WHAT IS IN MY PATIENT'S PANTRY? ADDRESSING FOOD INSECURITY IN PRIMARY CARE: A QUALITY IMPROVEMENT PROJECT

by

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ABSTRACT

RACHEL KOONTZ. What is in my Patient's Pantry? Addressing Food Insecurity in Primary Care: A Quality Improvement Project. (Under the direction of DR. KATIE SHUE-MCGUFFIN)

Food insecurity (FI) has negative health effects throughout the lifespan, yet there is a disconnect between national recognition of FI as a health issue and FI screening in the clinical setting. The purpose of this project was to determine if an educational intervention increased knowledge of FI's role on health, the screening and referral process, and using ICD-10 coding to document FI. A pretest-posttest design was used, sampling clinicians across five clinical sites. Participants received virtual education and completed a pre-, post-, and 3-month follow-up survey to measure knowledge, attitudes, and willingness to address FI issues. A retrospective ICD-10 coding report for FI was obtained to measure frequency of use per clinic site. Thirty-one clinicians completed the pre- and post-survey, and twelve clinicians completed all three time points. Participants' knowledge of FI and knowledge of referral resources was significantly improved from the pre- to post-survey ($p < .0001$, $p < .0000$ respectively). Clinicians showed a significant change in their intent to ask patients about FI ($p < .0000$) and to refer patients to community food resources ($p < .0000$); this remained at the 3-month follow-up ($p < .008$, $p < .001$). There was not a significant change in the use of the ICD-10 code for FI throughout the measurement period. The results of this project support findings in the literature that a point-in-time educational training on FI could improvement clinicians' knowledge, as well as their willingness to screen patients for FI and connect them to food resources.

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Lastly, to those clinicians who believe in this work, who have paved the way to make conversations about integrating social care into practice the norm, your drive and inspiration continues to motivate us to see a world that works to alleviate social disparities for our patients and communities.

DEDICATION

To Andrew, my husband, whose support and love fuel me to accomplish my goals and overcome any barrier.

To my parents, who have supported me through decades of educational pursuits and instilled in me the passion for lifelong learning.

Lastly, to my son, I hope to give you a love of learning and a dream to leave the world a better place.

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LIST OF ABBREVIATIONS

FI	Food Insecurity
USDA	United States Department of Agriculture
ICD-10	International Classification of Diseases, Tenth Revision
DNP	Doctor of Nursing Practice
IRB	Institutional Review Board
UIC	Unique Identifier Code
EMR	Electronic Medical Record

CHAPTER 1: INTRODUCTION

In the United States (U.S.), one in nine Americans are food insecure (Feeding America, 2019). Food insecurity (FI) is the lack of access to enough food to fully meet basic nutritional needs (Coleman-Jensen et al., 2019). The U.S. Department of Agriculture (USDA) estimates household FI from the national food security survey which measures households' limited or uncertain availability of access to nutritionally adequate foods (USDA, 2019). In 2018, the USDA estimated that 11.1% of households (37.2 million people) in the U.S. identified as food insecure (Coleman-Jensen et al., 2019). Rates of FI are higher in those households with incomes near or below the federal poverty line; headed by a single parent, Black- or Hispanic people, children, and individuals living alone (Coleman-Jensen et al., 2019). In North Carolina (NC), 13.9% of households (1.45 million people) are food insecure, placing NC in the nation's top ten highest prevalence of food insecure households (Coleman-Jensen et al., 2019; Feeding America, 2019).

The negative health effects of FI are well documented across the lifespan. Children who live in food insecure households experience increased risk of poor mental health outcomes (depression, suicidal ideation), birth defects, asthma, and anemia (Gundersen & Zillak, 2015). Adults who are food insecure have increased risk of chronic diseases (hypertension, diabetes, stroke, pulmonary disease) and behavioral health distress (depression, poor sleep) (Burkhardt et al., 2012; Gundersen & Zillak, 2015; Seligman et al., 2009; Smith, et al., 2017). In senior adults, FI is not only associated with increased rates of chronic disease and psychological stressors, but also with functional

status including limitations in activities of daily living (Afulani et al., 2015; Gundersen & Zillak, 2015). The deleterious effects of being food insecure have direct impacts on individual and population health.

In response to the prevalence of FI and the associated negative health consequences, many professional organizations have issued policy statements recommending screening for and addressing FI in healthcare settings (De Marchis, Torres et al., 2019; Smith et al., 2017). The American Academy of Pediatrics and the American Academy of Family Physicians recommend clinicians screen for FI and advocate to mitigate FI within communities ("Promoting Food Security for All Children," 2015; O'Gurek & Henke, 2018). Furthermore, using FI as the example, the National Quality Forum (2017) partnered with Centers for Medicare and Medicaid Services in identifying a framework to support collection of social determinants of health data. Finally, to educate providers on addressing the social needs of patients, including FI, the National Academies of Science, Engineering, and Medicine (2019) released a report titled "Integrating Social Care into the Delivery of Health Care: Moving Upstream to Improve the Nation's Health." These policy statements and key reports emphasize the growing focus on FI and strategic priorities to understand and ameliorate FI in the United States.

The COVID-19 pandemic has increased FI throughout the U.S. FI is estimated to have doubled overall and tripled in households with children during the COVID-19 pandemic (Nagata et al., 2020). By the end of April 2020, 3 in 5 households with children under age 12 and 38% of households with children under age 18 self-identified as food insecure (Frank et al., 2020; Wolfson & Leung, 2020). It is projected that an increase of 17 million Americans will become food insecure as a consequence of the pandemic, and

that those in vulnerable and marginalized populations will be disproportionately affected (Gunderson et al., 2020). Since March 2020, those who are food insecure have relied heavily on the existing social safety net, such as charitable organizations and food banks. In 2020, 30% of those accessing a food bank reported being first-time users of such services (Nagata et al., 2020). The COVID-19 pandemic has highlighted the food access crisis and revealed the impact of existing social disparities and negative health consequences.

1.1 Problem Statement

There is a disconnect between national recognition of FI as a health issue that must be addressed by clinicians and the actual incorporation of FI discussions in the clinical setting. Specifically, there is a lack of FI screening in primary care. Clinicians agree with the importance of screening patients for FI; however, very few clinicians are actually implementing this screening with their patient populations (Barnidge et al., 2017; Hoisington et al., 2012; Smith et al., 2017). Multiple barriers limit FI discussions in primary care, including limited FI knowledge, screening ability, and awareness of community resources (Barnidge et al., 2017; Hoisington et al., 2012; Palakshappa, Vasan et al., 2017).

1.2 Purpose of Project

The purpose of this DNP project was to create and test the impact of an educational intervention aimed to increase understanding of FI's role on health, identifying patients at risk using a standardized screening tool, utilizing referral networks and using ICD-10 coding for those who identify as food insecure. FI is prevalent in communities, the risks of poor health outcomes are well known, and healthcare

organizations are recognizing the need for standard intervention. This DNP project explored the education of FI screening in primary care, specifically academic family and internal medicine clinics that are part of a large tertiary care center in the Southeastern United States.

1.3 Significance of the Project

The prevalence and dynamic nature of FI necessitates the health care providers' awareness and understanding. The interplay of FI and chronic disease is cyclical; FI increases the risk of chronic disease and chronic disease increases the risk of FI (Patil, Craven, & Kolasa, 2018; Seligman & Berkowitz, 2019). The well-established negative health impacts of FI leads to increased health care utilization and absenteeism (Melo et al., 2019). FI has been linked to delaying care, utilization of different care sources, and delaying filling a prescription (Janio & Sorkin, 2020). Healthcare providers are uniquely positioned to further understand a patient's broader health risk by ascertaining their food security status.

People living with FI are also likely to have increased healthcare expenditures. Berkowitz et al. (2018) demonstrated that food-insecure households spend about 45% more ($6,100) annually on medical care than do food-secure households ($4,200) or a total of $77.5 billion in additional health care expenditure annually. The multifactorial effect of FI has impacts not only on individual's health and access to care, but also to overall healthcare costs. Thus, empowering healthcare providers to gain knowledge and confidence to address FI in primary care is a critical component of preventative care and chronic disease management.

1.4 Clinical Question

The primary clinical question for this DNP project was, “among primary care providers does education regarding FI increase providers’ knowledge and confidence in the recognition and intervention of patients with FI?” A secondary clinical question is, “among primary care providers does education regarding FI increase providers’ utilization of ICD-10 coding for FI?”

