Coleman-Jensen, 2017). Additionally, individuals identified as food insecure "have characteristics that put them at a higher risk for severe illness associated with COVID-19" (Feeding America, 2020, p. 1). By expanding the screening to the USDA 6-SF and providing additional food to those who screen as very low food security, clients can better meet nutritional needs and make progress toward the achievement of food security.

Literature Review

Searching

The main questions guiding this literature review include: 1) For patients who screen positive for food insecurity, what brief screening tool is best practice? 2) What options do providers have in aiding patients who screen positive for food insecurity? PubMed, CINAHL, and PsychINFO databases were accessed when conducting this literature search. Articles published from 2012 to 2018 were selected. A search strategy was executed across the aforementioned databases using the same keywords and mapped subject headings (MeSH) collectively and independently. Keywords and MeSH terms included *food security, food insecurity, outcomes of health, screening tools, social determinants of health*, and *food R.X.*

Online searches of health organizations known to publish in the areas of nutrition and food security were conducted. Reference lists from retrieved articles were manually searched. See Table 1.

Screening

Preliminary searches revealed 412 articles to investigate for relevance. An independent screening process at the abstract level was performed. Thirty full-text articles were given a quality assessment. Results were then synthesized by study type and reported in tabular form. The inclusion criterion included English language articles published from 2012-2018. Seventeen articles fit the inclusion criteria for this review.

Yields

Eight articles described strategies to aid food insecure populations, three articles explored relationships between chronic health conditions and food insecurity, two articles validated food insecurity screenings, and six articles referenced social determinants of health (i.e., disparities and barriers) and health outcomes. Following the topical searches, the articles were then categorized into the Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions (Guyatt & Rennie, 2002). One article was a systematic review (Hanson & Connor, 2014), three were randomized control trials (Lohse et al., 2015; Makelarski et al., 2017; Seligman et al., 2018), one was a controlled trial without randomization (Hager et al., 2015), two were case-control studies (Bryce et al., 2017; Wang et al., 2015), one was a systematic review of qualitative studies (Jablonski et al., 2016), and seven were single descriptive or cross-sectional studies (Canales, Coffey & Moore, 2015; Cavanagn et al., 2017; Davy et al., 2015; Ding et al., 2015; Hanson & Olson, 2012; Lyles et al., 2014).

Indicators of Research Use

The Johns Hopkins Nursing Evidence-based practice (JHNEBP) rating scale was used to evaluate the quality and strength of the reviewed literature (Newhouse et al., 2005). This evaluation revealed weaknesses in the discussions of validity, and reliability of tools, used in measurement and data collection across seven articles which could have led to biased results (Bryce et al., 2017; Cavanagn et al., 2017; Ding et al., 2015; Hanson & Olson, 2012; Lohse et al., 2015; Phan et al., 2018; Seligman et al., 2018). Each study shared a central theme of food insecurity, and each presented a different implementation context and approach to research. All rating levels were represented, as stated above. Many of the articles found were single descriptive or cross-sectional studies (Table 1). Longitudinal analysis and studies of the intensity, duration, and level of food insecurity are needed to identify more associations (Laraia, 2013).

Discussion

Income and morbidity were increased in those with food insecurity and chronic disease (Davy et al., 2015; Hanson & Olsen, 2012; Wang et al., 2015). Three cross-sectional studies using data from the Veteran's Aging Cohort (Wang et al., 2015), the U.S. Household Food Security Survey (Hanson & Olson, 2012), and the Behavioral Risk Factor Surveillance System (Davy et al., 2015) focused on the relationship between food security and chronic diseases. Wang et al. (2015) used the first item from the 18-item Household Food Insecurity Access Scale to measure food insecurity. The food insecure individuals exhibited decreased managed control of HTN, diabetes, HIV, and depression. The study by Hanson & Olson (2012) sought to identify predictive factors related to food insecurity. The sample size was small (n=225) and did not represent diverse populations. Davy et al. (2015) sought to investigate the relationship between chronic diseases, food insecurity, and sugar-sweetened beverage intake.

