UGA EFNEP *FOOD TALK: BABY AND ME*- AN ADAPTED PROGRAM FOR LOW INCOME PREGNANT WOMEN AND THEIR FAMILIES IN GEORGIA

by

CLAIRE MARIE MOUSER

(Under the Direction of Sarah Henes)

ABSTRACT

The Expanded Food and Nutrition Education Program (EFNEP) delivers series- and evidence-based nutrition education to populations with limited resources, including pregnant women and teens, across the United States. In Georgia, maternal health remains a challenge, as maternal mortality rates remain among the highest in the country. University of Georgia (UGA) EFNEP currently offers nutrition education programming across the state to adults, including pregnant women, using the UGA EFNEP *Food Talk* curriculum. However, pregnant women have nutritional needs that are unique from the general adult population. UGA EFNEP aimed to address this gap in nutrition education by adapting the existing adult curriculum, UGA EFNEP *Food Talk*, to include pregnancy-specific nutrition recommendations. UGA EFNEP Extension Supervising Agents and Program Assistants were involved in the adaptation and implementation of the adapted curriculum, providing ongoing feedback related to program development, training, and implementation. The following dissertation study

found that it was feasible to adapt an existing UGA EFNEP curriculum to include pregnancy-specific information and to implement the adapted curriculum, UGA EFNEP *Food Talk Baby and Me*, into the community; a hybrid training model was effective at preparing UGA EFNEP staff to teach the adapted curriculum; and UGA EFNEP staff were able to provide perspectives and feedback related to program recruitment, delivery, and future adaptations.

INDEX WORDS: Nutrition Education, Expanded Food and Nutrition Education Program (EFNEP), Maternal Health, Program Development, Cooperative Extension Services, Mixed-Methods Research, Qualitative Research

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DEDICATION

This dissertation is dedicated to my parents, sisters, and my fiancé. I couldn't have done it without your unwavering support, love, and encouragement.

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CHAPTER 1

INTRODUCTION

Background & Problem

The World Health Organization defines maternal health as the health of women during the period of pregnancy, childbirth, and the postnatal period[2]. During this time, women undergo physiological changes that increase nutrient needs, as the body adapts to support fetal development[3]. The 2020-2025 Dietary Guidelines for Americans provides recommendations and guidelines for pregnant women in the United States, addressing caloric intake, nutrient needs, appropriate weight gain, and physical activity[4]. However, national survey data indicates that most pregnant women do not meet these guidelines, and the U.S. continues to face challenges when it comes to maternal health[5–7].

Nutrition education during pregnancy has been shown to improve dietary intake and positively influence nutrition-related health outcomes for mothers and their infants[8–10]. Women who receive prenatal medical care are more likely to receive nutrition education, which in turn is associated with improved diet quality, healthy gestational weight gain, and reduced risk of complications[5,11–13]. However, Obstetrics/ Gynecological (OB-GYN) services for prenatal care remain limited for rural Georgia communities, with Census data reporting as little as one OB-GYN provider to 100,000 residents in some counties[5]. Expanding access to nutrition education presents a promising strategy for reducing these disparities and improving health outcomes for pregnant women.

Community-level nutrition education programs are particularly valuable because they expand access to underserved populations with limited resources. In the United States, several federally funded programs provide nutrition education and support to address the needs of these communities. These include the Supplemental Nutrition Assistance Program and its education component (SNAP/SNAP-Ed), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Food Distribution Program on Indian Reservations (FDPIR), and the Expanded Food and Nutrition Education Program (EFNEP) [14–17]. Each program offers tailored services and delivery methods designed to improve nutrition among their target populations.

Nationwide, low-income pregnant women and teens are a priority audience for EFNEP, while pregnant, postpartum, and lactating women, along with children from birth to age five, are target audiences for WIC. [14,17]. EFNEP is funded by the U.S. Department of Agriculture (USDA) through the National Institute of Food and Agriculture (NIFA) [14]. Funding is distributed to individual states and awarded to land-grant universities (LGUs), which implement EFNEP through Cooperative Extension Services [14]. EFNEP delivers hands-on, group-based nutrition education that includes cooking demonstrations, interactive activities, guided discussions, food resource management strategies, and physical activity promotion [14]. WIC, on the other hand, is administered by the USDA's Food and Nutrition Service (FNS), with state funding allocations based on the number of eligible participants and the cost of food in each state [15]. Unlike EFNEP, which operates through LGUs, WIC is implemented through local agencies such as community clinics and health departments [15]. While both EFNEP and WIC offer essential nutrition services, they are complementary in their structure and approach. EFNEP provides series-based, evidence-informed classes taught by trained paraprofessional peer educators, whereas WIC offers

individual or group sessions, typically not based on a formal curriculum, delivered by Registered Dietitians or nutritionists [14,15].

Recent research in Georgia supports the effectiveness of nutrition education interventions for pregnant women [18]. For example, Project DINE (Dads In Nutrition Education) demonstrated that participation in UGA EFNEP's eight-week virtual nutrition education program led to improvements in overall diet quality among African American pregnant women and their partners [18]. Feedback from participants and educators highlighted the need for pregnancy-specific nutrition topics to be included in the curriculum [18]. Investigating the feasibility of developing, implementing, and evaluating a pregnancy-specific EFNEP curriculum can provide valuable insight into the needs of this population and how federally funded programs like EFNEP can address them. This dissertation focuses on the development of such a curriculum, designed specifically for delivery through UGA EFNEP, leveraging its peer-educator model and group-based format to meet the unique nutritional needs of pregnant participants.

Study Rationale & Purpose

The rationale and purpose of this dissertation project is threefold: (1) to describe the feasibility of adapting an existing UGA EFNEP curriculum to address the unique needs of pregnant participants and of implementing the adapted curriculum in the community, (2) to evaluate the suitability of a hybrid training model at preparing peer-educators to deliver the adapted curriculum, and (3) to explore educators' experiences and perspectives on implementing the adapted program through a qualitative analysis. We hypothesize that adapting an existing UGA EFNEP adult curriculum *(UGA Food Talk)* will be feasible and that UGA EFNEP staff and participants will be accepting of the new program. Previous research has shown that expecting parents in Georgia want pregnancy-specific nutrition education and that providing these services can translate to real-life, positive behavior change[18].

Research Aim & Hypothesis

Specific Aim 1. Develop an adapted UGA EFNEP curriculum that meets the needs of EFNEP eligible, low-income pregnant women and their partners/families.

Hypothesis 1: We hypothesize that developing an adapted, pregnancy-specific curriculum will be feasible and will meet the needs of EFNEP participants.

Specific Aim 2. Develop and test a training protocol for UGA EFNEP supervisors and peer-educators on the adapted, pregnancy-specific curriculum.

Hypothesis 2: We hypothesize that UGA EFNEP supervisors and peer-educators will have improved knowledge of pregnancy-specific nutrition knowledge after completion of the training.

Specific Aim 3. Evaluate supervisor and peer-educator perspectives and feedback on the adapted curriculum and pilot programming.

Hypothesis 3: We hypothesize that EFNEP supervisors and peer-educators will provide constructive, positive feedback on the adapted curriculum and implementation of the pilot program.

Subjectivity Statement

I grew up in the Midwest United States, on the outskirts of Indianapolis, with my parents and two younger sisters. In elementary school, I began learning Spanish at a public Immersion school where the diversity of my community was highlighted. My teachers and classmates were a unique mix of racial and ethnic backgrounds. As I grew older, I observed that language could be both a facilitator and a barrier to knowledge, and being bilingual was not always accepted. As a white woman, my second language has always been seen as an advantage and a skill, but native Spanish-speakers are often punished for the same biliteracy. I have since had a passion for equitable education, especially when it comes to health and well-being.

Language, in an untraditional sense, can also mean an understanding and ability to accurately discuss a topic. For example, health literacy is commonly discussed in public health as a barrier to access for marginalized communities. I pursued my undergraduate education at Purdue University in Nutrition & Dietetics, where my own "language" for discussing health and nutrition was developed. Nutrition is a very personal topic for many people, it is social, cultural, and even emotional. This dichotomy creates a unique "language" that each person shapes for themselves throughout their lives. Being a nutrition professional has taught me that it is important to learn to hear these individual languages and understand how to incorporate healthful guidance while keeping their roots intact. Working with the EFNEP program at UGA has helped me to understand the importance of understanding the community and individuals you are working with.

The process of completing this dissertation process opened my eyes to the complexity of nutrition education. While I had the opportunity to spend four years learning nutrition in higher education, I was tasked with condensing that language for communities and individuals without that same experience. I am aware that I bring preconceived ideas about the communities and individuals I work with as I develop educational materials and conduct interviews. I am also aware that my personal characteristics have an influence on my perspectives, for example, I am younger than most of my participants and have never been pregnant. This has required me to base my perspective on the shared experiences of others who have been pregnant and on my educational background. My own perspectives on pregnancy and nutrition could influence or bias the content created, but this will be combated by an emphasis on evidence-based guidelines and continuous feedback from staff and participants. Overall, my experience has given me the motivation to meet this goal of providing pregnancy-specific nutrition education to UGA EFNEP staff and participants.

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CHAPTER 2

LITERATURE REVIEW

Importance of Nutrition During Pregnancy

Pregnancy is characterized by significant physiological changes in a woman's body that support fetal growth and development[19]. These changes include increased blood volume, increased body weight, and hormonal shifts that influence metabolism and nutrient absorption[19]. As a result, pregnant individuals experience increased energy and nutrient requirements to meet both their own physiological needs and those of the developing fetus[19–22]. Key nutrients such as folate, iron, calcium, iodine, and protein are particularly important during this time, as they play critical roles in reducing the risk of birth defects, supporting fetal brain and bone development, and maintaining maternal health[20]. Failure to meet these elevated nutritional needs can contribute to adverse outcomes, including low birth weight, preterm birth, and pregnancy complications[22]. Understanding and addressing these nutritional demands is essential for promoting optimal maternal and infant health outcomes.

The following section of the literature review will explore the importance of maternal nutrition by examining several key areas. These include current dietary guidelines and supplement recommendations for pregnant women, physical activity recommendations that support a healthy pregnancy, and a review of health outcomes targeted by nutrition interventions.