1.5 Project Objectives and Outcomes

This DNP project assessed primary care providers’ baseline knowledge of FI and FI’s effect on health. The project also explored clinicians’ willingness to incorporate FI screening into practice. The creation of an educational intervention served to increase providers’ knowledge, confidence, and ability to address FI in a primary care setting. The project evaluated the effectiveness of an educational intervention by measuring change in knowledge and confidence in clinicians by pre- and post-intervention surveys. Furthermore, it developed a framework for screening and referring patients with FI needs. Lastly, this project equipped primary care providers to use ICD-10 coding to document FI for their patient population.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A systematic search of the following databases was conducted: PubMed, Cochrane, Web of Science, and CINAHL. Studies were located using the following keywords and search terms: *food insecurity, social determinants of health, food access, social risk screening, training, social coding, and primary care*. The articles were not restricted by publication date and spanned from 2012 to 2020. The search led to 105 articles, 17 of which were selected for content. Studies were excluded if they did not specifically mention or address FI, if they focused more on interventions and intervention outcomes than screening and training activities, or if they did not take place in a primary care setting. Emerging themes included barriers to FI screening, FI training, provider perceptions, patient acceptability and ICD-10 utilization.

2.1 Emerging Themes

a) Barriers to FI Screening. Studies have shown that high rates of clinicians agree that screening the primary care population for FI is important (Barnidge et al., 2017; Smith et al., 2017). However, very few clinicians are currently screening patients. Barnidge et al. (2017) surveyed 67 pediatric physicians in a variety of pediatric specialties and found that 88% of physicians believed that FI was a problem for their patients. Eighty percent of those providers said they were willing to screen patients for FI, though only 15% reported currently screening for FI (Barnidge et al., 2017). In a study of family medicine clinicians (n=85), 95% of providers agreed that it is important to assess for FI, and 89.4% of clinicians felt that FI screening was relevant to their practice, though only 17.7% reported screening (Smith et al., 2017).

The incongruence between recognizing the importance of FI screening and implementing FI screening has been described as being related to clinicians' concerns with how to address a positive screen for FI, lack of knowledge about community resources, concerns about causing embarrassment for patients, and ability to provide adequate resources (Barnidge et al., 2017; Palakshappa, Vasan et al., 2017). Primary care providers consistently cite lack of time as a barrier to incorporating FI screening into practice (Morgenlander et al., 2019; Pooler, Hoffman, & Karva, 2018; Schickedanz, et al., 2019). Morgenlander et al. (2019) conducted a cross-sectional, observational study surveying pediatric residency continuity clinic directors where systematic screening of social determinants of health, including FI, were conducted. In addition, 68% of respondents (n = 65) cited lack of time as the most common barrier to screening (Morgenlander et al., 2019). Another common barrier explored in the literature is the lack of training on how to screen and intervene with patients who are food insecure (Morgenlander et al., 2019; Schickedanz et al., 2019).

b) FI Training. Medical and nursing education does not sufficiently prepare clinicians to discuss and address food access issues with patients (Barnidge et al., 2017; Burkhardt et al., 2012; Smith et al., 2017). Clinicians surveyed who are already screening for FI identified provider training as critical to provider buy-in and increased effectiveness of FI screening (Barnidge et al., 2017; Burkhardt et al., 2012; Palakshappa, Vasan et al., 2017). After implementing an FI educational intervention, Smith et al. (2017), found that family medicine providers' knowledge and willingness to screen increased significantly from baseline ($p < 0.0001$) and knowledge remained improved one year after the intervention ($p < 0.0001$). Burkhardt et al. (2012) increased the rate of

second year pediatric residents' identification of household FI from 1.9% to 11.9% by implementing multiple case-based sessions. Along with educational sessions, individual observation of screening for social history and feedback was provided, resulting in a statistically significant increase of providers screening for FI from 37.5% to 91.9% ($p < 0.01$) (Burkhardt et al., 2012).

There is a paucity of literature evaluating the effectiveness of the types of educational interventions regarding social determinants of health. In those studies that developed training on FI, the objectives included: definition of FI, prevalence of FI, impact of FI on health, screening methods for FI, electronic medical record (EMR) documentation, and how to make referrals (Adams et al., 2017; Burkhardt et al., 2012; Smith et al., 2017). Considering the empathetic approach and incorporating training on asking sensitive questions was cited as essential components of the educational sessions (De Marchis, Torres et al., 2019; Burkhardt et al., 2012). The modality of education varied from traditional lecture-based format to interactive multidisciplinary case-based sessions (Burkhardt et al., 2012; Smith et al., 2017). No study included in this review compared the type of FI educational modality on the attainment of knowledge.

c) Clinician Perceptions. Clinicians' perceptions about the importance of FI screening directly impact the likelihood that FI screening will be successfully implemented. Several studies reviewed clinicians' perspectives on addressing and screening of FI by survey or qualitative study. Providers reported that screening for FI was a caring act and that the patient relationships improved (Adams et al., 2017; DeMarchis, Hessler et al., 2019; Palakshappa, Vasan et al., 2017). Clinicians (n = 258) across a large integrated medical center in southern California were surveyed on social

needs screening including asking patients about FI. A large majority of participants agreed that social risk screening could lead to improved trust (93%), improved communication (96%), and improved overall care (95%) of patients (Schickedanz et al., 2019). Less than half of the clinicians screened (41%) felt confident in their ability to help meet their patients' social needs (Schickedanz et al., 2019).

Barriers identified by clinicians were manageable when surveying groups of providers who implemented FI screening. Clinicians who participated in focus groups reported that time was not a barrier to screening and found that incorporating FI screening was minimally disruptive to workflow (Palakshappa, Vasan et al., 2017). Leveraging workflows to incorporate screening questions and referral resources not only minimized time constraints, but also allowed for more time for patient conversation versus searching for referral resources (Adams et al., 2017; Buitron de la Vega et al., 2019).

In physician surveys across health care disciplines, clinicians were worried that patients and patient caregivers would feel uncomfortable, judged, or stigmatized when asked about FI (Adams et al., 2017; Barnidge et al., 2017, DeMarchis, Torres et al., 2017). In one qualitative focus group with pediatric clinicians, providers reported fear that families would react negatively to being asked sensitive questions (Palakshappa, Vasan et al., 2017). Providing scripted statements, educating patients on FI's impact on health, and reinforcing the universal nature of screening reportedly helped with this provider discomfort (Adams et al., 2017; Barnidge et al., 2020; Byhoff et al., 2019; De Marchis, Torres et al., 2019).

d) Patient Acceptability. The patient perspective about the importance of FI screening is an important consideration that also impacts the likelihood that FI screening will be meaningfully implemented. In several cross-sectional patient surveys, patients agreed that social risks impact health and that healthcare systems should ask about social risks such as FI (De Marchis, Hessler et al., 2019; Rogers, et al., 2020). Barnidge et al. (2017) screened caregivers of pediatric patients in primary care waiting rooms to assess the prevalence of FI among patient population and the perceived barriers to food access. Nearly two-thirds of 212 families surveyed said they would be comfortable talking with their provider about food needs; however, the odds of being uncomfortable talking with a provider about food needs was 2.72 times greater among families with FI compared with families that identified as food secure (Barnidge et al., 2017). In patient and caregiver surveys across primary care practices in nine states, themes emerged regarding patients' reactions to social risk screening (Byhoff et al., 2019). Survey patients believed that screening for social risks is important. Many participants stated that they felt "cared for" and "listened to" when screened for social risks and that screening strengthened the patient-provider relationship (Byhoff et al., 2019).

In screening for FI, caregivers expressed concerns about feeling shame, helplessness, bias, and privacy concerns (Byhoff et al., 2019; Palakshappa, Doupnik, et al., 2017). In a qualitative focus group of 23 parents of pediatric patients, participants reported that discussing FI with the clinician helped alleviate feelings of shame and frustration (Palakshappa, Doupnik, et al., 2017). Patients reported appropriateness of FI screening when discussion was associated with provision of resources (Byhoff et al., 2019; Orr et al., 2019). Patients reported a need for privacy with social risk screening,

and emphasized the importance of providers using an empathic approach (Byhoff et al., 2019).

e) ICD-10 Code Use. There is a growing body of literature regarding the use of social risk coding to document patients who identify as food insecure. The barriers to using ICD-10 diagnostic codes align with barriers to FI screening: limited time, and limited training on and awareness of community resources (Buitron de la Vega et al., 2019). In a cross-sectional survey of adults (n=969) in primary care and the emergency department, 65% felt comfortable with including social risk in the electronic medical record (De Marchis, Hessler et al., 2019).

Adams et al. (2017) noted lack of documentation of ICD-10 coding as an area of improvement in FI screening implementation. Providers would document FI in the clinical notes, but not in the patient's problem list. Adams et al. (2017) identified two reasons for providers' discordance in documentation of FI: first, providers were reticent to list FI on a patient's problem list because that would generate FI information in a patient's instructions document, and second, providers could not recall the ICD-10 code provided during FI training.