Health outcomes related to sleep, osteoporosis, and dietary quality are impacted by food security (Ding, 2015; Hanson & Connor, 2014; & Lyles, 2014). Ding et al. (2015) used a subset of the National Health and Nutrition Examinations Survey (NHANES) to measure poor sleep outcomes in relation to food insecurity. The data were self-reported. Results suggested that poor sleep quality and quantity may cause adverse health outcomes in food insecure individuals (Ding et al., 2015). Lyles et al. (2014) also used NHANES data to measure income, food insecurity, and osteoporosis. Food insecure individuals with low incomes were more likely to have osteoporosis. Hanson & Connor (2014) performed a systematic review to assess associations between food security and diet quality within adult and pediatric populations. Dietary quality in food insecure adults was poorer than their food secure counterparts and they ate less fruit, vegetables and dairy products (Hanson & Connor, 2014). The poor quality of pediatric diets was less common but still higher than expected by chance alone (Hanson & Connor, 2014). Because this review consisted of many observational studies, biases may have occurred.

Food insecurity screenings (Hager et al., 2015; Makelarski et al., 2017) can be performed during an office visit. Historically, the USDA 18-item Household Food Security Survey or a shorter 6-item survey (USDA 6-SF) has served as the preferred standard for food insecurity screenings. Two articles described the development and validity of brief screening tools during office visits. Hager et al. (2015) sought to evaluate the sensitivity and specificity of a two-item brief screening tool adapted from the 18-item survey. The authors used a large sample size (n=30,098) and found that the two-item screening tool was sensitive, and specific. The two-item screening tool was later named the Hunger Vital Sign (HVS). Makelarski et al. (2017) sought to test the diagnostic accuracy of the American Academy of Pediatrics brief screening tool (an adaptation of HVS), the HVS, and the USDA 6-SF survey, which are based on a 12-month recall

of information. The authors also tested the two brief screening tools for a 30-day recall and reported that the HVS was likely to identify more food insecure patients due to the inclusion of responses *never*, *sometimes*, and *always* (as opposed to *yes* or *no*).

Canales et al. compared food security and social determinants of health defined as disparities (2015). Jablonski et al. compared food security and barriers (2016). Both studies used USDA 6-SF to measure food security. Each study focused on a low-income population in the U.S. and was qualitative in nature. These two articles contributed to the use of the USDA 6-SF in this project due the additional four questions that make the screening more sensitive.

Food insecurity reduction strategies include digital technology (Lohse et al., 2015; Phan et al., 2018), and food prescriptions filled via food banks (Bryce et al., 2017; Cavanagn et al., 2017; & Seligman et al., 2018). The two studies of digital technology recommended the use of mobile apps to better assist food insecure individuals in overcoming socioeconomic barriers. For those individuals whose social determinants of health (transportation and geographic location) create barriers to food access, online food ordering options via grocery store mobile apps may provide alternative avenues to food access (Phan et al., 2018). Phan et al. utilized a convenience sample to test food accessibility apps. Another larger randomized study suggests the use of a mobile app to guide users to more healthful choices of food, helping to reduce the problem of unhealthful food choices and chronic health conditions (Lohse et al., 2015). Both articles had small samples (n=284 in both studies) of low-income patients.

Food banks are another strategy to assist food insecure populations. Four studies focused on utilizing food banks to promote access and consumption of more healthful foods. Bryce et al. (2017) and Seligman et al. (2018) focused on diabetes management and improvement of hemoglobin A1c levels while utilizing fruit and vegetable prescriptions. The goal of these studies

was to provide evidence that fruit and vegetable prescription utilization would help reduce the barrier of access and the rate of chronic diseases. Bryce et al. (2017) evaluated a single city's food bank, whereas Seligman et al. (2018) evaluated the food banks of three large cities. Cavanagn et al. (2017) looked at retrospective lessons learned from implementing healthy food prescriptions at health centers located near grocery stores or farmers. Statistically significant difference relating to decreased BMI (p =0.02; 0.74 kg/m^2) was shown.