Dietary Guidelines

The 2020-2025 Dietary Guidelines for Americans (DGAs) provides specific recommendations for diet, physical activity, food safety, weight management, and supplementation during pregnancy[4]. The DGAs serve as the basis for diet and health information that policymakers, healthcare providers, nutrition educators, and federal nutrition program operators utilize[4]. A committee of 20 nutrition and public health experts collaborated to review the most recent scientific evidence regarding diet and health outcomes to develop the 2020-2025 report[4]. The 2020-2025 DGAs recommend that women who are pregnant follow a nutrient dense meal pattern, which includes a high intake of fruits and vegetables, whole grains, low-fat dairy, lean proteins, and healthy fats[4]. At the same time, sugar, saturated fat, and sodium are advised to be limited in the diet[4]. Despite these recommendations, adherence remains a challenge.

One of the ways national-level adherence to the DGAs can be assessed is through analysis of data provided by The National Health and Nutrition Examination Survey (NHANES). NHANES is conducted in 2-year cycles by the National Center for Health Statistics of the Centers for Disease Control and Prevention[23]. The survey collects data from interviews and physical exams conducted using a multistage, probability sampling technique to obtain a nationally representative sample[23]. Data collected through the survey include demographic, socioeconomic, dietary, and health related questions[23]. The physical exam includes medical, dental, and physiological measurements, in addition to laboratory tests[23]. The interviews are conducted in participant's homes and the exams are conducted in mobile health centers[23]. Pregnancy status reporting for NHANES is determined by participants self-reporting as pregnant during the exam, or by a positive lab pregnancy test[23].

Several analyses have been conducted using NHANES data, providing insight into population level diet and health[24–26]. Habbal (2023) conducted a retrospective observational study of fifty-one postpartum women and found that, based on participants dietary recall of their last month of pregnancy, they were not meeting the DGA's[27]. Participants completed the Dietary Screener Questionnaire, a validated and rapid dietary screening tool, after giving birth at a hospital in Boston, Massachusetts, USA. Participants were asked to complete the questionnaire based on their estimated dietary intake over the previous month. None of the participants in this study met the recommended intake for all dietary factors of interest when compared to the DGA's. Dietary factors of interest for this study were determined based on items that aligned with the DGAs, including vegetables, fruits, whole grains, dairy, calcium, fiber, and added sugars. Only one participant met the DGAs recommended intake for fruit, eleven met the recommendation for calcium, and twenty-six participants exceeded the recommendation for added sugar[27]. While this study is limited in generalizability outside of the Northeastern United States (Boston, MA.), the findings still highlight the need for effective interventions that can bridge the gap between recommended and actual dietary intake.

Excess added sugar intake among pregnant women continued to be observed in a cross-sectional analysis of NHANES data[26]. Cioffi (2018) assessed added sugar intake among 4,179 pregnant (n=650) and non-pregnant women (n=3,529) who completed a dietary recall as part of the 2003-2004 to 2011-2012 survey cycles[26]. The dietary assessment component of NHANES, What We Eat in America, includes two 24-hour recalls. Researchers only used the first (day 1) dietary recall from study participants for this analysis[26]. Foods included in the calculation for total added sugar included products where sugar was added during preparation, processing, or at the table, but not naturally occurring[26]. For example, the naturally occurring sugars in fruit and

milk were not included in the added sugar calculation. On average, pregnant women consumed 85.1 grams of added sugar daily and non-pregnant women consumed 76.7 grams of added sugar daily. After accounting for total energy intake, this equated to 14.8% and 15.9% of energy coming from added sugars among pregnant and non-pregnant women, respectively. The 2020-2025 DGAs recommend that added sugars be limited to less than 10% of total energy in the diet[4]. Overall, this analysis reveals that both pregnant and non-pregnant women overconsume added sugars[26].

The researchers further evaluated differences in added sugar intake among this sample by stratifying based on sociodemographic information[26]. Percent added sugar intake was found to be lower among pregnant women with lower education and socioeconomic levels when compared to non-pregnant women in the same subgroup. Pregnant women with a high school diploma or less consumed 12.9% of calories from added sugars, compared to 17.3% of non-pregnant women with the same educational background. Similarly, pregnant women with a Poverty Income Ratio (PIR)<100% consumed 13.9% of calories from added sugars, compared to 17.3% of their non-pregnant counterparts. The researchers suggest that federal nutrition education and support programs may be a reason behind these differences in diet quality[26]. Although more research is needed to support that claim, these results are promising when considering the potential positive implications of expanding nutrition education services for pregnant women through EFNEP.

Protein intake during pregnancy is critical for supporting the growth of maternal tissue and for adequate development of the fetus[28]. Murphy et al. (2021) conducted a cross-sectional study to evaluate estimated protein intake by trimester of pregnancy based on responses from the 2003-2012 NHANES data collection cycles[25]. More recent data collection cycles did not ask for trimesters of pregnancy, thus were not included in the analysis because the reported intake could

not be accurately compared to the recommended intake[25]. Participants (n=528) included pregnant women aged 20-44 years old who were not lactating, self-identified their month of pregnancy on the survey, and provided two 24-hour dietary recalls. One dietary recall was collected during an in-person interview and the second was collected over the phone 3-10 days after the interview. Trained interviewers used the USDA's Automated Multiple-Pass method to collect the dietary recall data, which was then processed using the USDA Food and Nutrient Database for Dietary Studies (FNDDS) to evaluate the amount of energy and nutrient intake from the participants' reported diet. Based on participant self-report 109 women were in their first trimester, 207 were in the second trimester, 212 were in the third trimester, and 75 additional women were pregnant but did not include information on trimester. The population included in this sample was primarily non-Hispanic white, married, had some college education, had previous deliveries, achieved some daily physical activity, were non-smokers, and reported taking dietary supplements in the past 30 days[25].

Murphy et al. (2021) found that, for pregnant women in this sample, usual protein intake was 88 ± 4.3 g/day, 82 ± 3.1 g/day, and 82 ± 2.9 g/day among women in trimester one, two, and three, respectively[25]. Based on these results, 4.5 ± 4.8% of women in the first trimester were not meeting the Estimated Average Requirement (EAR) for protein. The EAR for protein for women in the second and third trimester is 0.88 g/kg body weight/ day and based on these dietary recalls 12.1 ± 4.3% and 12.8 ± 4.6% of women in their second and third trimester, respectively, were not meeting that goal. Overall, animal protein sources accounted for approximately two thirds of total intake and plant-based protein sources accounted for one third of the remaining. Animal protein was broken down into total red meat, beef, pork, poultry, cured meat and poultry, dairy, eggs, and seafood. Total red meat (beef, pork, and other red meat) contributed 15.5 ± 1.2%,

poultry accounted for 13.2 ± 1.1%, dairy intake was 23.1 ± 0.8%, and seafood intake contributed 4.3 ± 0.7% of animal-based dietary protein[25]. Further, pregnant women with lower socioeconomic status (poverty income ratio <1.85) and lower education level (high school diploma or lower) were found to have lower intake of plant-based protein when compared to participants with higher socioeconomic status (poverty income ratio >1.85) and higher education (some college, undergraduate degree or higher)[25]. These results suggest that pregnant women in the US may not be meeting optimal protein intake, and the protein consumed is mostly animal protein, identifying a need for education on protein needs during pregnancy and ideal sources of protein like lean meats, poultry, eggs, low-Mercury seafood, and plant-based options.

Specific Micronutrient Needs & Prenatal Supplementation Recommendations

Pregnancy significantly increases the demand for certain nutrients that may be difficult to obtain through diet alone, making supplementation an essential component of maternal nutrition[29]. While a balanced diet forms the foundation of prenatal health, specific vitamins and minerals—such as folic acid, iron, calcium, vitamin D, and omega-3 fatty acids—are often recommended in supplemental form to support fetal development and maternal well-being[29,30]. These recommendations are based on research linking micronutrient deficiencies to adverse pregnancy outcomes, including neural tube defects, low birth weight, and maternal anemia[29]. National guidelines from organizations such as the Institute of Medicine (IOM), Centers for Disease Control and Prevention (CDC), the American College of Obstetricians and Gynecologists (ACOG), and the World Health Organization (WHO) provide evidence-based guidance on the appropriate use of supplements during pregnancy[28]. This section will outline key supplementation recommendations, their health benefits, and considerations for implementation in prenatal care.

Bailey et al. (2019) conducted a cross-sectional analysis using data from the 2001-2014 National Health and Nutrition Examination Survey (NHANES) to assess the dietary intake of pregnant women in the United States[24]. The researchers combined data from seven survey cycles (2001-2014), due to small sample size for pregnant women in each 2-year reporting cycle, for a total of 1,003 pregnant participants[24]. Dietary data from NHANES used for their analysis includes a dietary supplement questionnaire and two 24-hour dietary recalls per participant[24]. Participants included in the study had a mean age of 28 years, 54.3% were non-Hispanic white, and 56.8% were above 185% of the income to poverty ratio[24]. Most women in this sample reported using a dietary supplement (69.8%)[24]. Statistical modeling was used to estimate the usual total nutrient intake using data from all 1,003 participants, which was then compared to the Estimated Average Requirement (EAR), Adequate Intake (AI), and Tolerable Upper Intake Level (UL) cutoff points[24]. Researchers found that many women were not meeting recommendations for several nutrients, even with supplements.

Jun (2020) analyzed data from the same set, collected during the NHANES 1999-2014 cycles, to evaluate the use of dietary supplements among pregnant women in the United States[31]. As mentioned previously, NHANES collects dietary supplement data through a 30-day questionnaire where participants self-report type, frequent, duration and amount consumed of each supplement. Documentation of the product container and label is used to evaluate the serving size and nutrient content of the supplement. A trained nutritionist based at the National Center for Health Statistics compared the reported products with the NHANES Dietary Supplement Database to identify the composition of the participants supplements. Researchers used NHANES dietary supplement data to estimate the means and medians of nutrient intake from dietary supplements[31].

Based on the data from these NHANES cycles, seventy-seven percent of pregnant women reported taking at least one supplement[31]. Older women (35-44 years of age) and those with higher income (PIR>350%) reported supplement use at a higher prevalence than women who are younger (20-34 years of age) or with lower income (PIR<130%)[31]. Additionally, supplement use varied by trimester, with around half of women taking supplements during their first trimester and increasing to eighty percent during the second and third trimesters[31]. Supplement use motivation was most often encouraged by a health care provider (47.4%), but some women also took supplements on their own accord (16.1%)[31]. Of the reported supplements taken by pregnant women in this study, over half (60%) contained thiamin; riboflavin; niacin; folic acid; vitamins B-6, B-12, C, and D; calcium; iron; selenium; and zinc[31]. This study specifically evaluated the amount of nutrients in the supplements reported, since there are hundreds of supplements on the market and there is no standardization in place for these products[31]. This study found that one third of participants did not take folic acid supplements in their first trimester, despite early pregnancy being the most critical time for mothers to have adequate intake of this nutrient for fetal neurodevelopment[31]. Another important nutrient for maternal and fetal health, iron, was found to be inadequately met through diet alone in 95% of pregnant women[31]. However, 40% of women taking iron supplements exceeded the tolerable upper limit, resulting in gastrointestinal distress[31]. These findings emphasize the importance of not only recommending a prenatal supplement and encouraging use during all trimesters but also making pregnant women aware of the specific nutrients, and amounts, they need to consume to adequately support their diet[31].