2.2 Literature Review Summary

The literature highlights a willingness of primary care providers to address FI among their patient population. To help overcome the barriers that prevent clinicians from screening, provider training that reviews how to address a positive screen and where to refer patients is essential. In clinical settings where FI screening was incorporated, providers found that time was not the barrier anticipated; this helped form better communication and trust with patients. Patients' acceptability of screening practice was

overall positive, describing social risk screening as strengthening the patient-provider relationship. Lastly, using the ICD-10 diagnostic codes to document social risks is accepted by clinicians and patients and requires training to integrate consistently into clinical workflows.

2.3 Theoretical Framework

Kurt Lewin is accepted as the founder of organizational psychology (Sare & Ogilvie, 2010). Lewin's theory of change, conceived in the 1940s, is multifaceted, incorporating field theory, group dynamics, and a three-step model of change (McGarry, Cashin, & Fowler, 2012). Lewin's three stages of change are "unfreezing, moving, and refreezing" (Burnes, 2004).

The first stage, unfreezing, asserts that the current environment or status quo must be destabilized prior to any change (McGarry et al., 2012). Lewin reasoned that human behavior is in a state of quasi-stationary equilibrium (Burnes, 2004; Sare & Ogilvie, 2010). To disrupt this equilibrium, Lewin developed the idea of a force field analysis. A force field analysis helps identify positive and negative forces within an environment (McGarry et al., 2012; Sare & Ogilvie, 2010). The unfreezing stage does not create change, it creates an atmosphere to cultivate and prepare for new behaviors.

The second stage, moving or transitioning, is when the change occurs (Shirey, 2013). With a clear plan of action, the change agent works to promote driving forces and ameliorate restraining forces to motivate new behaviors. The leader catapults on the motivation of the group to propel change towards the end goal.

The third stage, refreezing, seeks to stabilize a new quasi-stationary equilibrium (El-Shafy et al., 2019). This is the stage that aims for sustainability, embedding the

change into the existing system (Shirey, 2013). Refreezing aims to institutionalize change often by changing policies, procedures, cultures, and norms (McGarry et al., 2012).

a) Theoretical Application. Lewin's Stages of Change framework allows for a planned approach to implement change. In preparation for change, it is necessary for primary care clinicians and staff to experience the unfreezing process. This step requires the DNP prepared nurse to recognize the problem, identify the need for change, and mobilize others to see a need for change (Shirey, 2013). Creating support with the administration, medical director, nursing and patient services was key to understanding and addressing any resistance. Meeting with clinic leadership allowed for understanding current workflows and clinic culture; it also provided the opportunity to discover any potential barriers. A survey was created for clinicians to explore current attitudes and knowledge on FI as a baseline for change.

The next step, moving, is when change is initiated (El-Shafy et al., 2019). The moving step included the educational intervention to primary care providers at each academic primary care practice. The educational training incorporated feedback from the unfreezing stage to address providers' concerns for this new screening process. It was imperative to connect the goal and purpose of incorporating FI screening into providers' daily practice with seamless integration. The education encompassed the reasons to screen, how to screen, and which community organizations are available for referrals.

In the third step, refreezing, the change practice becomes the new norm and there is emphasis on sustainability (Mitchell, 2013). During this stage, it is important to reinforce improved knowledge and confidence on FI screening through continued education and evaluation. Identifying champions at each practice site will be important to

reinforce change within each practice. Allowing clinic leadership to drive the integration of the screening process into their specific workflow embeds the education within the culture of the clinical practice.

CHAPTER 3: PROJECT DESIGN

3.1 Project Population

The population included primary care providers at participating family and internal medicine academic clinics that are part of a large regional healthcare system. This was a purposive sample of clinicians including physicians, residents, nurse practitioners, and physician assistants.

3.2 Setting

The setting for this DNP scholarly project was a network of academic family and internal medicine clinics in Mecklenburg and Cabarrus Counties in North Carolina. Feeding America (2019) estimates the overall FI rate in Mecklenburg County to be 12% and in Cabarrus County 11.1%. The projected overall FI rate in these counties was expected to increase due to the coronavirus pandemic, with estimated 2020 FI rates in these counties to increase to 15.7% and 14.7% respectively (Feeding America, 2020). Because of limitations due to coronavirus pandemic, the education training was virtually recorded and disseminated at the participating clinics.

3.3 Measurement Tool

A pre- and post-test design was selected for this DNP project. The pre- and post-intervention survey was adapted from the survey used in Smith et al. (2017), “Addressing Food Insecurity in Family Medicine and Medical Education.” As asserted by Smith et al. (2017), when reviewing the literature there was not a well-validated survey instrument to measure knowledge, skills, attitudes, and clinical practice of health care providers related to FI. Consequently, Smith et al. (2017) designed a survey instrument in consultation with food security experts and community-based food security organizations. The survey

was piloted and Cronbach's alpha estimate for internal reliability for the pre-survey and post-survey was 0.81 and 0.83 respectively. This survey was utilized in this DNP project; permission to use this survey was provided from researcher Dr. Sunny Smith (S. Smith, personal communication, April 1, 2020). One fact based multiple-choice test with the content of the FI educational intervention was included as a manipulation check of the educational intervention. If participants answered this question correctly there was an increased likelihood that participants processed the educational intervention (Melnyk & Fineout-Overholt, 2019).

3.4 Intervention

The intervention was the implementation of FI education in primary care. The education was delivered by PowerPoint presentation using a traditional lecture-based format virtually. The DNP student created the presentation with feedback from a multidisciplinary committee with a mission to address and implement programs that focus on social determinants of health in a large regional healthcare system. The 26-minute presentation provided the following: awareness (the scope of the problem, definition of FI, prevalence data, health impacts), screening (workflow suggestions, the screening tool, how to document in the EMR, ICD-10 coding), and intervention (introduction into the utilization of the healthcare organization's community resource hub).

Prior to the start of the education training, a pre-survey link was emailed to the clinic leadership to disseminate to the clinic providers and shared electronically prior to the presentation. The pre-survey was created in the Microsoft Forms online platform. The pre-survey included demographic data (clinic site, discipline, years of experience),

knowledge data measured by 5-point Likert scale, and pre-education knowledge test (one multiple choice question based on presentation material). The FI survey was adapted from Smith et al. (2017) Food Insecurity Survey for Health Professionals. This survey measured knowledge, attitudes, and confidence to address FI in primary care practice.

Providers who completed the virtual training module were asked to complete the pre- and post-survey immediately before and after the session. Participants were asked to use a Unique Identifier Code (UIC; first letter of mother's or female guardian's name, middle initial, number of siblings). Three months after the initial education, a follow-up survey was sent to participants to assess for continued impact.

3.5 Inclusion and Exclusion Criteria

Purposive sampling was utilized for this project. The sampling strategy was to recruit primary care providers to participate in an educational intervention at select academic clinics across large regional healthcare system. Inclusion criteria included any primary care provider that is employed at the participating primary care clinic at the time of the educational intervention. Primary care providers include medical doctors, medical residents, nurse practitioners, and physician assistants. Exclusion criterion includes any employee that is a student or in training (e.g. medical student, nurse practitioner student, or physician assistant student).

3.6 Method of Data Collection

Data was collected by survey administration. The survey, including the measurement tool, was created using Microsoft Forms online software. Institutional Review Board (IRB) approval from both University of North Carolina Charlotte and Atrium Health was obtained prior to implementation. Participants were informed of the

quality improvement project purpose, risks and benefits, and confidentiality plan. The data collection survey was devoid of any personal identifying information and was tracked at the individual level by UIC. After the educational intervention, the post-survey was made available to participants through Microsoft Forms by email or provision of web address. Only those who participated in the educational intervention completed the post-survey. A follow-up survey was emailed at 3 months post intervention.

Microsoft Forms software securely stored the responses to the survey. The UIC helped the DNP student track for any loss to follow-up at post-survey and 3 months follow-up survey. Microsoft Forms survey data was exported to Microsoft Excel and then to StataCorp v.16 statistical software (2019). Prior to the analysis step, data was reviewed, verified, and cleaned.

One component of the educational screening educated clinicians on the use of an ICD-10 code to add to the problem list if screened positive: F54.9 “lack of adequate food and safe drinking water,” which is currently mapped with FI codes (DeSilvey et al., 2018). After implementation of the educational intervention, a retrospective EMR report was obtained to assess for the use ICD-10 code present eight months before intervention and four months after intervention. This report was exported to Stata for analysis.

3.7 Timeline for Data Collection

The FI intervention was delivered at clinic-level meetings scheduled at the clinics’ convenience until November 2020. Time zero was the day of the educational intervention where the pre-and post-survey were administrated. Three months after the clinic level intervention a follow-up survey was emailed to providers to complete.

Retrospective report on use of the ICD-10 code was completed from February 2020 through January 2021.