Conceptual Framework

To guide this project expansion, the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework (Glascow et al., 1999) was used. The RE-AIM framework is useful when evaluating health promotion programs and translating research into practice. This framework has been utilized in other screening projects ranging from psychological distress (Lazenby et al., 2019) and depression (Trivedi et al., 2019) to lung cancer (Taylor et al., 2019). Reach, Effectiveness, and Implementation were measured in this project.

- Reach includes participants with inclusion/exclusion criteria for representation.
    - To ensure a representative sample, the USDA 6-SF paper copy was filled out only after a positive two-item screening performed by the medical assistants. The medical assistants also performed the USDA 6-SF. Clients were not aware of the potential to receive an additional bag of food so as not to create a bias.
    - Inclusion criteria were active client status at FHC and screening in a positive manner to either of the USDA two-item food insecurity statements. Positive screening consisted of client response of *often true* or *sometimes true*.
    - Exclusion criteria were screening negative to both the USDA two-item food insecurity screening statements.

- Effectiveness includes primary and unintended outcomes.
    - Measured outcomes included food security category (i.e., high or marginal food security, low food security, or very low food security) and the amount of food provided to clients (i.e., one vs. two bags).
- Implementation follows the delivery as intended in the protocol.
    - Formative assessment of protocol adherence was conducted via weekly phone meetings or emails with the nursing supervisor. Questions to the supervisor consisted of how the flow of the additional screening was going and if any barriers were occurring. No direct questions were asked of the other staff.

Needs Assessment

A needs assessment was performed with DtC. A tour and assessment of DtC facilities, including FHC, that utilize the Prescriptive Pantry Program were performed with the chief programs officer. A review of the assessment results revealed the need to 1) provide more nutritious food, 2) expand programs already in place, and 3) follow-up with clients. Since 2017, DtC has partnered with health clinics to offer healthier options to food insecure clients with the Prescriptive Pantry Program. The Prescriptive Pantry Program food consists of whole-grain pasta, fruits in 100% juice, low sodium canned vegetables, low sodium chicken broth, peanut butter, canned tuna, and powdered milk. Discussion of needs for DtC to continue and expand the Prescriptive Pantry Program within its facilities resulted in a request to expand from a two-item screening to a six-item screening to collect more data. The expansion of the current two-item food security screening instrument to the USDA 6-SF was proposed.

Setting

Fairdale, Kentucky, is located in southern Jefferson County, a metropolitan annex to Louisville, Kentucky. According to the 2010 U.S. Census information, the area has around 9,788 in total population (U.S. Census Bureau, 2018). FHC of Fairdale strives to provide high quality primary and preventive health care services regardless of clients' ability to pay. The FHC of Fairdale employs three full-time HCP and one part-time provider. Each HCP may see up to 17 clients per day. The FHC of Fairdale offers primary care and behavioral health for all ages, as well as laboratory services and healthy living classes. This additional screening was provided to all clients who screened positive to the two-item screen (N=137). A Request to Research form from FHC was obtained for this project. See Appendix A.

Purpose and Aims

The purpose of this project is to evaluate the expansion of the food insecurity screening in the primary care setting and to develop practice-change recommendations. The following served as a guiding PICO question: In food insecure populations, what is the effect of a categorized (high/marginal, low, or very low) screening program on food resources provided in a primary care setting?

The outcomes measured in this project were the food security category (i.e., high or marginal food security, low food security, or very low food security) and the amount of food provided to clients (i.e., one vs. two bags). Clients with low food security were given one bag of food (i.e., canned low sodium vegetables, fruits in 100% juice, multigrain cereal or oats, whole wheat pasta or rice, low sodium chicken broth, peanut butter, and dry milk). Clients with very low food security were given two bags of food. The food insecurity category and amount of food given were recorded on paper forms, and data were extracted over a four-week period.