Another, more recent study evaluated micronutrient intake among pregnant women in the U.S. using data collected from 2016 through 2020 and found similar results[32]. Crawford (2023)

conducted a secondary analysis of data collected as part of a prospective clinical trial evaluating the influence of micronutrient intake, from both diet and supplements, on the effect of docosahexaenoic acid (DHA) supplementation on preterm birth[32]. Participants in the study provided information on dietary intake through completion of the National Cancer Institute's diet history questionnaire (DHQ-II) or three 24-hour dietary recalls. Recruitment for the study took place in Cincinnati, OH, Columbus, OH, and Kansas City, KS. Women were recruited to participate if they were between 12- and 20-weeks' gestation, were 18 years of age or older, had a singleton pregnancy, and could read and speak English or Spanish. A total of 1,021 participants were included in the analysis, with 843 (83%) completing the DHQ-II and 178 (17%) completing three 24-hour recalls. Of note, Spanish-speaking participants were only able to participate if they completed the 24-hour dietary recalls, since the DHQ-II had not been validated in a Spanish-speaking population, and Spanish-speaking participants were only recruited from Kansas City, KS. Overall, the participants recruited for this study represented diverse racial and ethnic backgrounds, education levels, and income levels, helping to promote the generalizability of the researcher's findings.

Researchers evaluated 21 micronutrients: choline, folic acid, niacin, riboflavin, thiamin, vitamin A, vitamin B6, vitamin B12, vitamin C, vitamin D, vitamin E, calcium, chromium, copper, iodine, iron, magnesium, manganese, potassium, selenium, and zinc based on the DHQ-II and dietary recall data from this study. The findings reveal less than 25% of the participants had vitamin C, niacin, riboflavin, vitamin B12, vitamin B6, and thiamin levels below the EAR based on dietary intake alone. However, vitamin D, vitamin E, and folate intake from diet alone were more frequently below the EAR. Vitamin D intake was below the EAR in 85% of participants, vitamin E intake was under the EAR in 70% of participants, and folate intake was

under the EAR for 50% of participants when considering diet alone. Evaluation of vitamin and mineral status with supplements reveals that all vitamin levels increase, but some participants intake levels exceed the tolerable upper limit (UL). For example, folic acid intake was increased above the UL in around 80% of participants after taking a folate supplement. 5.5% of participants exceeded the UL for folate from diet alone, while 78.3% exceeded the UL for folate from diet + supplements, based on DHQ-II results. These findings support the need to continue improving education surrounding prenatal supplements and dietary intake during pregnancy. Most pregnant women reported taking a dietary supplement, but the contents of supplements varied and did not always contain the nutrients needed for pregnancy.

Food safety during pregnancy

Pregnant women are at increased risk for developing food-borne illness due to physiological changes that downregulate aspects of their immune system[33]. Specific pathogens of concern include *Listeria monocytogenes*, *Toxoplasma gondii*, *Salmonella*, and *Campylobacter jejuni*[34–37]. Excessive methylmercury exposure is another risk to mothers and their fetus, with excessive mercury intake during pregnancy resulting in neurodevelopmental abnormalities in childhood[38]. Identification of foods that pose a food safety threat and the knowledge of how to reduce the risk of infection are important for promoting the health and safety of expecting mothers.

Listeria monocytogenes infection can spread from certain foods, including soft cheeses, raw milk, deli meats, cold-smoked fish, sprouts, and melons[34]. *Listeria* bacteria can be killed by heating food to high temperatures, which is what food safety guidelines outline for pregnant women[34]. *Salmonella* and *Campylobacter jejuni* infections can also be avoided by following appropriate food safety guidelines[36,37]. *Toxoplasma gondii* can also be spread through

undercooked meat and other raw animal products but untreated water, soil and cat feces may also present a risk to pregnant women[35]. These infections are often not severe in healthy adults but pose an increased risk to pregnant women and their fetus, with maternal infection posing a risk for permanent neurological damage to the fetus[35]. Infection caused by *Listeria monocytogenes* during pregnancy can cause maternal fever, premature delivery, fetal loss, and neonatal infection of the nervous system[34]. *Salmonella* infection during pregnancy can lead to an increased risk of preterm delivery, low birthweight, and fetal loss in some cases[36].

Previous research has found that knowledge of food safety guidelines and safe food handling practices among pregnant women is lacking but can be improved through education[39]. Kendall et al. (2017) found that pregnant women who participated in a pathogen-specific education program had significantly better scores on food safety concepts and behaviors post-intervention[9]. This prospective and longitudinal intervention was conducted with pregnant participants recruited at community health, prenatal, and WIC clinics in Colorado and Ohio[9]. Participants recruited to participate in this study were randomly assigned to the intervention or control group[9]. Over a 5-year period, 550 of the 686 participants recruited into the study completed the program and survey evaluation. Of the 550 participants, 298 were in Colorado, with 176 (74 control, 102 pathogen-specific) participating in the English group and 122 (50 control, 72 pathogen-specific) in the Spanish group[9]. The additional 252 participants were recruited in Ohio, with 124 in the English group (55 control, 69 pathogen-specific) and 128 in the Spanish group (59 control, 69 pathogen-specific)[9].

The educational programs (control and intervention) were taught over 6-8 weeks by EFNEP paraprofessionals in a small group setting at local human services agencies or similar public spaces, in either English or Spanish[9]. Participants were also offered at-home make up

sessions as needed. The control program consisted of Colorado EFNEP's *Healthy Baby, Healthy Me* curriculum, an 8-session community nutrition program for limited resource families, adapted from the EFNEP *Eating Smart, Being Active* curriculum, that includes additional information on having a healthy pregnancy[9,39]. The *Healthy Baby, Healthy Me* curriculum focuses on basic food safety principles of Clean, Separate, Cook, and Chill[9,39]. The intervention group received the standard education from the *Healthy baby, Healthy Me* curriculum plus an additional 2.5 hours of pathogen-specific food safety education taught in 30-minute segments as part of lessons 3-7[9]. The additional information provided to the intervention group focused on *Listeria monocytogenes*, *Toxoplasma gondii*, *Salmonella*, and *Campylobacter jejuni*[9]. As discussed previously, these pathogens are especially dangerous to pregnant women and their fetus[34–37].

A 48-item pre/post survey was used to evaluate participants food safety knowledge and behavior change[9]. The survey was administered verbally by a trained researcher at the participants' home[9]. Visit one was conducted between lesson 1-3 and visit two was conducted following lesson 7[9]. Based on this evaluation, researchers found that both groups improved their awareness of pathogens, but the pathogen-specific education group improved more ($p<0.001$)[9]. Researchers found that the language of the program also had an influence on outcomes, with gain in awareness of Listeria monocytogenes and toxoplasmosis seen in the English-speaking groups[9]. However, Spanish-speaking participants in the pathogen-specific intervention group had greater food safety knowledge post-intervention than the English-speaking group[9]. Food safety behaviors like using a meat thermometer and refrigerator temperatures significantly improved in the pathogen-specific group[9]. Washing hands and rinsing vegetables showed greater improvements among English-speaking participants, while Spanish-speaking groups had higher improvements in refrigerating leftovers within an appropriate time frame after cooking[9]. Further,

both English and Spanish-speaking group significantly reduced their intake of foods that are commonly known to contain the pathogens discussed in the intervention[9]. Based on results from these participants, it appears that food safety education and the addition of pathogen-specific food safety information to food safety programming can improve knowledge and behavior related to food safety[9]. Greater improvements were seen in knowledge than in reported behavior change, which may suggest a need for greater focus on how to apply food safety knowledge as part of programming[9].

Research on food safety education for pregnant women in the United States is limited, but several studies outside of the U.S. have found that there is a need for these programs. For example, Jeffs (2020) found that pregnant women in New Zealand self-reported continuing to eat foods considered unsafe during pregnancy[40]. Average knowledge of food safety guidelines was high, but discrepancies persisted when evaluating actual dietary practices. Further, in Ghana, Asiedu (2021) conducted a cross-sectional study to evaluate the knowledge on food safety and the food safety practices among pregnant women[41]. The results of the study also found that a high percentage of participants had satisfactory food safety knowledge, but a large portion of those women did not follow food safety practices, and some had even experienced foodborne illness in the past six months[41].These studies suggest that more work needs to be done to educate pregnant women on the risks of food-borne illness to promote following of food safety guidelines.

Physical Activity during Pregnancy

Physical activity is another modifiable behavior that can impact the health of mothers and their fetus during pregnancy[42]. The DGA's recommend that pregnant women complete at least 150 minutes of moderate-intensity aerobic activity a week, as they are able[4]. Despite these

guidelines, research suggests that less than half of all pregnant women in the U.S. meet the physical activity recommendations[43]. Physical activity during pregnancy has been shown to reduce the risk of preterm birth, gestational diabetes, hypertension, and maternal mental health disorders[44,45]. Knowledge related to appropriate physical activity practices during pregnancy have been found to be limited, especially among limited resource communities[46]. Research has found that providing education and support related to physical activity is related to an increase in physical activity practices among sedentary pregnant women[47]. Limited research has been done to assess the feasibility of incorporating physical activity education into a nutrition education series, highlighting a key gap in current literature.

Soto et al. (2018) assessed the feasibility of implementing a physical activity intervention for pregnant women through the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)[48]. Latina women were recruited from 2 WIC sites in San Diego County, California and were invited to participate in a 12-week physical activity intervention[48]. The intervention was delivered in Spanish by trained, bilingual lay health workers in one hour long weekly sessions[48]. The sessions involved education and discussion on physical activity, physical activities (stretching, dancing), and goal setting activities[48]. In addition to the weekly sessions, the health workers organized two 45-minute walking groups each week at a local park[48]. This study found that WIC was a feasible community partner for implementing this type of intervention, however recruitment and retention of participants posed a significant challenge[48]. Further research is needed to identify ways to increase acceptability of the intervention for community members.