3.8 Confidentiality of Data

Participants in this DNP project were protected by the use of alphanumeric coding and the data obtained was non-identifiable. The results were aggregated data. The EMR report query provided frequency information, aggregated by clinic, and did not contain any patient information. The DNP student ensured confidentiality by using secure applications such as Microsoft Forms, Excel, and Stata and created password protection of data spreadsheets. The electronic surveys were password protected and stored behind healthcare system firewall. This DNP project plan was reviewed by the DNP Committee Chair and approved by IRB at Atrium Health and University of North Carolina Charlotte.

CHAPTER 4: RESULTS

4.1 Statistical Methods

Descriptive statistics were performed on all pre-, post-, and follow-up intervention variables. Categorical variables were reported as counts and percentages; continuous variables were reported as mean, median, and standard deviation. Survey data was collected in Likert-style format, where potential responses to questions 1-5 were Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. These responses were coded as 1, 2, 3, 4, 5 respectively. Potential responses to questions 6-9 were Never, Rarely, Sometimes, Often, and Always and were coded as 1, 2, 3, 4, 5 respectively. Continuous data were tested for normality. Three assessment time periods were analyzed: pre-intervention (n=31); post-intervention (n=31); and follow-up (n=12). Twelve participants completed only the pre-intervention survey and were not included in analysis.

a) Matched Time Points Given the ordinal nature of the Likert-style response options, Wilcoxon matched-pairs signed-ranks test was performed on each combination (pre x post, pre x follow-up, and post x follow-up), and exact probabilities were reported due to sample size < 200.

b) All Time Points Analysis To assess if a relationship was present during all the assessment time periods, the Skillings-Mack (SM) test was performed on the ordinal data (Chatfield & Mander, 2009). The SM test is a non-parametric procedure to test repeatedly measured, matched, ordinal data. Twelve records were able to be analyzed over the three time periods.

Repeated measures ANOVA was performed to assess the participants' response to the statement "Estimate the % of patients who have food insecurity" over the three time

periods. *F* and *p*-values were reported. Repeated measures logistic regression was performed for the binary outcome question "In NC, how many children are living in a food insecure household?" *Z* and *p*-values were reported.

Statistical significance was set at $p \leq .05$ and all analysis was performed using StataCorp v.16 statistical software (2019).

4.2 Results

a) Demographics of Participants. The pre-test survey included demographic questions to obtain the following information about participants: clinic location, health care professions, and years of clinical experience. Most participants were from the Myers Park (32.3%) or Cabarrus Family Medicine-Concord (32.3%) practice locations (Table 1). Nearly 84% of participants were resident MD or DO's. Years of practice as healthcare professional was categorized from 0-3 years to capture residency, 4-10 years, 11-20 years, and greater than 21 years. Nearly 84% of participants had 0-3 years of practice and 10% had 21+ years of practice.

Table 1. Demographics of Participants

Demographics	**n=31**	**%**
Clinic		
Myers Park	10	32.3
CFM Harrisburg	5	16.1
CFM Mt Pleasant	3	9.7
CFM Concord	10	32.3
CFM Kannapolis	3	9.7
Profession		
Attending MD/DO	4	12.9
Resident MD/DO	26	83.9
Nurse Practitioner	0	
Physician's Assistant	1	3.2
Years of Practice as Healthcare Professional		
0-3	26	83.9
4-10	1	3.2

11-20	1	3.2
21+	3	9.7

b) Matched Time Periods Between the pre-intervention and post-intervention time periods, statistically significant increases were seen in questions 1, 2, 5, 6, 7, 8, and 9 (Table 2). Questions 1 ($p = .0001$) and 2 ($p < .00$) both assessed knowledge of FI and referral resources. Question 5 ($p = .20$) assess relevancy of FI to patient population. Questions 7-9 ($p < .00$) assessed clinicians' practice attitudes to screen and refer patients with FI needs. Over a longer interval of time, significant increases were seen between the pre-intervention and follow-up time periods in questions 2, 7, 8, and 9 (Table 3). No change in feelings of importance or willingness were seen over pre-intervention to follow-up time periods. Between the post-intervention and follow-up time periods, no significant changes were seen in any survey item (Table 4).

Table 2. Pre- and Post-Intervention Survey Comparisons

Statement/Question			
	Pre- Mean, Median, SD N=31	Post- Mean, Median, SD N=31	p-value
1. I am knowledgeable about food insecurity and how it can adversely affect health.	3.6, 4 , 0.88	4.3, 4 , 0.53	.0001*
2. I am knowledgeable about referring patients to resources that address food insecurity (local food banks, food-stamp equivalent programs).	2.5 , 2 , 0.92	3.9 , 4 , 0.56	.0000*
3.It is important to assess patients for food insecurity.	4.5 , 4 , 0.57	4.6 , 5 , 0.50	.432
4. It is important to refer patients to food resources.	4.5 , 4 , 0.51	4.6 , 5 , 0.48	.227

5. Food insecurity is relevant to my patient population.	4.4 , 4 , 0.62	4.7 , 5 , 0.47	.020*
6. I am willing to ask my patients about food insecurity.	3.7 , 4 , 0.83	4.1 , 4 , 0.63	.036*
7. I have asked my patients about food insecurity → in postsurvey: plan to ask	2.5 , 3 , 0.96	3.9 , 4 , 0.70	.0000*
8. I have referred my patients to a local food bank → in postsurvey: plan to refer	2.1 , 2 , 0.96	3.9 , 4 , 0.79	.0000*
9. I have referred my patients to SNAP benefit program. → in postsurvey: plan to refer	1.4 , 1 , 0.61	3.6 , 4 , 0.84	.0000*
10. Estimate of the % of my patients who have food insecurity	26.1 , 20 , 19.3	27 , 25 , 16.1	.664

Table 3. Pre- and Follow-up Intervention Survey Comparisons

Statement/Question			
	Pre- Mean, Median, SD N=31	Follow-up Mean, Median, SD N=12	p-value
1. I am knowledgeable about food insecurity and how it can adversely affect health.	3.6, 4, 0.88	4, 4, 0.86	.375
2. I am knowledgeable about referring patients to resources that address food insecurity (local food banks, food-stamp equivalent programs).	2.5, 2, 0.92	3.8, 4, 0.62	.031*
3.It is important to assess patients for food insecurity.	4.5, 4, 0.57	4.5, 4.5, 0.52	1.0
4. It is important to refer patients to food resources.	4.5, 4, 0.51	4.5, 4.5, 0.52	1.0
5. Food insecurity is relevant to my patient population.	4.4, 4, 0.62	4.4, 4.5, 0.67	1.0
6. I am willing to ask my patients about food insecurity.	3.7, 4, 0.83	3.8, 4, 0.83	1.0
7. I have asked my patients about food insecurity → in postsurvey: plan to ask	2.5, 3, 0.96	3.8, 4, 0.72	.008*

8. I have referred my patients to a local food bank → in postsurvey: plan to refer	2.1, 2, 0.96	4, 4, 0.74	.001*
9. I have referred my patients to SNAP benefit program. → in postsurvey: plan to refer	1.4, 1, 0.61	3.75, 4, 0.75	.0005*
10. Estimate of the % of my patients who have food insecurity	26.1, 20, 19.3	25.8, 25, 18.7	.546

Table 4. Post- and Follow-up Intervention Survey Comparisons

Statement/Question			
	Post- Mean, Median, SD N=31	Follow-up Mean, Median, SD N=12	p-value
1. I am knowledgeable about food insecurity and how it can adversely affect health.	4.3, 4, 0.53	4, 4, 0.86	.109
2. I am knowledgeable about referring patients to resources that address food insecurity (local food backs, food-stamp equivalent programs).	3.9, 4, 0.56	3.8, 4, 0.62	.750
3.It is important to assess patients for food insecurity.	4.6, 5, 0.50	4.5, 4.5, 0.52	1.0
4. It is important to refer patients to food resources.	4.6, 5, 0.48	4.5, 4.5, 0.52	1.0
5. Food insecurity is relevant to my patient population.	4.7, 5, 0.47	4.4, 4.5, 0.67	.727
6. I am willing to ask my patients about food insecurity.	4.1, 4, 0.63	3.8, 4, 0.83	.375
7. I have asked my patients about food insecurity → in postsurvey: plan to ask	3.9, 4, 0.70	3.8, 4, 0.72	1.0
8. I have referred my patients to a local food bank → in postsurvey: plan to refer	3.9, 4, 0.79	4, 4, 0.74	1.0
9. I have referred my patients to SNAP benefit program. → in postsurvey: plan to refer	3.6, 4, 0.84	3.75, 4, 0.75	1.0
10. Estimate of the % of my patients who have food insecurity	27, 25, 16.1	25.8, 25, 18.7	.510

c) All Time Points Analysis. A repeated measures logistic regression was run (n=12) to assess if participants retained knowledge regarding how many children are living in a food insecure household in NC over the three time periods. Answering this question correctly was significant at the post-intervention time period, as compared to the pre-intervention time period ($Z = 2.19$, $p = .029$) but was not at the follow-up time period (Table 5, Figure 1).