Intervention

Practice change included adding the paper-based USDA 6-SF to each bag of food. After a positive two-item screen, the medical assistant would perform the USDA 6-SF. Depending on the assessed category of food insecurity, the client received one of three referral resource packages:

- The client with a high or marginal category was given a resource packet of local community resources (food pantries, healthy recipes, and SNAP/WIC information).
- The client with a category of low food security was given one bag of food as well as the resource packet.
- The client with a category of very low food security was given two bags of food, as well as the resource packet.

The University of Louisville (UofL) Institutional Review Board (IRB) approved this project in December of 2019, proposal ID #19.1256. See Appendix B.

Population

The target population included food insecure families and individuals that are clients at the FHC of Fairdale. Previously, each medical client is screened for food security at the beginning of every visit. This project included four health care providers (HCP) who see approximately 11,000 clients annually. Inclusion criteria were active client status at FHC and screening in a positive manner to either of the USDA two-item food insecurity statements. Positive screening consisted of client response of *often true* or *sometimes true*. Exclusion criteria were screening negative to both the USDA two-item food insecurity screening statements.

Methods

The expansion of the two-item screen consisted of a combination of process evaluation and program monitoring. Prior to the implementation of this project, FHC of Fairdale medical assistants were screening all medical clients for food insecurity using the two-item food security screen. Screening continued with these two items but additional questions from the USDA 6-SF were added in those individuals who answered affirmatively to either of the two items. Based on client response to the USDA 6-SF, food security level was categorized into high/marginal, low, or very low, and appropriate food resources were provided.

The food insecurity category and the amount of food given were recorded in the electronic health records and paper forms. Data were extracted over a four-week period to compare how much additional food was provided.

Procedures

Potential participants were identified as anyone who comes to FHC of Fairdale seeking medical care. No consent was needed, as no identifiable information was obtained. The medical assistants administered the screening via paper copies after two positive responses on the two-item screen. Training for the administration of the expansion, as well as paper copies of the USDA 6-SF, were provided by the project coordinator prior to the implementation. Each client had the USDA 6-SF read to them prior to being given food bags. Depending on the assessed category of food insecurity, the client received one of three referral resource packages:

- The client with *high or marginal* foor security was given a resource packet of local community resources (food pantries, healthy recipes, and SNAP/WIC information).

- The client with a category of *low* food security was given one bag of food as well as the resource packet.
- The client with a category of *very low* food security was given two bags of food as well as the resource packet.

Results of the original two-item food insecurity screen continued to be entered into the electronic medical record as other FHC clinics were not administering the USDA 6-SF.

All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which protects the privacy of patients' health information (United States, 2004). All information collected as part of evaluating this project were aggregated data from the project participants and did not include any identifiers. Paper copies were kept in a locked cabinet of the nursing supervisor until the program coordinator retrieved them. Paper copies were then kept in a locked cabinet at the School of Nursing.

Measures

Outcomes were measured in this project using the following instrument: U.S. Household Food Security Survey Module: Six-Item Short Form. The USDA 6-SF has a 92% sensitivity and 99.4% specificity for the determination of overall food insecurity and classified correctly 99.7% of the time when compared to the 18-item survey (Blumberg et al., 1999). Data on food security category (high or marginal food security, low food security, and very low food security), and the amount of food given were collected and were reported as descriptive statistics.

Instruments

The instrument used in this project was the USDA 6-SF. The short form was developed by researchers at the National Institute for Health Statistics. The USDA 6-SF was adapted from the 18-item U.S. Household Food Security Survey Module. The USDA 6-SF is an established

measure of food security (Blumberg et al., 1999). The USDA 6-SF has a 92% sensitivity and 99.4% specificity for the determination of overall food insecurity and classified correctly 99.7% of the time when compared to the 18-item survey (Blumberg et al., 1999).