A 2021 study based in North Carolina found that pregnant women are knowledgeable on weight gain, safety of light exercise, and the benefits of physical activity, but are uneducated on

the appropriate types and intensity levels for physical activity during pregnancy[46]. Stickford et al. (2021) surveyed 75 participants, either pregnant or postpartum (<3 months post birth), from rural communities in Western North Carolina[46]. Participants were mostly white, low-income, and had varied educational backgrounds. Additionally, 40% of the respondents participated in WIC, 35% had Medicaid/Medicare, and 12% used SNAP benefits[46]. The survey questioned participants on their beliefs and habits related to physical activity during pregnancy[46]. Based on survey results, most of the respondents did not meet the American College of Sports Medicine (ACSM) recommendations for cardiorespiratory (33%) or muscular fitness training (12%)[46]. Despite low levels of reported physical activity, most participants reported benefits to being physically active during pregnancy[46]. These findings suggest that there are barriers present for pregnant women inhibiting them from being physically active, despite having the knowledge that it is beneficial for the health of themselves and their fetus[46]. Over 75% of participants in the study reported believing that physical activity during pregnancy can increase energy levels, improve labor and delivery, and improve their baby's health. Participants reported lack of time, fatigue, lack of motivation, and bad weather as the main reasons for not participating in physical activity[46]. These responses suggest that interventions that address the lack of motivation of participants, by providing support and encouragement to pregnant women, may result in increased participation in physical activity[46].

Maternal & Infant Health Outcomes Associated with Nutrition Interventions

Inadequate diet quality has been linked to adverse maternal and infant health outcomes including gestational diabetes mellitus, cesarian delivery, hypertensive disorders of pregnancy (gestational hypertension, pre-eclampsia, and eclampsia), preterm birth, and low birth weight[49–55]. Nutrition-related risk factors, like overweight and obesity, type 2 diabetes mellitus, and

hypertension continue to have a high prevalence in the United States (National Diabetes Statistics Report). The following section describes some of the health complications that can arise during pregnancy and can be prevented or managed through dietary intervention.

Hypertensive Disorders of Pregnancy

One consequence of poor diet quality is obesity and excessive gestational weight gain, conditions that have been associated with an increased risk of developing pre-eclampsia[50]. The Norwegian Fit for Delivery study found that participants with higher gestational weight gain (difference of 3.7 kg) were more likely to develop pre-eclampsia ($p=0.004$)[51]. Excessive gestational weight gain was found to increase the odds of developing pre-eclampsia by 3.5 times (95% CI 1.15-10.91, $p=0.028$)[51]. Additional studies have found that dietary modifications can play a role in reducing the risk of hypertensive disorders of pregnancy, like pre-eclampsia and eclampsia[50]. Dietary patterns that are high in fruits and vegetables, nuts, whole grains, legumes, fish, and vegetable oils have been found to have protective effects against hypertensive disorders, while Western dietary patterns pose an increased risk[50].

Yee et al. (2020) specifically evaluated participants' Healthy Eating Index (HEI) scores derived from their Food Frequency Questionnaire completed at visit 1 and a select group of maternal and infant health outcomes collected from patients' medical charts post-delivery[49]. The average HEI score among all participants was 63 (standard deviation=13), with scores varying based on education, income, insurance, and relationship status[49]. Lower levels of education and income, public insurance status, being unmarried, and identifying as non-Hispanic black or Hispanic was associated with lower HEI scores[49]. Further, women with lower HEI scores had higher instance of postpartum hemorrhage (adjusted Relative Risk (aRR)=3.3, 95% confidence interval (CI), 1.47-7.52) and hypertensive disorders (aRR=1.16, 95% CI, 1.02-1.31)[49]. This study

suggests that poor diet quality, as evidenced by low HEI scores, is associated with higher rates of hypertensive disorders of pregnancy.

Gestational Diabetes Mellitus

Nutrition and physical activity have also been shown to influence the development of gestational diabetes mellitus (GDM)[53–56]. The pathophysiology of GDM is described as the inability of pancreatic Beta cells to meet the increased demand for insulin during pregnancy[54]. Glucose is the main source of energy for fetal development, thus creating potentially severe implications for the mother if insulin resistance is not managed[54]. Medical Nutrition Therapy (MNT) has been shown to be effective at helping pregnant women manage their blood glucose[54]. Specific areas of nutrition that are relevant to the management of GDM include energy balance, carbohydrates (low glycemic index diet), protein, fat, folate, vitamin B12, and vitamin D[54]. Energy balance guidelines are consistent with general pregnancy guidelines, recommending appropriate Gestational Weight Gain (GWG) based on pre-pregnancy weight, since excessive weight gain is associated with developing GDM and more issues with managing blood glucose during pregnancy[54].

Akinyemi et al. (2023) conducted a retrospective analysis using United States Vital Statistics Records of deliveries occurring from January 2015 through December 2019[57]. The researchers specifically evaluated the relationship between GDM and adverse maternal and neonatal health outcomes, considering potential confounders like maternal SES and preexisting comorbidities[57]. The analysis consisted of 19,249,237 records of deliveries (1,212,589 with GDM and 18,036,648 without GDM) in the United States and were evaluated with a bivariate logistic model and multivariate analysis[57]. The bivariate logistic model was used to compare one variable with GDM status, and the resulting odds ratio showed the odds that participants with

certain characteristics of interest would have GDM compared to participants without the characteristic[57]. Post-hoc analyses were used to evaluate which groups were different from each other if a significant result was identified through the bivariate logistic model[57]. Ultimately, participants with GDM had higher rates of cesarian section, higher transfusion rates, and increased likelihood of ICU admission[57]. These findings emphasize the importance of educating pregnant women on the risks of GDM, especially among at-risk populations. Overall, diet and physical activity interventions may positively influence outcomes for expecting mothers, especially those with GDM.

Adverse Health Outcomes Among Infants

Diet quality during pregnancy has also been associated with the health of infants at birth and during early childhood. Hedderson (2024) conducted a cohort study with almost three thousand birthing parent-child dyads to evaluate how prenatal diet impacts infant growth[52]. Data were collected from the Environmental Influences on Child Health Outcomes (ECHO)-Wide Cohort Study (EWC), an ongoing cohort study that began enrollment in the 1980s in the United States[52,58]. Dyads for this study were recruited from eight cohorts participating in the ECHO program from 2007 through 2021[52]. Participants in the ECHO study are enrolled during pregnancy or at birth and are followed throughout childhood, with data collected on a variety of health outcomes and environmental exposures collected throughout their life[52,58]. Researchers were specifically interested in evaluating how prenatal diet quality influenced infant birth weight and infant growth from birth to 24-months of age[52]. Diet quality was assessed through calculated HEI scores based on participants food frequency questionnaire (FFQ) or 24-hour recalls[52]. This study found that higher prenatal HEI scores were associated with a higher percentage of infants within normal reference ranges for growth at 6-, 12-, and 24-months of age and less occurrence

of large for gestational age (LGA) infants[52]. Yee et al. (2020) also found that preterm birth, NICU admission, small-for-gestational-age infants, and low birth weight were higher among women with low HEI-scores[49]. These findings further support the importance of maternal diet quality, for the health of both the mother and her child.

Nutrition Education Interventions

This section will describe existing nutrition education programs targeting pregnant populations and common barriers to implementing these programs. Community, clinical, and virtual nutrition education programming will be evaluated. This section will also address cultural and socioeconomic considerations, and health literacy factors that influence program effectiveness and participant engagement among underserved populations.

Community-Based Nutrition Education Programs

Federally funded nutrition programs are a large component of community-based programming in the United States. Federal programs that offer some form of pregnancy-specific nutrition education in the U.S. include the Expanded Food and Nutrition Education Program (EFNEP), the Supplemental Nutrition Assistance Program-Education (SNAP-Ed), and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)[59–61]. This section will focus on interventions conducted through federally funded nutrition education programs and other community-based programs offered outside of a clinical or hospital setting.

Expanded Food and Nutrition Education Program (EFNEP)

The EFNEP program provides series-based nutrition education to their priority audiences across the country[60]. EFNEP is funded by the United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA)[60]. Funding is provided to 76 Land Grand

Universities (LGU's) across the United States (all states, the District of Columbia, and all 6 US territories). EFNEP is administered through each institution's Cooperative Extension program using a peer-educator model[60]. Limited research has been conducted on EFNEP programming with pregnant women. Boyd (2003) was one of the first studies to evaluate the feasibility of adapting EFNEP methodology for pregnant women in their community[62]. This study evaluated the process of adapting a curriculum for pregnant women, training peer-educators to teach the curriculum, recruitment of participants, effectiveness of the program at promoting behavior change in participants, and acceptability and usability of the program[62]. Participants were recruited from the Mississippi Delta region, an area that includes a high percentage of residents with limited resources, with more than 95% of pregnant women in the region using services provided by the county health department[62].

The nutrition education intervention used for this study was based on an unspecified EFNEP curriculum and was taught once per week over eight weeks[62]. Peer-educators were recruited from the local community and were trained by the study staff over a 3-month period before the intervention[62]. These educators had similar background to the target population, qualifications included being African American, being a mother, having a similar SES to the target population, and having at least a high school education[62]. Following training, 120 participants were randomly assigned to participate in the new EFNEP-based nutrition education curriculum, and 120 participants were recruited for the control group receiving WIC usual care[62]. Out of the 120 participants recruited, 48 completed the intervention and 65 completed the usual care. Focus groups revealed that the low retention rate was due to the time-commitment of the program being too great[62]. While this study set precedent for the feasibility of adapting a nutrition education program and training peer-educators, changes in nutrition-related behavior

were not assessed[62]. Retention continues to be a significant challenge with pregnant participants from limited-resource backgrounds, as was revealed in this study[62].

Perkins et al. (2020) found that EFNEP participation was associated with improvements in total Healthy Eating Index (HEI) and HEI subgroup scores[63]. EFNEP participant data was collected from the Web-based Nutrition Education Evaluation and Reporting System (WebNEERS) software[63]. The study specifically evaluated data from EFNEP graduates (with complete data sets) in Maine from fiscal years 2013-2016[63]. The researchers found that participants had significant improvements in diet quality ($p<.001$), as measured by HEI scores, following participation in EFNEP[63]. Notably participant total fruits, vegetables, and whole grain intake increased ($p<.001$)[63]. Researchers found that time spent in the program was correlated to HEI score, with less than 7 hours of participation being less effective at improving HEI scores when compared to 7 to 16 hours of participation[63]. These findings suggest that the longer, series-based format of EFNEP may be inclined to provide more benefits for participants as opposed to a program under 7 hours in duration.