A one-way repeated measures ANOVA was run (n=12) to determine if there were differences in participants' estimations of the percentage of their patients who had FI. There was not a significant difference over the three time periods ($F = 0.31$, $p = .734$). A matched Skillings-Mack test was performed for each Likert-style question (Questions 1-9, n=12) to assess if differences in participants' responses to each question changed over the three time periods. Statistically significant differences were seen in questions 1, 2, 7, 8, and 9 (Table 6).

Table 5. Repeated Measures Analyses

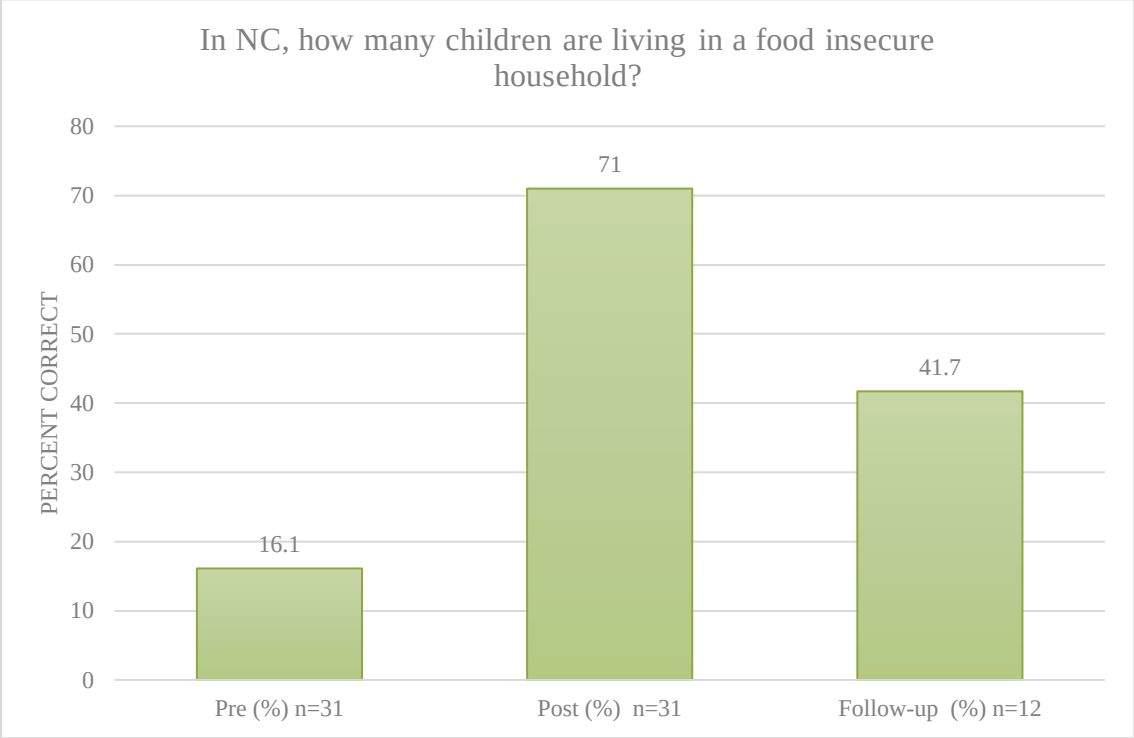
Statement/Question	Pre n (%) correctly answered	Post n (%) correctly answered	Follow-up n (%) correctly answered	p-value (Z)
In NC, how many children are living in a food insecure household? (Repeated measures logistic regression)	5/31 (16.1)	22/31 (71.0)	5/12 (41.7)	
Post				.029* (2.19)
Follow up				.061 (1.88)
	Pre Mean, median, SD	Post Mean,	Follow-up Mean, median, SD	p-value (F)

		median, SD		
Estimate the % of patients who have food insecurity (Repeated measures ANOVA)	26.1, 20, 19.3	27, 25, 16.1	25.8, 25, 18.7	.734 (0.31)

Table 6. All Time Points Analysis (n=12)

Statement/Question (Skillings-Mack test)				
	Pre- Mean, Median, SD	Post- Mean, Median, SD	Follow-up Mean, Median, SD	p-value (F)
1. I am knowledgeable about food insecurity and how it can adversely affect health.	3.6, 4, 0.88	4.3, 4, 0.53	4, 4, 0.86	.021*
2. I am knowledgeable about referring patients to resources that address food insecurity (local food backs, food-stamp equivalent programs).	2.5, 2, 0.92	3.9, 4, 0.56	3.8, 4, 0.62	.011*
3.It is important to assess patients for food insecurity.	4.5, 4, 0.57	4.6, 5, 0.50	4.5, 4.5, 0.52	.866
4. It is important to refer patients to food resources.	4.5, 4, 0.51	4.6, 5, 0.48	4.5, 4.5, 0.52	.685
5. Food insecurity is relevant to my patient population.	4.4, 4, 0.62	4.7, 5, 0.47	4.4, 4.5, 0.67	.358
6. I am willing to ask my patients about food insecurity.	3.7, 4, 0.83	4.1, 4, 0.63	3.8, 4, 0.83	.426
7. I have asked my patients about food insecurity → in postsurvey: plan to ask	2.5, 3, 0.96	3.9, 4, 0.70	3.8, 4, 0.72	.0000*
8. I have referred my patients to a local food bank → in postsurvey: plan to refer	2.1, 2, 0.96	3.9, 4, 0.79	4, 4, 0.74	.0000*
9. I have referred my patients to SNAP benefit program. → in postsurvey: plan to refer	1.4, 1, 0.61	3.6, 4, 0.84	3.75, 4, 0.75	.0000*

Figure 1. Repeated Measures Logistic Regression



d) ICD-10 Use. A report was generated from the electronic medical record obtaining a count of patients that had a visit assigned diagnosis code of ICD-10 Z59.4 "lack of adequate food and safe drinking water" from February 2020 to January 2021. Myers Park clinical site used the ICD-10 code more than the other clinical sites (Table 7, Figure 2). CFM Harrisburg, Mt. Pleasant, and Kannapolis clinical sites did not use this ICD-10 code throughout the report period. A two-sample t-test was used to compare the frequency of ICD-10 use from February 2020 to September 2020 pre-intervention and October 2020 to January 2020 post-intervention (Table 8, Figure 2). There was not a

significant difference (*p* = 0.33*)* between pre-intervention and post-intervention timeframe.

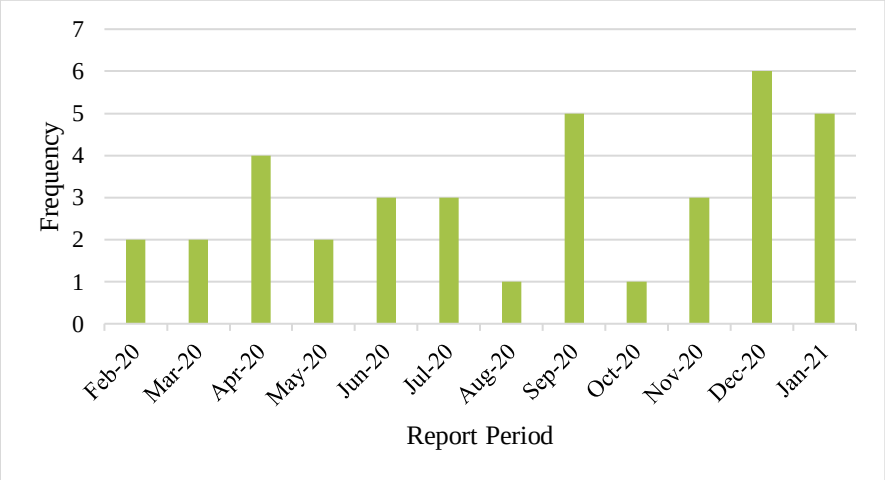
Table 7. Use of ICD-10 Codes per Clinic Site

Clinical Site	N of ICD-10 use from Feb 2020 to Jan 2021
Myers Park	37
CFM Concord	1
CFM Harrisburg	0
CFM Kannapolis	0
CFM Mt. Pleasant	0

Table 8. Use of ICD-10 Code Pre and Post Intervention

	Pre-Mean, SD N = 8 (months)	Post-Mean, SD N = 4 (months)	p-value
Count of patients that had a visit assigned ICD-10 for Z59.4	2.75, 0.43	3.75, 1.11	0.337