The following statements were asked in reference to clients' prior 30-day period:

1) The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more.
2) (I/We) couldn't afford to eat balanced meals.
3) Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?
4) If yes above, how often did this happen- almost every month, some months, but not very much, or in only 1 or 2 months?
5) Did you ever eat less than you felt you should because there wasn't enough money for food?
6) Were you ever hungry but didn't eat because there wasn't enough money for food?

Responses of *often true*, *sometimes true,* equate to a positive score. Responses of *never true,* or *don't know/refusal* equate to a negative score. Positive scores of 0-1 indicate high or marginal food security. Positive scores of 2-4 indicate low food security. Positive scores ranging from 5-6 indicate very low food security (USDA, 2012)

Results

During the four weeks of data collection, 137 clients were eligible to be screened with the USDA 6-SF. Fifteen (10.9%) clients had high/marginal food security. Sixty-eight (49.6%) clients had low food security. Fifty-four (39.4%) clients had very low food security. Fifty-four (39.4%) clients were given an additional bag of food.

Table 2

Frequency of Food Security Categorization

Food Security Categorization	Frequency	Percent
High/Marginal Food Security	15	10.9
Low Food Security	68	49.6
Very Low Food Security	54	39.4
Total	137	100

Discussion

This project was an expansion of a two-item food security screening to the USDA 6-SF. With the two-item screening, clients were either food secure or food insecure. The expansion to the USDA 6-SF helped to differentiate those who were food insecure as having low and very low food security. Each client who was categorized as very low food security was given additional food resources. These clients would not have received adequate food supplies following assessment with the two-item screen. A significant amount of clients would have received half of the resources with the two-item screen. Providing increased healthy food offerings for those who screen low or very low can address the increased stress and decreased amounts of fruit and vegetable intake associated with food insecurity (Laraia, 2013). Providing an increased amount of healthy food offerings also addresses chronic stressors leading to increased risk of chronic disease (i.e. cardiovascular disease, type 2 diabetes, and stroke) among individuals who experience food insecurity over several months (Laraia, 2013).

Limitations and Barriers

This project was limited by a small (four week) sample window. Plans initially had been made to evaluate the use of the USDA 6-SF over a longer time period, but data collection time was reduced by the COVID-19 shutdown in Kentucky.

Barriers include the inability to screen every patient with the USDA 6-SF. The ability to screen all patients regardless of their two-screen answers would have increased the sample size as well as tested the validity of the USDA 6-SF.

Facilitators

The nursing supervisor helped facilitate the program expansion and coordinate all the medical assistants. Weekly emails helped keep the program expansion at the top of FHC of Fairdale's to-do list.

Conclusion

Expansion of food insecurity screenings in primary care offices is a feasible way to address food security issues. Partnerships between food banks and primary care offices have the potential to alleviate gaps in nutrition resources by identifying and providing support to those most at risk for food insecurity.

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Table 1:

Evidence Table

Level of Evidence, Author, year	Purpose	Design/Methods	Findings	Strengths/ Weaknesses
Income & Morbidity				
6, Davy, 2015	Targeted nonrandom sample of 930 residents of 3 counties in medically underserved rural areas were recruited from government-sponsored housing to measure sociodemographic, food security and assistance water intake, sugar-sweetened beverage intake, weight status, and chronic health conditions	Cross-sectional, random-digit phone survey with questions from the Behavioral Risk Factor Surveillance System & beverage intake questionnaire	Non-white participants drank more water and a higher percentage met recommendations for water intake compared to white participants In this sample consumption of sugar sweetened beverages was 60% higher than national samples	Strengths timely public health issue, sample size, respondent rate, significant proportion of F.I. participants Weaknesses self-reported data, cross sectional nature, mean age of participant
6, Hanson & Olsen, 2012	Inquire to 396 participants with 1 child younger than 13 years old and income below 200% of poverty level with the 18-item USHFSSM to inquire about chronic conditions, community knowledge about resources available, social support, financial resources, expenses, demographics	3 years longitudinal	More than half of all respondents were F.I. High levels of knowledge about community resources Support for parenting was moderately high Families lived just below the poverty level and more than half were employed, 2 income families	Strength longitudinal study Weaknesses sample size was small, purposive sampling techniques, 12-month recall