Auld et al. (2015) evaluated the EFNEP Eating Smart-Being Active (ESBA) curriculum for its effectiveness at promoting positive nutrition-related behavior change in participants[64]. ESBA was compared to data collected from participants who completed the program with the previously used curricula over the year prior to implementing ESBA in that state[64]. The study was conducted over 5 states across the U.S: Arkansas, California, Colorado, New York, and Ohio, to show external validity of the curriculum[64]. ESBA was adopted by California and Colorado in 2007, and then was adopted by Arkansas, New York, and Ohio in 2009. Behavior change is assessed in EFNEP through a pre- and post-questionnaire[64]. Researchers found that ESBA was effective at increasing self-reported positive behavior change across states related to

food resource management, food safety, and nutrition[64]. Physical activity duration improved in all states except New York. A statistically significant difference was observed across states where participants increased consumption of dairy, fruit, and vegetables ($p<.001$)[64]. The analysis revealed that ESBA was more effective than the previously used curricula, supporting the multi-state adoption of this curriculum[64]. These findings support the use of series-based EFNEP curricula for providing participants with the knowledge and skills to promote positive nutrition-related behavior change post-intervention.

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

The WIC program provides supplemental nutrition and nutrition education to pregnant, postpartum (6 months post-birth), or breastfeeding women (up to their child's first birthday) and children aged 0-5 years of age. WIC is administered by the USDA's Food and Nutrition Service (FNS), with state funding allocations based on the number of eligible participants and the cost of food in each state [15]. Services are provided through State agencies at clinics within county health departments, schools, and hospital locations. Several studies have explored the benefits of WIC participation on maternal and infant health[65–68]. Participation in WIC has been found to improve diet and some nutrition related health outcomes, like GWG, among participants[66].

Findings related to the benefits of WIC participation for pregnant women are generally favorable but suggest more room for improvement. A retrospective cohort study using National Vital Statistics Birth Data from 2014 through 2018 and found that WIC enrollment decreased odds of preterm delivery for pregnant women diagnosed with gestational diabetes mellitus[66]. Venkatesh (2024) also found that WIC enrollment resulted in lower risk of adverse pregnancy outcomes[65]. However, upon analysis of diet quality among pregnant women participating in

WIC, the research findings suggest that more can be done to improve nutrition among this population[67,68].

Clinical nutrition interventions

Nutrition professionals are often underutilized when it comes to educating pregnant women, even though they have relevant resources and training[69]. Research shows that nutrition practitioners perceive client motivation as a barrier to nutrition education, however other studies have found that pregnancy is a prime time to make these changes because mothers are motivated to be healthier for their baby[69]. Van Scoyc (2021) surveyed nutrition practitioners (n=73) in North Carolina aimed to evaluate nutrition practitioner perceptions of providing nutrition education to a pregnant population and gaps in current practices[69]. The survey results revealed that although pregnant women report an increased interest in learning about nutrition and making behavior changes, nutrition providers report that interest and compliance are major barriers to providing information to this population[69]. Nutrition practitioners included in the survey include registered dietitians, dietetic technicians, dietetic interns, and nutritionists. Survey results revealed that the topics most requested by clients did not match with the topics that nutrition practitioners identified as being most important[69]. Nutrition practitioners reported that clients most often requested information on a general healthy diet and weight gain, however, practitioners identified food safety, lactation, and weight gain as most important[69].

Several studies have found that nutrition counseling can be an effective means for improving gestational weight gain outcomes[70,71]. Peccei (2017) found that nutrition counseling from an RDN during pregnancy resulted in lower gestational weight gain and a lower incidence of large for gestational age (LGA) infants[70]. Downs (2021) also found that nutrition counseling from an RDN led to lower GWG among pregnant women with overweight/obesity.

Research suggests that it may not just be nutrition counseling that provides the greatest benefit, but rather targeted nutrition messages and goals[72]. A randomized controlled trial conducted in Las Vegas, Nevada, evaluated standard nutrition counseling compared to nutrition counseling with specific messaging to increase leafy green vegetable and berry intake and physical activity on the cardiometabolic profiles of pregnant women with GDM[72]. The intervention group included 20 participants, and the control group included 18 participants, for a total of 38 enrolled[72]. The control and intervention groups in this study both received biweekly nutrition counseling over a 12-week period, but only the intervention group was given specific dietary changes to incorporate into their diet[72]. Participants kept food diaries, logging their fruit and vegetable intake at least three days each week of the study, and kept a physical activity journal to record their exercise[72]. Prior to starting the intervention, researchers collected anthropometric data, dietary habit data, and a blood drawing at the participants' 24-28-week gestation clinic visit[72]. The intervention then took place until the participants returned to the clinic for their 36-40-week gestation clinic appointment, where repeat measures were taken, and food and physical activity logs were collected[72]. The study found that the specific nutrition counseling messages focused on fruit and vegetable intake and physical activity promotion resulted in improved HDL-cholesterol ($p=0.03$), random blood glucose ($p=0.04$), and total serum antioxidant capacity ($p=0.001$)[72]. These results suggest that providing pregnant women with specific nutrition and physical activity goals has a positive impact on promoting behavior change.

Barriers & Facilitators to Implementing Nutrition Education

Social Determinants of Health

Social determinants of health (SDH) are defined by the World Health Organization (WHO) as non-medical factors that influence health outcomes[73]. These can include factors like income, education, food security, early childhood development, housing, social non-discrimination, and access to affordable health services[73]. Crear-Perry (2021) examined the state of maternal health in the United States, and how it is influenced by social and structural determinants of health[74]. Maternal mortality rates in the United States are among the highest when compared to other developed nations, with alarming differences persisting across racial groups[75]. African American women continue to have maternal mortality rates almost three times that of their non-Hispanic white counterparts[75]. Social determinants of health aim to put these disparities into perspective, allowing researchers to identify root causes of these inequities and negative health outcomes. One of the main barriers created by the health system structure identified in this study is a lack of affordable, accessible prenatal care due to a shortage of obstetricians and nurse midwife providers in low-income communities. On a larger scale, policies and practices are present across the country that fail to reduce health inequities. For example, paid maternity leave is not guaranteed in the U.S., and healthcare access and policies are limited and fail to cover the entire period of pregnancy and post-partum recovery.

Armstrong-Mensah (2021) specifically evaluated social determinants of health and their impact on maternal mortality in the state of Georgia[5]. Georgia continues to have among the highest maternal mortality rates by state in the country, at about 20% higher than the national average in 2018[5]. Limited availability of obstetrician-gynecologist providers in Georgia, especially rural regions, puts pregnant women at increased risk for adverse health outcomes,

including death[5]. A 2016 study conducted in-depth interviews with mothers and perinatal providers to learn more about the barriers to perinatal care in Georgia[76]. Researchers interviewed four service providers (2 nurses and 2 social workers) and 24 women who had given birth within the last year[76]. Most of the mothers interviewed were on Medicaid during their pregnancy, and cited difficulties with insurance as a reason for not receiving medical care early in their pregnancy[76]. Another barrier for women in rural communities was the time and cost associated with traveling to the doctor, as many hospitals labor and delivery units have closed or moved locations[76]. Both mothers and service providers emphasized the importance of having a trustworthy healthcare provider that is consistent throughout pregnancy[76]. Unfortunately, women in this study reported that throughout their pregnancy, doctors would move or insurance approval would change, requiring them to find a new provider[76]. These findings suggest a need for reliable prenatal care across Georgia, especially in rural communities.

Venkatesh (2022) conducted a cross-sectional study evaluating the risk of adverse pregnancy outcomes in pregnant women with GDM in the United States. Data from the U.S. National Center for Health Statistics natality data was used to determine the frequency, disparity, and risk of a series of maternal health outcomes across racial and ethnic groups. Results show that adverse pregnancy outcomes among pregnant individuals with GDM increased from 2014 to 2020, particularly hypertensive disorders of pregnancy. This study revealed disparities in maternal health outcomes, with Black and American Indian individuals having significantly increased risk for adverse maternal health outcomes when compared with White participants. These findings highlight the need for further research on how different racial and ethnic groups are disproportionately affected by poor maternal health outcomes, and how to address and improve these disparities.

Nutrition-related health literacy among pregnant women

According to the World Health Organization, pregnant women report midwives being their main source of nutrition information[77]. However, midwives report lacking the confidence, skill, and educational expertise to provide adequate nutrition and weight management advice to pregnant women[78]. Previous research found that pregnant women often also seek nutrition information from their primary care provider, but find it hard to understand what they are told or lack time to discuss the information[79]. Further, primary care providers (nurse midwives, OB-GYN, nurses) are facing employee shortages that increase this barrier to care[77]. Women also report that nutrition and physical activity education from health care providers was often vague, and they had to lead the conversation[79].

Lindsay (2017) explored the experiences of pregnant Latina women with healthcare guidance on gestational weight gain and physical activity found that these women did not feel they received adequate education from their healthcare provider. The women in this study were recruited through flyers posted at community centers, churches, and other local agencies in the Northeast United States. Participants were eligible for the study if they reported being between 22-36 weeks gestation with their first pregnancy (nulliparous), self-identify as Latina (Hispanic or Brazilian), having a singleton pregnancy, being 18 years of age or older, eligible for WIC, residency in Massachusetts or Rhode Island, residing in the US for at least 12 months, and providing informed consent. Participants were asked to participate in a semi-structured interview in their native language (Spanish or Portuguese) where researchers used a pilot-tested interview guide to learn about their beliefs about gestational weight gain and physical activity during pregnancy and their experiences with providers giving advice related to gestational weight gain and physical activity during their pregnancy. Interview recordings were transcribed, translated to

English, and analyzed using thematic analysis. Two qualitative researchers conducted this analysis independently prior to reviewing consistency between the two and ultimately reaching a consensus on main themes in the interviews. Two overall themes, patient–provider communication/advice about gestational weight gain and patient–provider communication/advice about physical activity during pregnancy, were identified by investigators.

Overall, 23 participants were interviewed for this study. Participants reported that they received little information about gestational weight gain from their healthcare provider and had trouble getting reliable information on the topic. Women in this study reported trouble communicating with their provider through an interpreter and were uncomfortable asking personal questions through an interpreter. Participants reported feeling more comfortable communicating with WIC providers about gestational weight gain but also feel that their primary care physician is more knowledgeable on the topic. When asked about physical activity, participants reported receiving little information or conflicting advice from providers. Most participants decreased their physical activity during pregnancy due to fear of harming their baby, pregnancy-related sickness, and low energy levels. The research indicates that there may be a barrier between pregnant women and the nutrition education provided by their healthcare providers. Federally funded programs like WIC, SNAP-Ed, and EFNEP are ideally situated to bridge that gap by providing more accessible information and encouraging participant communication with their healthcare provider.