Figure 2. ICD-10 Use Pre- and Post-Intervention



CHAPTER 5: DISCUSSION

5.1 Impact of the FI Educational Intervention

The results of this project suggest that a FI educational intervention may lead to an increase in clinicians' knowledge about FI and referral resources, and readiness to ask about FI and refer patients to food resources. This supports the literature that demonstrates improvement in knowledge after a point-in time educational intervention (De Marchis, Torres et al., 2019; Smith et al., 2017). The results of this project also add to the literature in support of educational interventions as a way to improve health care providers' knowledge and attitudes about addressing FI in clinical setting (Burkhardt, 2012; De Marchis, Torres et al., 2019; Smith et al., 2017).

a) Clinicians' knowledge and confidence to address FI. Participants' knowledge of FI and its effect on health and knowledge of referral resources were significantly improved from the pre- to post-survey ($p < 0.001$, $p < 0.00$ respectively). Over a longer time period, from pre- to follow-up survey, knowledge of FI's health effects was no longer statistically significant. This contrasts from the study by Smith et al. (2017), in which participants' self-reported knowledge of FI remained significantly improved one year from pre-intervention test. This potentially reveals that more reiterative training maybe useful to maintain knowledge gained. Participants were asked one fact-based multiple-choice test question based on the content of the FI educational intervention. Participants answered this questioned correctly in the post-survey ($p = .029$), but not at the follow-up survey. Solitary educational interventions often can have low reliability, and some studies show that repetitive educational trainings may continue

to impact knowledge (Burkhardt et al., 2012). In matched analysis (n=12) the knowledge of FI and FI resources remained statistically significant across all three time points.

Participants surveyed did not have a statistically significant change related to attitudes of the importance of FI to their patient population. The mean for the pre- and post-survey was relatively high (4.5, 4.5 respectively), suggesting that participants recognized the importance of FI among patients as a baseline value. The relevancy of FI to participants patient population did change significantly from pre-to post-intervention survey ($p = 0.02$); however, over a longer time period (pre- to follow-up survey) the mean was no longer significant. The matched analysis of the participants who completed each time period (n=12), also did not change significantly across measured time periods. This supports existing literature where clinicians agree that addressing FI with patients is important and believe FI is a challenge for their patients (Barnidge et al, 2017; Smith et al., 2017).

Participating clinicians' willingness to screen patients for FI improved from pre- to post- survey ($p = 0.36$) but did not remain significantly different from pre- to follow-up survey. When looking at the matched analysis between three time-points (n=12), this change was also not significant. However, participants showed a significant change in their intent to ask patients about FI immediately after the educational intervention ($p < .0000$) and this remained at the follow-up time point ($p < 0.001$). This adds to the literature that there is a willingness to screen patients for FI and improve confidence to address FI with patients (Barnidge et al., 2017; De Marchis, Torres et al., 2019; Hoisington et al., 2012). A further implication is that an FI educational intervention can impact a shift from willingness to address FI to a plan to screen patients for FI. Across all

three time points, participants' plans to refer patients to both food banks and SNAP benefit program increased significantly ($p < .0000$). These findings support the literature that training may help overcome participant barriers to addressing FI with patients including lack of referral resources and discomfort with asking patients about FI (Morgenlander et al., 2019; Palakshappa, Vasan, et al., 2017; Pooler et al., 2018; Schickedanz et al., 2019). De Marchis et al. (2019) also iterates that ongoing clinician training is necessary to help with clinical providers' confidence in addressing FI with patients and comfort with referral patients to food resources.

Clinicians' estimate of the percentage of patients who live in food insecure households did not change statistically significantly across the three surveyed time points. However, the average approximation stayed consistent at 26.1%, 27%, 25.8% respectively. The educational intervention included prevalence of FI of at the national and state levels. Participants' answers did not change significantly due to the educational intervention; however, the estimation is consistent with ranges found in the literature, with surveyed clinicians estimating between 10% to 40% of patients experiencing FI (Barnidge et al., 2017). Clinically, this approximation is meaningful; if clinicians' estimate 1 in 4 of their patients may be food insecure, this supports the relevancy of screening for and addressing this need.

Comparison of the post-intervention survey results for all questions to the follow-up survey did not reveal any statistically significant changes. This reveals there is not much change from the day of the intervention to the following time period 2-3 months after the intervention. This supports that knowledge maintained the day of the intervention remained from the post- to follow-up survey.

b) Participant usage of ICD-10 coding for FI. The educational intervention introduced the use of the ICD-10 diagnostic code to document when patients' screen positive for FI. Only one clinical site was using the ICD-10 code for FI throughout the study period, but there was not a significant change after the educational intervention. There was an increase in usage of ICD-10 code in December and January, though not statistically significant. The post-intervention time period was only 4 months compared to the 8 months of the pre-intervention reporting period; an extended measuring period may be needed to show a significant change in use of the ICD-10 code. The clinical site using the ICD-10 code for FI was unique compared to other clinical sites because there was an implementation at the clinic level of screening for social determinants of health during the study period. The literature indicates that integrating the screening tool within the EMR is an effective method to aid in facilitating screening (Burkhardt, et al., 2012; Palakshappa, Vasan et al., 2017). Utilizing the EMR for not only the screening tool, but also for connecting to a diagnostic code, may impact the acceptance of ICD-10 use. Optimizing the features of the EMR and clinic workflows are vital in decreasing time constraints for clinicians when documenting the ICD-10 code for FI (Buitron de la Vega et al., 2019).

5.2 Recommendations for Clinical Practice

The findings of this project support that an FI educational intervention can improve knowledge and willingness to ask or screen patients and refer those who are food insecure to a food safety network. To ensure sustainability in clinical practice, it is essential that all clinical staff (referral coordinators, medical assistants, licensed practice nurses) receive the FI educational training. It is imperative not only to expand training to

all staff involved in clinic workflow, but also incorporate training for new employees and reiterate yearly to mitigate issues of turnover. Furthermore, it may be beneficial to create a handout for reference that includes key information on FI, the proposed screening tool, how to access the electronic resources presented, and information on documenting the ICD-10 code for FI. Ideally, this will serve as the reiterative education and also serve as a guide for clinicians to use in clinical practice.

Next, to build momentum on FI screening and referrals, it is important to meet with clinic leadership to decide on an appropriate workflow for incorporating the FI screening tool into clinical practice. A coordinated effort between training and use of the screening tool will be key to gain buy-in and support from clinical staff. Ultimately, training, screening, and referring patients who are food insecure will serve as a potential framework for addressing social needs in primary care. This project could be leveraged to expand to other domains of social determinants of health such as housing and transportation.

5.3 Recommendations for Future Projects and Studies

In future areas of study, it would be valuable to expand the study to include a more diverse sample of primary care providers, since the majority of the sample for this project included resident physicians. There is an opportunity to not only look at the impact of training amongst family and internal medicine primary care providers, but also to nursing staff and patient coordinators. Future studies could explore how FI educational interventions would extend to other relevant service lines such as emergency department, endocrinology, inpatient care, and pediatrics.

When considering the usage of the ICD-10 code for FI, there is opportunity to measure how to improve participants' use of social codes to coordinate care with referral networks. To improve acceptance of ICD-10 coding, integrating social coding as part of the FI screening workflow will be essential. Future projects could also use the ICD-10 diagnostic code to better understand the burden of FI among providers' patient population. This information can support system-level changes to forge new partnerships with community organizations, thereby better meeting the needs of the patient population.

5.4 Limitations

This project was limited by a small sample size of providers, of which the majority were resident physicians. Attrition of providers across the study period, where only 12 participants completed surveys at all three time points, is a potential threat to external validity. The intervention only occurred in five family and internal medicine residency practices in two counties, which may not be representative of primary care clinics in the region. A more diverse sample of clinicians, both in title and in years of experience, would be key to future work.

Additionally, this study was limited in the platform of which the educational intervention was delivered. Due to COVID-19, education needed to be delivered virtually, and the training was recorded for consistency. This limited the number of clinics that opted for participation. This project was coordinated with healthcare system objectives to implement a multi-clinic initiative to screen for social determinants of health, including FI. COVID-19 delayed the planned screening, and thus limited further clinics for being enrolled into this project. The pandemic restrictions also limited the

ability to follow up with participants and necessitated reliance on hierarchical communication channels for further coordination.

5.5 Conclusion

Overall, the goal of the educational intervention was to provide primary care providers with knowledge on the importance of addressing FI, confidence to screen patients for FI, and knowledge about referrals. The results of this project support findings in the literature that a point-in-time educational training on FI could improve clinicians' knowledge, and empower clinicians to screen patients for FI and connect them to food resources. The effectiveness of an FI educational intervention was supported by project participants. Providing FI training is imperative in order to create buy-in from primary care providers to allow for practice change and, ultimately, better address the needs of patients.