			Most received government assistance F.I. is a substantial problem for low-income, rural families with children	
4, Wang, 2015	Analyze cross-sectional baseline data with 6,709 subjects using the 18 item USHFSSM to compare demographics and chronic conditions from 2002-2008	cross-sectional baseline data on the observational cohort of Veteran's Aging Cohort Study using self-reported, administrative, and clinical data from 8 V.A. infectious disease and general medical clinics	24% reported F.I. Racial/ethnic minority groups had increased odds of being F.I. Those with clinical conditions had increased odds of being F.I.	Strengths large, multisite study, self-reported, administrative and clinical data were used Weaknesses cross-sectional, used only a single item from the Household Food Insecurity Access Scale, only looked at data of Veterans accessing medical care
Food Security & Health Outcomes				
6, Ding, 2015	Analyze cross-sectional data from the 18 item USHFSSM to compare demographics, mental health, alcohol intake and work schedules	Retrospective, cross-sectional study from the NHANES data	Link between sleep and F.I. Women with low food security slept less than men Men and women in F.I. household were more likely to report sleep complaints to a HCP	Strength Ability to show a link between food security and sleep patterns Weaknesses Self-reports, cross-sectional, sleep was based on one general question, environmental factors could not be controlled
1, Hanson & Connor, 2014	Used 26 Cross-sectional design studies that statistically tested relations between food insecurity and dietary quality Assess whether evidence	Cross-sectional design studies from PubMed, ProQuest, JSTOR, Google Scholar, Cornell University Library.	Dietary quality was lower for food-insecure adults than food secure adults	Strength Systematically review Weaknesses

	suggests that parent in food-insecure household protect children from experiencing poor dietary quality. Preferred reporting items for systematic reviews and meta-analyses		Food-insecure adults ate less fruit/vegetables/dairy Low-income families may be more likely to underreport dietary intake	limited evidence in dietary quality and food insecurity in males, reporting and publication bias may have contributed to an, overestimation of the association between food-insecurity and dietary quality
6, Lyles, 2014	Used NHANES data from 2007-2008 in those 50 years and older to compare BMD of femoral neck, Demographic, Self-reported health behaviors, Medication use, Nutritional intake of calcium and vitamin D	Retrospective, cross-sectional study from the NHANES data	osteoporosis more common among women low income and food insecurity were associated with a number of risk factors for osteoporosis significant association of both income level and food insecurity with osteoporosis	<u>Strength</u> findings consistent with other work examining bone density <u>Weaknesses</u> unable to assess longitudinal changes, not able to asses vitamin d level or urine calcium levels
Food Insecurity Screenings				
3, Hager, 2015	34,049 completed interviews regarding demographics, food insecurity, child health outcomes, child anthropometric measurement, caregiver health outcomes	Trained interviewers surveyed caregivers who accompanied children 36 months or younger in acute primary care clinics and hospital emergency departments in 7 sites nationally using the 18 item HFSS screen and new 2 item screen	2-item screen for F.I. has high sensitivity (97%) 2-item screen for F.I. has good specificity (83%) Households identified as F.I. were at increased risk for negative child and caregiver health outcomes For a more comprehensive assessment of F.I., the 18-item HFSS should be used	<u>Strengths</u> tool has high sensitivity and good specificity for a quick assessment <u>Weaknesses</u> the approach to develop the screening tool was systematic, but not as precise as methods used in traditional item-response theory, data was collected from large, multisite, clinics of exclusively urban, low-income families of very young children, validity has not been tested in varying socioeconomic settings, these