Garcia, T. (2021). conducted a qualitative study with pregnant women to identify motivators, strategies, barriers, and learning needs related to healthy cooking[80]. The researchers conducted five focus groups in October and November 2019 with twenty participants total.

Participants were recruited through online recruitment via the University of Michigan, social media advertisements, and flyers at local prenatal clinics, WIC offices, cafes, libraries, and stores. Participants were included in the study if they were 18 years or older, were pregnant, and spoke English as their primary language. Additionally, researchers limited inclusion to participants with higher nutrition-related pregnancy risk factors, defined as having a family history of type-2 diabetes, having a close relative with gestational diabetes, or having overweight or obesity. Researchers found that common motivators for home cooking were having other children in the home, managing pre-existing conditions, and promoting fetal growth. Common strategies include meal planning, buying in bulk, and limiting added salt, fat, and sugar. Barriers to home cooking include pregnancy discomforts, burnout and feeling overwhelmed. These findings highlight the importance of nutrition education and support for pregnant women.

Food Security

Food Insecurity among expecting families is another barrier to meeting dietary guidelines. Research shows that food insecurity is associated with reduced fruit and vegetable intake among pregnant and breastfeeding women[81]. Nunnery (2017) reports results in *Public Health Nutrition* from structured interviews conducted with a WIC-eligible sample of pregnant women (n=198) in the Southeast USA[81]. Inclusion criteria for this study included age over 18, 13-27 weeks pregnant, and able to speak English or Spanish[81]. Women were recruited from January 2014-July 2014 during WIC maternity certification appointments[81]. A structured, closed-ended interview was conducted with each participant during their pregnancy certification appointment, or during a separate scheduled time at the WIC clinic[81]. The interviews included questions relating to sociodemographic characteristics, household food security status, frequency

of intake of fruits and vegetables, and home food environment by availability of variety of fruits and vegetables[81].

Household food security was measured using the USDA's 18 item Household Food Security Survey Model[81]. The 2013 Behavioral Risk Factor Surveillance System Fruit and Vegetable FFQ was used to assess frequency of fruit and vegetable consumption[81]. Finally, the home food environment was measured using an inventory of commonly eaten fruits and vegetables in the US[81]. A total of 44 items were included and participants indicated 'yes' or 'no' on the survey to indicate whether they had consumed the food in the previous 7 days[81]. SPSS was used to evaluate the data provided by participants (n=198). A one-way ANOVA was used to test the difference between variety of fruits (VAF) and variety of vegetables (VAV) by food security levels[81]. Bonferroni post hoc test was then used to control for the family-wise error when making pairwise comparisons. Next, several models were used to example the relationship between food security status and VAF/VAV[81]. Overall, it was found that as food insecurity increased, the variety of fruits and vegetables decreased. It was also found that variety of fruits and vegetables was associated with daily intake, meaning that an increase in food insecurity leads to a decrease in daily fruit and vegetable intake[81].

Shriver (2023) evaluated food security status in pregnant women and its relationship to eating behaviors and diet quality[82]. Participants were recruited from the Infant Growth and Development Study (iGrow), which was a two-year longitudinal study conducted in North Carolina from January 2019 through April 2022[82]. Participants (n=299) completed this studies survey during their third trimester of pregnancy at a lab visit that was part of the larger iGrow study[82]. Dietary intake, eating behaviors, and food security status were assessed through this survey[82]. Dietary intake was evaluated using a 26-item Dietary Screener Questionnaire (DSQ),

eating behaviors were assessed with a modified Dutch Eating Behavior Questionnaire (DEBQ), and food security status was measured with a 6-item Short Form Household Food Security Module from the USDA[82].

The findings from this study revealed poor diet quality, consistent with what other studies have found[82]. Added sugar intake, total fat intake, and total energy intake exceeded the American Heart Association and Institute of Medicine recommendations, while under consuming fruits and vegetables based on the Dietary Guidelines for Americans recommendation[82]. This study also found that food security was related to less added sugar intake ($p=0.03$) and less energy from fat ($p=0.01$), however both groups had intakes over the recommended amount[82]. While these findings suggest that food insecurity is related to increased added sugar and fat intake, all pregnant women in the study had poor diet quality, reinforcing the need for nutrition education and accessible healthful food for expecting families[82].

Social Support during Pregnancy

Social support, or lack thereof, is a barrier pregnant and lactating women face when working to meet their nutritional goals. Gamba (2019) found that not being married/not having a partner is associated with increased sugar sweetened beverage intake, decreased diet quality and higher overall energy intake[83]. Twenty-four-hour dietary recalls from 1,154 pregnant women who participated in the 1999-2006 National Health and Nutrition Examination Survey (NHANES) were collected and evaluated for diet quality[83]. Data from 1999-2006 NHANES was used because pregnant women were intentionally oversampled during this period to provide better estimates for this population[83]. Diet quality was measured with the Alternate Healthy Eating Index (AHEI-P), a diet quality measure adapted for pregnant women[83]. Between 1999-2006 NHANES collected one 24-hour recall from participants 1999-2002 and two 24-hour

recalls from participants 2003-2006[83]. Diet quality was averaged among the two 24-hour recalls participants provided if needed[83]. The NHEI-P survey includes components for fruits, vegetables, white: red meat, fiber, polyunsaturated fatty acids: saturated fatty acids, folate, calcium, and iron[83]. Sugar sweetened beverage (SSB) consumption was measured based on participants reported intake of 12 oz. servings of SSB[83].

Results of this secondary analysis reveal that SSB consumption is associated with a decrease in AHEI-P[83]. The average AHEI-P score was 52.6 among pregnant women who did not drink SSB compared to 39.7 in pregnant women who consumed 2 or more SSB per day[83]. Additionally, an increase in SSB consumption is associated with an increase in total calorie intake[83]. Marital status was found to impact SSB consumption among pregnant women, with married women consuming less SSB compared to single, divorced, or widowed women[83]. Having an income <100% of the federal poverty line (FPL) was also found to be associated with an increase in SSB consumption compared to women reporting an income >300% of the FPL[83].

Although there are benefits to father/partner involvement during pregnancy, barriers are present for fathers/partners as well. Often, health care providers focus on the mother and infant during care, failing to realize the importance of the partner[84]. Albuja (2019) evaluated a "father-friendly" prenatal care clinic design and found that men felt that there was a higher social expectation that they be involved in the pregnancy vs. a typical clinic that focuses on mothers-infant dyad only[84].

A qualitative study conducted by Dychtwald et al (2021) investigated the experience of male partners in WIC programming[85]. Investigators conducted semi-structured interviews with the individual members of 8 dyads, or 16 participants total[85]. Participants were recruited using flyers and by approaching participants in-person at 11 WIC clinic offices in Metro-

Philadelphia[85]. Eligibility criteria included age 18 or older, WIC enrollment within the last 6-months or being a current WIC participant, WIC-enrolled mother and male partner are in a relationship during enrollment period, English-speaking, and the ability to complete the interview[85]. All participants in this study were married, however for recruitment purposes the relationship between dyads was not defined by marriage, but by pregnancy having resulted of the relationship of the dyad[85].

Investigators developed an interview guide based on previous literature, as there was no prior research done specifically with men and their experiences with WIC[85]. Men were asked about their experiences with WIC and their attitude surrounding interactions at WIC clinics[85]. Investigators also focused on the perceived role that the men felt they had regarding their partners pregnancy, breastfeeding, and participation in WIC[85]. Mothers were also interviewed about their experiences with WIC, including nutrition counseling and breastfeeding support[85]. Participant interviews lasted between 30 minutes and 3 hours[85]. The investigators transcribed the interviews verbatim from recordings prior to conducting thematic analysis[85]. A manual inductive coding approach was done first, followed by use of NVivo software to supplement the patterns found by the investigator[85]. Following the qualitative analysis, the research team discussed the findings and redefined some of the themes using a theory-based framework based on the Social Ecological Model[85]. Within the male participants it was found that 2 of the male participants participated in WIC, 2 attended but remained in the waiting room, and the remaining 4 had not been involved in WIC[85]. The investigators identified 9 subthemes that fell under the main theme, barriers to participation [of men in WIC programming][85]. Subthemes included pride, fear, fear of coercion, unacknowledged roles, feelings of exclusion, hours of operation, WIC program interactions, WIC office environment, and WIC name[85].

Investigators found that women identified barriers that burdened their male partners, such as pride, lack of acknowledged paternal role in parenting, and fears about participation[85]. Women reported that men associate support programs, like WIC, as welfare and often feel that participation in these programs is harmful to their pride[85]. Further, both male and female participants reported some concern about attending WIC programs, as they were afraid that social services could use that as an indication that the family was not financially fit to have their child at home[85]. Women also report that men typically are not given the same expectations or credit when it comes to parenting, which could dissuade men from trying to be more involved[85]. Male participants reported concerns about being expected to attend WIC visits as they would need to miss work and felt excluded in the environment[85]. Overall, these interviews revealed concerns on the part of both mothers and fathers related to involvement in WIC programming and identify changes that can be made to support families in similar programs[85].

Peer Nutrition Education in Community Health

Effectiveness of peer-led interventions

Anliker (1999) found that peer-educators were effective at delivering nutrition education at Maryland WIC clinics[86]. Peer-educators for this study were trained by the project nutritionist and the project manager who guided peer-educators on recruitment strategies and nutrition content for the three sessions. While peer-educators were effective at delivering programming and support to participants, the author notes that peer-educators also need extensive training, monitoring, and support to maintain consistent program delivery. This study emphasizes the importance of considering the pros and cons of using peer-educators. Peer-educators can relate to the target audience and provide support; however, they also face similar life challenges to

participants which can impact their ability to stay focused on delivering the program if they are not provided with sufficient support and training from program leaders[86].

Peer-education has been used for breastfeeding interventions in the United States to promote breastfeeding and to provide support for new mothers[87]. Martinez et al. (2020) evaluated the impact of adding a lactation peer-counselor to the care team at a prenatal clinic in Chicago, IL[87]. This study is a secondary analysis on data collected as part of the Navigating New Motherhood (NNM) study[87]. The NNM study took place over a 12-month period, from May through October 2015, and a lactation peer-counselor was added to the team at the midpoint of the study. Participants (n=218) completed surveys at baseline, immediately after delivery, and at the 6-week postpartum visit on a variety of topics, including breastfeeding specific questions to assess breastfeeding training, confidence, and comfort. An additional follow-up 6-months postpartum was conducted over the phone to assess contraception and breastfeeding outcomes[87].