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APPENDIX A: Permission to Use Measurement Tool

Rachel Koontz <rkoontz2@uncc.edu>

Permission to use FI Survey for Health Professionals
2 messages

Koontz, Rachel C <Rachel.Koontz@atriumhealth.org> Thu, Mar 26, 2020 at 12:00 PM
To: "sdsmith@ucsd.edu" <sdsmith@ucsd.edu>
Cc: "rkoontz2@uncc.edu" <rkoontz2@uncc.edu>

Hello Dr. Smith,

My name is Rachel Koontz and I am currently a first year doctorate of nursing practice (DNP) student at the University of North Carolina - Charlotte. I am also a Family Nurse Practitioner at Cabarrus Family Medicine in Concord, North Carolina, a Family Medicine Residency Program and part of Atrium Health.

Part of my DNP program requirements include implementing evidence-based interventions into clinical practice. I am currently working with Atrium Health's Community Health team to implement educational intervention for providers (MDs, PAs, NPs, residents) regarding social determinants of health screening, particularly food insecurity, across 10 academic clinics. The clinical question for my DNP project is "among primary care providers, does education regarding food insecurity increase providers' knowledge and confidence in the recognition and intervention of patients with food insecurity?"

I have become familiar with your research, particularly your article "Addressing Food Insecurity in Family Medicine and Medical Education." Reviewing the literature for food insecurity, your tool "Food Insecurity Survey for Health Professionals" fits well with my project aims and is unique in the literature. With your permission, I would like to utilize this survey for my quality improvement DNP project. My project is being supervised by my professor Dr. Katie McGuffin and clinical mentors, Dr. Andrew Nance and Dr. Iris Cheng.

My goal is to implement the DNP project for fall 2020, however, I know timelines may be adjusted due to the current pandemic. Any feedback and guidance you're willing to provide would be much appreciated. If you have any questions feel free to email me. I look forward to hearing from you.

Best regards,

Rachel Koontz

Rachel Koontz, MPH, MSN, APRN, FNP-C
Advanced Practice Provider, Family Medicine
Cabarrus Family Medicine - Concord
Office: 704-786-6521 | Fax: 704-782-9703

Atrium Health

Smith, Sunny <sdsmith@health.ucsd.edu> Wed, Apr 1, 2020 at 10:38 AM
To: "Koontz, Rachel C" <Rachel.Koontz@atriumhealth.org>, "sdsmith@ucsd.edu" <sdsmith@ucsd.edu>
Cc: "rkoontz2@uncc.edu" <rkoontz2@uncc.edu>

Of course, I'd be happy to have you use it. It is just what is in the paper and should be easy for you to do.

APPENDIX B: Pre-Intervention Survey

PRETEST: Food Insecurity Survey for Health Professionals

You are invited to participate in a project about food insecurity in primary care. The goal of this project is to understand primary care providers knowledge and confidence in addressing food insecurity for their patients. This project is being conducted by Rachel Koontz, FNP. Your demographics and survey answers will be kept completely confidential. Below, you will choose a 3-digit unique identifier code (UIC) to ensure your privacy is maintained and to correlate the survey responses. If you have any questions about this project, please contact Rachel Koontz, FNP at rachel.koontz@atriumhealth.org

1.To create your Unique Identifier Code (UIC), use this guide: First Digit: First letter of your mother's or female guardian's first name Second Digit: # of siblings you have Third Digit: Your middle initial (X if none) Example: **J**ane, **2** siblings, Middle Name is **A**dam → J2A

_____

2. Clinic Name
   - Biddlepoint Family Medicine
   - Cabarrus Family Medicine Concord
   - Cabarrus Family Medicine Kannapolis
   - Cabarrus Family Medicine Harrisburg
   - Cabarrus Family Medicine Mt Pleasant
   - Elizabeth Family Medicine
   - Myers Park Internal Medicine

3. Profession
   - Attending MD/DO
   - Resident MD/DO
   - Nurse Practitioner
   - Physician Assistant
   - Other _____

4. Years of practice as Healthcare Provider?
   - 0-3
   - 4-10

- 11-20
- 21+

Check the box of the most appropriate answer.

Statement/Question	Response				
	Strongly disagree	Disagree	Uncertain/ not applicable	Agree	Strongly agree
1. I am knowledgeable about food insecurity and how it can adversely affect health.					
2. I am knowledgeable about referring patients to resources that address food insecurity (local food backs, food-stamp equivalent programs).					
3.It is important to assess patients for food insecurity.					
4. It is important to refer patients to food resources.					
5. Food insecurity is relevant to my patient population.					
Statement/Question	Response				
	Never	Rarely	Sometimes	Often	Always
6. I am willing to ask my patients about food insecurity.					
7. I have asked my patients about food insecurity					
8. I have referred my patients to a local food bank					
9. I have referred my patients to SNAP benefit program.					
10. Estimate of the % of my patients who have food insecurity	_____ %				

11. In NC, how many children are living in food insecure households?
    - 1 in 3
    - 1 in 4
    - 1 in 5
    - 1 in 6
    - 1 in 7
    - I don’t know

APPENDIX C: Post-Intervention Survey

POSTTEST: Food Insecurity Survey for Health Professionals

Thank you for watching the SDOH Education in Primary Care training video. Please only complete the below survey after viewing SDOH Education; copy/paste link in your browser to view. https://tinyurl.com/SDOH-Education As a reminder your demographics and survey answers will be kept completely confidential. Below, you will choose a 4-digit unique code identifier (UIC) to ensure your privacy is maintained and to correlate the survey responses. If you have any questions about this project, please contact Rachel Koontz, FNP at rachel.koontz@atriumhealth.org

1.To create your Unique Identifier Code (UIC), use this guide: First Digit: First letter of your mother's or female guardian's first name Second Digit: # of siblings you have Third Digit: Your middle initial (X if none) Example: **J**ane, **2** siblings, Middle Name is **A**dam → J2A

2. Clinic Name

- Biddlepoint Family Medicine
- Cabarrus Family Medicine Concord
- Cabarrus Family Medicine Kannapolis
- Cabarrus Family Medicine Harrisburg
- Cabarrus Family Medicine Mt Pleasant
- Elizabeth Family Medicine
- Myers Park Internal Medicine

Statement/Question	Response				
	Strongly disagree	Disagree	Uncertain/ not applicable	Agree	Strongly agree
1. I am knowledgeable about food insecurity and how it can adversely affect health.					
2. I am knowledgeable about referring patients to resources that address food insecurity (local food backs, food-stamp equivalent programs).					
3.It is important to assess patients for food insecurity.					

4. It is important to refer patients to food resources.					
5. Food insecurity is relevant to my patient population.					
Statement/Question	Response				
	Never	Rarely	Sometimes	Often	Always
6. I am willing to ask my patients about food insecurity.					
7. I plan to ask my patients about food insecurity					
8. I plan to refer my patients to a local food bank					
9. I plan to refer my patients to SNAP benefit program.					
10. Estimate of the % of my patients who have food insecurity	_____ %				

Check the box of the most appropriate answer.

11. In NC, how many children are living in food insecure households?
    - o 1 in 3
    - o 1 in 4
    - o 1 in 5
    - o 1 in 6
    - o 1 in 7
    - o I don’t know

APPENDIX D: Follow-up Survey

FOLLOW-UP POSTTEST: Food Insecurity Survey for Health Professionals

Thank you for participating in the SDOH Training for Primary Care. Please only complete the below survey if you previously completed the pretest/posttest and SDOH Education training. As a reminder your demographics and survey answers will be kept completely confidential. Below, you will choose a 4-digit unique code identifier (UIC) to ensure your privacy is maintained and to correlate the survey responses. If you have any questions about this project, please contact Rachel Koontz, FNP at rachel.koontz@atriumhealth.org

1.To create your Unique Identifier Code (UIC), use this guide: First Digit: First letter of your mother's or female guardian's first name Second Digit: # of siblings you have Third Digit: Your middle initial (X if none) Example: **J**ane, **2** siblings, Middle Name is **A**dam → J2A

2. Clinic Name

- Biddlepoint Family Medicine
- Cabarrus Family Medicine Concord
- Cabarrus Family Medicine Kannapolis
- Cabarrus Family Medicine Harrisburg
- Cabarrus Family Medicine Mt Pleasant
- Elizabeth Family Medicine
- Myers Park Internal Medicine

Statement/Question	Response				
	Strongly disagree	Disagree	Uncertain/ not applicable	Agree	Strongly agree
1. I am knowledgeable about food insecurity and how it can adversely affect health.					
2. I am knowledgeable about referring patients to resources that address food insecurity (local food backs, food-stamp equivalent programs).					