				questions were used in a larger questionnaire, information was self-reported
2, Makelarski, 2017	Use the 6-item Household Food Screen (control) to compare the accuracy of the 2-item Hunger Vital Sign (HVS) and 2-item AAP tool using 12 month and 30-day recall study with adults from pediatric and adult emergency departments over 4 months	Prospected diagnostic accuracy study of 6-item Household Food Screen, 2-item Hunger Vital Sign, 2-item AAP tool	AAP tool sensitivity was 76% (12 month) & 72% (30 day); CI=65% & 85% (12 month); CI= 57% & 84% (30 day) HVS sensitivity was 94% (12 month) & 92% (30 day); CI=86%, 98%, P=0.002 (12 month); CI=79%, 98%, P=0,02 (30 day)	Strength Controlled for bias by randomizing surveys to administer the same items ordered different ways Weakness Convenience sample
Food Insecurity & Community Outcomes				
6, Canales, 2015	Studied low-income Hmong residents (ethnic minority) with recorded focus groups	Weekly regular meetings for two years of planning Pilot focus groups from specific agencies, school districts, rural Digital recordings and transcription	4 themes- falling through the cracks, struggling physically and emotionally with hunger, juggling to meet life's basic needs, desiring healthy foods without the means	Strength recruitment and stigma lessons learned Weakness Recruitment was a challenge due to stigma within the ethnic group
5, Jablonski, 2016	Studied 684 residents from 3 focus groups from Pueblo County, CO regarding community factors that contribute to or alleviate F.I., individual factors that contribute to or alleviate F.I. Wanted to know if these factors are consistent throughout a sub-county population	Cluster approach to examine the responses to a community-driven process exploring F.I. in one region of Colorado	Community factors: food retail access, transportation, food assistance, locally grown food access Individual factors: cost, time, education 5 clusters were identified: 1) food engaged & secure, 2) away from home price conscious fruit & vegetable eaters, 3) food secure with inconvenient access	Strength findings aligned with data from USDA Food APS survey Weakness low generalizability

			to fruits & vegetables, 4) compromised consumers, 5) single & food insecure	
Food Insecurity Reduction Strategies- Technology				
2, Lohse, 2015	Used the USDA Food Security Screener tool to measure food security based on Likert scales to measure food resource management skills of 24 females between age 18-45, English literate, email, and internet access with not history of chronic disease.	10 module programs for college-aged population regarding healthy behaviors and increased fruit/vegetable intake, adapted into a 6-module program for low-income women Based on eSatter competent eating and best practice for nutritional education Self-directed	39% of intervention group was food insecure 60% of control group was food insecure 39% of total group had good food resource management skills at start Intervention group was positively affected in food resource management skills Transformation of the 10-module, college-aged program could successfully be adapted for low-income women	<u>Strengths</u> Qualitative and quantitative evaluation methods, formative process, outcome and impact <u>Weaknesses</u> small sample size, self-selection decreased generalizability
6, Phan, 2018	284 parental surveys, Mostly women 18-34 y/o	Parental surveys over 2 months in urban, academic, pediatric resident continuity clinic	¾ reported having shopped online >50% had ordered food online 63% would be interested in consistently ordering food online Concerns about lack of money, lack of reliable internet, cybersecurity, desire to shop in person	<u>Strengths</u> Initial data suggests that a large number of families are either shopping for food online currently or are interested in doing so, references health-technology collaborations to address F.I. <u>Weakness</u> very small study with a specific population
Food Insecurity Reduction Strategies- Food Prescriptions & Food Banks				

4, Bryce, 2017	Demographics, utilizations of the market, pre- and post-program HbA1c, weight and B.P. of non-pregnant adults with uncontrolled diabetes with an HbA1c of >6.5	referral from physicians for chronic conditions	statistically significant decrease in HbA1c concentration means Not a significant change in average weight or B.P.	Strength cohort reflects a typical population of an urban area in the U.S. by ethnicity and insurance status Weakness low enrollment
6, Cavanagh, 2017	Compared 54 control and 54 eligible of low-income in urban neighborhood of upstate New York for coupon redemption and BMI	Retrospective, case-control, pre/post design using medical records	Greater improvement in BMI of Veggie Rx participants	Strength used validated measures Weaknesses secondary data analysis, retrospective design
2, Seligman, 2018	Partnered with Feeding America food banks which are embedded in communities of people in need. Participants were recruited via flyers, word of mouth, in-person announcements. 568 adults with a HgA1C > or equal to 7.5% in on-site testing in 3 Feeding America food banks (TX, MI, CA)	Food banks applied to through an internal competitive application process	Statistically significant improvements for intervention group in outcome related to food stability, security and fruit/vegetable intake No nonfood outcome differed between the groups HbA1c was not significantly different between the groups 40/203 in intervention group were "fully engaged" and their HbA1c was significantly lower	Strengths high follow-up, RCT within a community organization Weaknesses potential group contamination, increased HgbA1C could have been related to food banks changing their practices outside the study