Results for participants who delivered in the first half of the intervention period (n=119) were compared to the second half of the intervention (n=99) once the peer-counselor was added to the care team[87]. The primary outcome of interest in the study was continued breastfeeding at 6 weeks postpartum and secondary outcomes of interest included breastfeeding comfort, confidence, training satisfaction, any breastfeeding, and total breastfeeding duration. Breastfeeding initiation rates were found to be higher among women who had access to the lactation peer-counselor ($p=0.04$); however, the overall duration of breastfeeding did not differ significantly between groups. These findings suggest that there is some influence of having a lactation peer-educator, but more research is needed to determine how to further improve breastfeeding rates using peer-educators[87].

Oliver, T. (2020) conducted a qualitative study evaluating the use of a peer-mentor model as a means of providing nutrition education to users of an emergency food pantry (EFP)[88]. The EFP in this study, located in Pennsylvania, serves around 900 families each month by providing nutrition education, parenting classes, job search assistance, and financial literacy classes. Researchers developed a "train-the-trainer" peer mentor program called *Community Cooks*, designed to prepare trained community members to provide nutrition education to their peers. Community members interested in becoming mentors completed an application and were selected based on their leadership experience and demonstrated reliability through previous volunteer roles. Of the 31 applicants, 15 were invited to participate and 11 completed the program. The peer-mentors participated in nine 60-minute training sessions prior to leading community workshops. Peer-mentors were also required to score at least 80% on a quiz assessing their attained knowledge of the training content. Training materials for the program were developed from the Cooking Matters Toolkit and included information on cooking skills, healthy eating, and easy recipes[88].

Following implementation of the Community Cooks program, two semi-structured focus groups were conducted with the peer-mentors[88]. Two members of the research team transcribed the focus group audiotapes and analyzed the data for key concepts and themes. Overall, feedback from peer-mentors was positive. Researchers found that the peer-mentors felt empowered by participating in the program and were able to spread the knowledge they learned to family and friends. Barriers were also identified by the peer-mentors, including transportation struggles of EFP members and hesitancy to attend "workshop" events out of a dislike for lectures. The peer-mentors suggested re-branding to "cooking classes" or "events" and suggested providing nutrition education to members as they shop, rather than needing to attend another "event"

during the month. Overall, peer-mentors benefitted from participating in the program and were motivated to share the knowledge they gained with their peers. Additional research is needed to identify the impact of this program on the greater EFP community, but this study supports the feasibility of training peer-mentors to provide nutrition education and reveals the benefits of such programs on the peer-educators who participate[88].

Training peer-educators

EFNEP nutrition education programming is delivered by paraprofessional peer-educators. Research has shown that peer-educators can be effective at promoting nutrition and health messaging at the community-level, therefore it is important to ensure that these educators are receiving consistent, comprehensive training. Chlipalski (2018) evaluated the training needs of EFNEP paraprofessional peer-educators through interviews with seven EFNEP supervisors and fifteen paraprofessionals. Researchers interviewed supervisors and paraprofessionals from March 2014 through March 2015 using a semi-structured interview protocol. Transcribed interviews were analyzed using a deductive thematic approach and additional codes derived from instructional design tenets and adult learning principles. Researchers identified a need for online training, challenges of current in-person training, a need for organizational support, and benefits of online training. This study served as a basis for developing an online nutrition education training for EFNEP peer-educators on the EFNEP "Eating Smart, Being Active During Pregnancy" lessons.

Chlipalski (2019) conducted a quasi-experimental pre-posttest study evaluating the effectiveness of the previously discussed online training developed for EFNEP paraprofessional peer-educators[89]. Paraprofessional peer-educators were randomly assigned to the intervention (n=67) or delayed intervention group (n=64)[89]. Demographic and preassessment surveys were

completed by both groups during the first week, prior to the training being made available. After completing the preassessment surveys, the intervention group was given access to the online training to complete within two weeks. Both groups then completed the post assessment surveys and the delayed group was then given access to the online training for two weeks and retook their post assessment surveys. Results from the surveys found that online training had a positive impact on paraprofessionals reported self-efficacy and knowledge. The intervention group had significant improvements in knowledge from pre to posttest ($p<0.05$) and the delayed intervention group improved in all three survey measures (knowledge, self-efficacy, scenario evaluation) when comparing their first posttest to their posttest results after completing the training ($p<0.05$)[89]. These findings support the feasibility of training paraprofessional peer-educators to teach prenatal lessons using an online, video-based training model[89].

Core Competencies

Core competencies are used to define the knowledge and skills required for a specific job position. SNAP-Ed and EFNEP leaders have developed and implemented Core Competencies to help guide staff training and evaluation. Baker et al. (2023) describes the process of revising these core competencies to better reflect the roles of program leaders, supervisors, professional educators, and paraprofessional educations that work for SNAP-Ed or EFNEP[90]. The core methodology used was the DACUM process (Developing a Curriculum), which involves recruiting employees to create a panel that assists with revision and validation of core competencies[90]. Next, researchers conducted a crosswalk analysis where core competency frameworks from other professions like public health professionals, Registered dietitian nutritionists, community health workers, and WIC paraprofessionals were compared to the proposed SNAP-Ed and EFNEP core competencies[90]. Evaluation of job descriptions from

several SNAP-Ed and EFNEP locations were compared to identify discrepancies and to create a composite job description[90]. Baker et al. (2023) found that this process was effective at developing a revised set of core competencies for three of the four SNAP-Ed and EFNEP roles[90]. Professional Educators were unable to come to a consensus on core competencies due to the wide differences in job duties across sites[90]. Program leaders, supervisors, and paraprofessional educators were able to reach consensus on their job duties and core competencies[90]. This study highlights the need for continued revision of core competencies to maintain assessment tools that are relevant to the staff's current job duties.

Educator Perspectives and Qualitative Inquiry

RE-AIM/PRISM

The integrated RE-AIM/PRISM framework is used to outline the relevant factors involved in program implementation. The Practical Implementation Sustainability Model (PRISM) includes the 5 RE-AIM outcomes: reach, effectiveness, adoption, implementation, and maintenance. This framework has been widely applied to the development and implementation of public health programs. For example, Balis (2024) conducted a qualitative research study on perinatal Food is Medicine (FIM) program applying the RE-AIM framework[91]. A purposive sampling technique was used to recruit program implementers and supporters from across the United States. Semi-structured interviews (n=36) were used to explore the perceptions of these stakeholders on perinatal FIM programs. A deductive thematic approach was used to analyze participant interviews, and meaning units were categorized into the RE-AIM outcomes of interest. Based on the findings of this study, perinatal FIM program supports feel that participants may be unaware of programs and discussed the need for more recruitment strategies to help reach participants. When asked about program effectiveness, interviewees cited improved

birth outcomes and healthcare cost savings, however these outcomes are not often measured as part of programming. Program adoption was supported by interviewees with the suggestion to have a more standardized, consistent program. Additionally, more robust evidence supporting the effectiveness of these programs would be needed to improve the confidence of program supporters. Overall, program supporters felt that FIM programs could address a gap in perinatal healthcare needs, but more work needs to be done before stakeholders are ready to commit to implementing and maintaining these programs.

Fort et al. (2023) presents an updated approach to the PRISM framework by emphasizing the need to apply an equity lens throughout public health and health services research. The researchers argue that addressing systemic inequities during context assessment, intervention design, and implementation improves the effectiveness of programs. Practical strategies include engaging marginalized communities, examining organizational power dynamics, and continuously evaluating equity. These additional considerations are especially important when working with vulnerable populations, including pregnant women. This project has worked to incorporate an equity lens by including EFNEP paraprofessionals and participants into the evaluation process.

Thematic Analysis

Thematic analysis is a methodology used by researchers to evaluate qualitative data[92]. This method does not require the use of any one framework or theoretical model, allowing researchers flexibility in their approach[92]. Braun & Clark (2006) first defined the six steps of thematic analysis, which have been further defined in more recent publications[92,93]. The six steps of thematic analysis include (1) familiarize yourself with the data, (2) Generate initial codes, (3) Search for themes, (4) review potential themes, (5) Define and name themes, (6) write up[93]. This

methodology allows the researcher to become familiar with the data through repeated analysis and requires clear definitions for themes identified in the data[93]. This methodology has been used across public health, and within nutrition interventions, to evaluate themes in qualitative data[94,95].

Stotz (2023) applied a thematic qualitative analysis method to evaluate themes across a set of interviews (n=25), surveys (n=41), and one focus group aiming to learn more about the approaches used by USDA nutrition educators[94]. Researchers identified four main themes from the data collected: nutrition educators serve many roles, they focus on participant centered programming, they rely on community partnerships and identify potential solutions to challenges they face with programming[94]. The findings from this study help to understand nutrition educator experiences with programming, allowing for future research utilizing nutrition educators to better understand their role in programming[94].

Oliver et al. (2023) explored the experiences of peer mentors facilitating a food pantry-based nutrition education program in southeastern Pennsylvania[95]. Researchers conducted two focus groups with a total of ten peer mentors who had facilitated lessons as part of the nutrition education program[95]. The focus groups were recorded, transcribed verbatim, and analyzed using an inductive thematic analysis approach[95]. This allowed the researchers to identify key themes based on patterns that emerged directly from the participants' discussions, rather than imposing predefined categories[95]. The study aimed to capture both the successes and challenges the mentors faced, as well as the personal impact of serving in their role[95]. Peer mentors reported successes in building trust and sharing nutrition knowledge but faced challenges managing group dynamics and participant engagement[95]. The experience empowered the mentors, improving their confidence and communication skills, and highlighted the value of shared lived experiences in delivering effective nutrition education[95]. Overall, thematic analysis has been shown to be a

useful tool for program developers, but also implementers. The peer-educator model used by EFNEP has the unique ability to gather feedback from educators who are familiar with their participants and community, making thematic analysis a useful tool for program development projects.

Theoretical Support

The Health Belief Model

The Health Belief Model is based on six constructs that predict health behavior[96]. The constructs are risk susceptibility, risk severity, benefits to action, barriers to action, self-efficacy, and cues to action[96]. Nutrition education based on principles of the Health Belief Model (HBM) have been shown to support increased nutrition knowledge. A 2017 study in northeast Ethiopia investigated the effect of nutrition education, based on the HBM, on nutrition knowledge and dietary behavior change in a cohort of 138 healthy pregnant women[97]. Nutritional knowledge, dietary practices, and Health Belief Model constructs were all measured using structured pre/post questionnaires[97]. The intervention group participated in a nutrition education session every 15 days for 5 months, including topics that related the HBM to pregnancy risks identified in this population[97]. The control group for this study received 3 days of nutrition education with no follow-up sessions[97]. Researchers found a significant difference in nutrition knowledge post-intervention between the two groups. The intervention group had significantly higher nutrition knowledge and dietary practices when compared to the control group, suggesting that nutrition education based on the Health Belief Model can improve outcomes in this population[97].