3.It is important to assess patients for food insecurity.					
4. It is important to refer patients to food resources.					
5. Food insecurity is relevant to my patient population.					
Statement/Question	Response				
	Never	Rarely	Sometimes	Often	Always
6. I am willing to ask my patients about food insecurity.					
7. I plan to ask my patients about food insecurity					
8. I plan to refer my patients to a local food bank					
9. I plan to refer my patients to SNAP benefit program.					
10. Estimate of the % of my patients who have food insecurity	_____ %				

Check the box of the most appropriate answer.

11. In NC, how many children are living in food insecure households?
    - o 1 in 3
    - o 1 in 4
    - o 1 in 5
    - o 1 in 6
    - o 1 in 7
    - o I don’t know

APPENDIX E: IRB Letter from UNCC

Rachel Koontz <rkoontz2@uncc.edu>

IRB Notice - 19-0778

1 message

IRB <uncc-irb@uncc.edu> Wed, May 20, 2020 at 10:56 AM
To: rkoontz2@uncc.edu, kdshue@uncc.edu
Cc: uncc-irbis@uncc.edu

To: Rachel Koontz
School of Nursing

From: Office of Research Compliance

Date: 5/20/2020
RE: Determination that Research or Research-Like Activity does not require IRB Approval
Study #: 19-0778

Study Title: Addressing Food Insecurity in Primary Care

This submission was reviewed by the Office of Research Compliance, which has determined that this submission does not constitute human subjects research as defined under federal regulations [45 CFR 46.102 (e or l) and 21 CFR 56.102(c)(e)(l)] and does not require IRB approval.

Study Description:

There is a lack of knowledge on food insecurity (FI) and how to address this issue in primary care. The purpose of this DNP project is to create and test the impact of an educational intervention aimed to increase understanding of FI role on health, identify patients at risk using a standardized screening tool, and to use ICD-10 coding for those who identify as food insecure. This quality improvement project uses the Plan, Do, Study, Act methodology (PDSA) to implement a pre/post survey to measure change in primary care providers knowledge, confidence and willingness to address FI in primary care.The project includes physicians, residents, nurse practitioners, and physician assistants working in primary care. The setting for this project is a network of Atrium Health's academic family and internal medicine clinics.

Please be aware that approval may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records), even though IRB approval is not required.

If your study protocol changes in such a way that this determination will no longer apply, you should contact the above IRB before making the changes.

APPENDIX F: QI Approval from Atrium Health

Confidential

Record ID 840 - Rachel Koontz (submitted: 04-29-2020)
Page 1

QI vs Research Form

* All fields on this form are required to be completed before submitting *

* Do not submit this form for projects already completed. Contact the IRB at IRBInfo@atriumhealth.org *

Response was added on 04/29/2020 9:51am.

ATRIUM HEALTH
Institutional Review Board / Patient Privacy Board

IRB Review & Determination of QI vs. Research Projects

Submission Date:	04-29-2020
Project Lead:	Rachel Koontz (Full Name)
Department:	Cabarrus Family Medicine
Phone:	(336) 317-3378
E-mail:	rachel.koontz@atriumhealth.org
Project Title:	Addressing Food Insecurity in Primary Care

Is the project supported by funding?

⊗ No

Purpose of the project:
(Provide a 2-3 sentence description.)

The aim of this quality improvement project is to implement an educational intervention that will equip the primary care provider to understand, identify, support, and document food insecurity in primary care practice.

Briefly describe project details, including how patients and/or providers will be involved:
(Provide a 2-3 sentence description.)

This quality improvement project uses the Plan, Do, Study, Act methodology (PDSA). The project is includes physicians, residents, nurse practitioners, and physician assistants working in primary care. Providers who complete food insecurity training will be asked to complete the pre/post survey immediately before and after the session to assess for change in knowledge, attitudes, and confidence of addressing food insecurity. After implementation of the educational intervention, a retrospective EMR report will be generated in aggregate at clinic level to assess for the use of Hunger Vital Sign (HVS) questionnaire and ICD-10 code (F54.9) 3-months before intervention and 3-months after intervention.

QI Summary Template & Instructions (Please download, complete, and upload back to this form.)

[Attachment: "QI Project Summary Template.doc"]

Attach QI Project Summary:

[document]

Have you completed the Quality Improvement training module?

⊗ Yes

Please upload your (and your team's) completion certificate(s) for the Quality Improvement module:

Certificate #1:

[document]

Certificate #2:

[document]

Certificate #3:

[document]

Is this project Quality Improvement (QI)?

Quality Improvement includes activities that have purposes limited to: (a) implementing a practice to improve the quality of patient care, and (b) collecting patient or provider data regarding the implementation of the practice for clinical, practical, or administrative purposes. Quality Improvement projects are limited to a setting of care and do not seek to make universal changes to evidence-based care.

See CHS Policy link

	Yes	No
Do you consider this project to meet the definition of QI as noted above?	⊗	○
Is the activity primarily designed to: Improve clinical care at CHS?	⊗	○
Is the activity primarily designed to: Apply to patients or populations beyond your specific study population? *	○	⊗

* (i.e. apply to only Atrium Health patients or possibly to patients outside of Atrium Health?)

Is this project Research?

Research is "a systematic investigation, including research development, testing and evaluation
that is designed to develop or contribute to generalizable knowledge".
[45CFR46.102 and 45 CFR 164.501]

See CHS Policy link

	Yes	No
Do you consider this project to meet the definition of research as noted above?	○	⊗
Does the project involve a systematic investigation that may include a hypothesis, testing and evaluation?	○	⊗
Is the activity primarily designed to: Develop new knowledge?	○	⊗
Is the activity primarily designed to: Apply to patients or populations beyond your specific study population? *	○	⊗

* (i.e. apply to only Atrium Health patients or possibly to patients outside of Atrium Health?)

Activity Involves Human Subjects?

	Yes	No
Does your project involve: Interventions or interactions with patients, including manipulation of a person, or a person's environment through surveys, interviews, tests or observations?	○	⊗
Does your project involve: Obtaining identifiable private information about living people?	○	⊗

Clinical Investigation?

	Yes	No
Does your project include testing the safety and efficacy of a drug or device in a human subject, including analysis or comparison of outcome data about a drug or device?	○	⊗
Does your project include a non-FDA-approved assay or In Vitro Diagnostic device?	○	⊗
Will any data resulting from this activity be submitted to the FDA?	○	⊗

Other Considerations

	Yes	No
Does your project involve a vulnerable population, e.g. children, impaired adults with special consent issues, Atrium employees? See link	⊗	○
Are there plans to publish information gained from this project?	⊗	○
Will patients be consented for entry into this project?	○	⊗

What are the potential risks to participants?

No risk other than the accidental disclosure of personal information. All precautions will be implemented so this does not occur.
(Please list, separate by comma (,))

What are the potential benefits to participants?

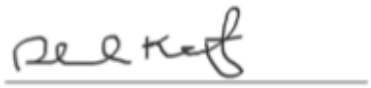
Increase knowledge of food insecurity and referral resources, inform resources needed at a clinic level to support patient population
(Please list, separate by comma (,))

Signatures

CERTIFICATION OF PROJECT LEAD:

I certify that the information provided in this IRB Review of QI and Research Projects screening form is complete and accurate. The above titled project has been/will be conducted in full compliance with the HHS/FDA Regulations and IRB requirements/policies governing human subject research. IRB review is required for projects meeting the criteria of, "Research" as noted above.

Signature of Project Lead:



Date:

04-29-2020 09:49:24

Are you a resident or student?

⊗ Yes

What category?

⊗ DNP/PhD Nursing

CERTIFICATION OF DEPARTMENT CHAIR (If a resident or student):

I certify that I have read the attached IRB Review of QI and Research Projects screening form and the project has been reviewed.

Please note: If the AH IRB determines your project DOES meet the definition of Human Subjects Research, you will be required to submit the Expedited/Exempt Protocol Application, prior to beginning any research activities.

The application can be found, HERE.

DNP Use Only

Reviewed completed?	⊗ Yes
DNP Signature:	
Date:	04-29-2020 10:03:33 ((click "Now" if signing now.))

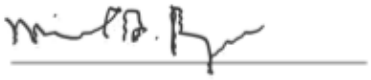
IRB Use Only

Staff Section

Please be sure that the DNP section above is completed.

Reviewed by:	⊗ Jomani Cheeseman
Forward to which chair?	⊗ Michael Runyon
Date:	05-05-2020 09:35:30 ((click "Now" if signing now.))

Chair Section

Require edits or changes?	⊗ No
The IRB has determined this project is:	⊗ Quality Improvement
Completed By:	Michael Runyon ((Please Print Full Name))
IRB Chair Signature	
Date:	05-05-2020 09:38:33 ((click *Now* if signing now.))