Appendix A: Request to Conduct Research

Family Health Centers, Inc. Request to Conduct Research (rev. 04.04.12)

Name of Principal Investigator: Frances Hardin-Fanning

Name of Student (if not principle investigator): Andrea Gibson

E-mail Address: andrea.gibson@louisville.edu

Phone Number(s): 812-595-3011

Mailing Address: 5127 S. Pleasant Ridge Rd. Lexington, IN

School: University of Louisville, School of Nursing

Faculty Advisor or Instructor: Frances Hardin-Fanning, Cheryl Witt

Beginning Date: January 2020 Completion Date: April 2020

Are you and FHC employee? ☐ Yes ☐ No If so, what department? _____

Where will the research be conducted?: Family Health Center, Fairdale

Name of Project: Implementation of a Triage Food Inecurity Scale in Primary Care

Brief Description of Proposed Research (attach additional information if needed): Expand the current 2-item food insecurity screening to 6-items. At completion of the 6-item screen, the patient can be categorized as high food security, low food security or very low food security. Food items and resources could then be tailored to that patient for maximal food security needs.

Does your school require you to submit the project to an Institutional Review Board? Yes

Are you requesting Family Health Centers to provide you access to Protected Health Information? No

Will you be asking your subjects to sign consent forms? No

If this study does not require an IRB, I understand that any use of FHC data or study results outside of the class in which the student is enrolled requires the written permission of FHC.

Signature: Andrea L Gibson Date: 9/17/19

Other information may be requested based upon the responses presented on this form. Please return to Bart Irwin, PhD, Family Health Centers, Inc., 2215 Portland Avenue, Louisville, Kentucky 40212 Phone: 502.772.8558

Approval:

William B. Wagner, Chief Executive Officer

Date: 1/10/2020

James Jackson, M.D., Chief Medical Officer

Date: 1-10-2020

Appendix B: IRB Review

UNIVERSITY OF LOUISVILLE

Human Subjects Protection Program Office
MedCenter One – Suite 200
501 E. Broadway
Louisville, KY 40202-1798

DATE:	December 17, 2019
TO:	Frances Hardin
FROM:	The University of Louisville Institutional Review Board
IRB NUMBER:	19.1256
STUDY TITLE:	Expansion of a Food Insecurity Scale in Primary Care
REFERENCE #:	698442
DATE OF REVIEW:	12/16/2019
IRB STAFF CONTACT:	Sherry Block 852-2163 slbloc04@louisville.edu

The IRB Chair/Vice-Chair has reviewed your submission and the project described does not meet the "Common Rule" definition of human subjects' research. Therefore, this project does not require IRB review.

This submission has been determined to be quality improvement, and not human subjects research, based on the goal stated in the protocol.

Institutional policies and guidelines on participant privacy must be followed. If you are using protected health information, the HIPAA Privacy rules still apply.

Any changes to this project or the focus of the investigation must be submitted to the IRB to ensure that the IRB determination above still applies.

If you have any questions, please contact: Sherry Block 852-2163 slbloc04@louisville.edu

We value your feedback. Please let us know how you think we are doing:
https://www.surveymonkey.com/r/CCLHXRP

Paula Radmacher, Ph.D., Vice Chair
Biomedical Institutional Review Board
PR/slb