Health Belief Model constructs highlighted in UGA *Food Talk* are risk severity, risk susceptibility, barriers, benefits, and self-efficacy. These constructions continue to be applied to

the adapted curriculum UGA *Food Talk: Baby & Me*. This research aims to provide participants with the knowledge to identify these constructs within their own lives. For example, specific disease states, like hypertension and diabetes, are discussed in the curriculum, showing risk severity and risk susceptibility.

Andragogy (Adult Learning Theory)

Andragogy, the core principles of adult education, were also used when developing UGA *Food Talk* and UGA *Food Talk: Baby & Me* to create an interactive, participant-centered curriculum. Adult Learning Principles were originally developed to aid educators in working with adult learners, who have different needs than children[98]. Motivation, previous experience, engagement, and how learning is applied are the major differences identified between adult and youth learning principles[99]. Adults have a greater need to understand why they are learning something, and how the material will relate to their previous and future experiences[99]. Additionally, adult learners need more control over what they are learning, want to feel they can direct the educational experience, and appreciate being involved in assessing the learning experience[99]. Adult learners typically seek out a teacher or helper when needed, but do not rely on that person for learning to take place[98]. Adult learners also have increased barriers to learning, like a lack of time, lack of confidence, lack of information about opportunities to learn, and lack of motivation[99].

Further, Adult Learning Principles emphasize the importance of creating a learning environment that is appropriate for adults[98]. A typical classroom layout may dissuade adult learners from feeling a sense of control in the environment, reminding them of typical classroom expectations for children in school[98]. Adults appreciate having a more open space where the instructor is a part of the discussion group, rather than a lecturer[98]. Evaluation techniques also

need to be adapted to meet the needs of adult learners[98]. Typical evaluations can seem judgmental; therefore, self-reflection and feedback are encouraged to leave space for constructive conversations surrounding learning[98].

Best Practices for Nutrition Education for Low-Income Audiences

Baker (2020) identified a framework for best practices in nutrition education, composed of 28 practices, within 5 domains[100]. A panel of nutrition experts identified the best practices and recommend that they be applied through multiple levels of the Social Ecological Model[100]. The 5 domains identified are program design, program delivery, educator characteristics, educator training, and evaluation[100]. The 28 best practices fall into one of the previously mentioned 5 domains.

Program design includes the following best practices: content areas, evidence-based, goal setting, appropriate for audience, literary considerations, theoretical basis, goals and objectives, and the social ecological model[100]. Content areas and evidence-based refer to including relevant material on nutrition, physical activity, food resource management, food safety, and more based on the current Dietary Guidelines for Americans[100]. Behavior change encourages participation by program participants in setting behavior change goals[100]. The curriculum is also recommended to meet the needs of the target audience by ensuring appropriate literary level of materials, appropriate language offerings, consistency of recipes to program goals, and appropriate activities for the target audience[100]. Finally, program design should include a strong theoretical basis, including the social ecological model, as well as clear goals and objectives[100].

Transtheoretical Model

A 2010 California WIC study applied the Transtheoretical Model to development and assessment of their intervention[10]. The Transtheoretical Model describes stages of readiness or change in a population[10]. While the proposed study does not explicitly measure participant readiness to change, behavior change is assessed through pre/post questionnaires. In addition to asking participants about readiness to change, the study asked about frequency of consuming the target food groups[10]. The national EFNEP 30-question questionnaire and an additional 10-question questionnaire developed for use in this project include questions of the same format that ask participants to report the number of times different food groups were consumed per week. Including this type of question allows evaluation of behavior change related to intake of different food groups, reflecting changes in dietary intake following the intervention.

Social Ecological Model

Educator characteristics include relating to the target audience, expertise in content, expertise in teaching methods, and performance expectations as best practices[100]. The Social Ecological Model analyzes the interactions between the individual, the community, and their physical, social, and political environments in relationship to health. The Social Cognitive Theory describes interactions between the individual, others, and their environment on individual health behaviors. Applying the Social Ecological Model to practice encourages change to both the physical and social environment impacting an individual, not only individual health behaviors. The proposed study involves partnership with central pregnancy centers/ agencies in each participating county that participants have previous involvement with, building on the individual/ environmental connection discussed in these theories.

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CHAPTER 3

FOOD TALK: BABY & ME: A TOOL FOR EXTENSION EDUCATORS TO TEACH PREGNANCY-SPECIFIC NUTRITION [1]

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ABSTRACT

Background: UGA EFNEP delivers nutrition education to low-income Georgians through the UGA *Food Talk* curriculum. Though pregnant women are a priority audience, no pregnancy-specific curriculum has been offered since the early 2000s, highlighting the need for an adapted program.

Introduction: The UGA *Food Talk* curriculum was adapted to include evidence-based, pregnancy-specific guidelines on nutrition, physical activity, food safety, prenatal supplementation, gestational weight gain, and energy needs.

Methods: Informal interviews with UGA EFNEP Extension Supervising Agents and a literature review informed both the need for and content of the curriculum adaptations. UGA EFNEP staff piloted the eight-session adapted curriculum, provided feedback, facilitated recruitment, and implemented the adapted curriculum. The evaluation included standard EFNEP paperwork, and a pregnancy-specific nutrition knowledge and behavior change questionnaire adapted from a previously validated survey.

Results: UGA EFNEP staff identified the need for pregnancy-focused education in their communities, contributed to curriculum refinement, and partnered with local agencies to enroll 39 EFNEP-eligible participants in the program.

Discussion: The eight-session curriculum was feasible and well received. However, low retention across sessions suggests the need to explore better ways to engage pregnant participants in multi-session programs.

BACKGROUND

The Expanded Food and Nutrition Education Program (EFNEP) is a federally funded nutrition education program administered nationally through the United States Land Grant University Cooperative Extension services[60]. In Georgia, the University of Georgia (UGA) EFNEP delivers nutrition education programming across the state[60]. In fiscal year (FY) 2024 UGA EFNEP reached 2,869 adult Georgians, 176 of which were pregnant women[101]. Pregnant women are considered a priority audience within EFNEP nationally; however, a pregnancy-specific nutrition education curriculum has not been available in Georgia since the early 2000's[102]. This gap in pregnancy-specific nutrition education presents an opportunity to adapt an existing UGA EFNEP curriculum to better meet the needs of pregnant participants and support maternal and infant health outcomes in Georgia.

INTRODUCTION

Georgia faces a critical public health challenge, ranking among the states with the highest maternal mortality rates in the United States[6]. Communities with limited resources and from racial minority groups are disproportionately affected by poor maternal health outcomes[5]. UGA EFNEP is well positioned to address these disparities by providing series-based, comprehensive nutrition education through a paraprofessional peer-educator model[60]. UGA EFNEP peer-educators, called Program Assistants (PA's), are trained by UGA EFNEP Extension Supervising Agents to deliver evidence-based nutrition education curricula in their communities. EFNEP PA's must have a high school diploma or GED and are typically members of the community they support, are able to teach a series of hands-on nutrition lessons, are committed to providing sound instruction, are able to influence the lives of those they teach, and are dedicated to reaching diverse low-income audiences[102].

Nutrition education has been shown to improve maternal and infant health outcomes by enhancing diet quality, reducing food insecurity, and promoting safe food and physical activity behaviors[8,9]. Recent research in Georgia supports the efficacy of such interventions delivered through the EFNEP model. For instance, the Project DINE (Dads In Nutrition Education) study demonstrated that participation in UGA EFNEP's virtual eight-week nutrition education program improved overall diet quality among African American pregnant women and their partners[18]. However, the Project DINE study was implemented using the general UGA EFNEP adult *Food Talk* curriculum, and participants expressed a need for more pregnancy-specific nutrition content[18]. Adapting UGA EFNEP *Food Talk* to meet the unique needs of pregnant participants strengthens EFNEP's ability to support maternal and infant health outcomes statewide.

The UGA EFNEP *Food Talk* has been the curriculum delivered in Georgia for all adult audiences, including pregnant women, since 2008[60]. It is an 8-session nutrition education curriculum that aims to promote participant behavior change related to diet quality, food safety, food security, food resource management, and physical activity[60]. This current study evaluates the feasibility of developing and implementing an adapted version of the UGA EFNEP *Food Talk* curriculum, tailored to meet the needs of low-income pregnant women in Georgia. Adaptations were informed by the Framework for Best Practices in Nutrition Education for Low-Income Audiences and principles of Adult Learning Theory, ensuring content was learner-centered and practical[98,100]. This study aligns with the broader Extension mission of addressing health disparities among low-income communities by equipping UGA EFNEP paraprofessional peer-educators with the resources to deliver evidence-based, specific nutrition education for low-income pregnant women in Georgia[102].

METHODS

UGA EFNEP Pilot Team Recruitment:

In December 2022, ten UGA EFNEP staff were contacted by the UGA EFNEP State Coordinator over email regarding grant funding received from the Georgia CTSA pilot grants program to develop and pilot a pregnancy-specific nutrition education curriculum. The UGA EFNEP State Coordinator emailed five Extension Supervising Agents and five Program Assistants (PA's) who had either previously worked with pregnant individuals or who had expressed an interest in expanding their reach to this population. In the email message, UGA EFNEP Extension Supervising Agents were invited to participate in informal interviews with the research team to discuss the need for a pregnancy-specific curriculum in their counties. Of the five Extension Supervising Agents emailed, two were interested in participating in the pilot study. Four of the five PA's joined the pilot study. An additional PA, who works in the same county as one of the initial pilot study PA's, joined in November 2024. Ultimately, three PA's, two of the initial four PA's and the new PA, delivered the adapted program and the initial two Extension Supervising Agents remained active in the pilot for the duration of the study (**Table 1.1**).

Needs Assessment:

Informal interviews with the two UGA EFNEP Extension Supervising Agents were conducted over Zoom in January 2023. These two agents had been working with pregnant women already or had identified a need for working with pregnant women in their community and were interested in expanding their offerings. An exploration and evaluation of EFNEP program offerings for pregnant women across the country was also conducted by searching

PubMed using keywords like “EFNEP”, “pregnancy”, “pregnant”, and “maternal”. Additionally, specific states EFNEP webpages were reviewed for resources and materials available for pregnant women.

Literature Review:

A focused literature review was conducted to inform the adaptation of the UGA EFNEP *Food Talk* curriculum. Searches were performed in PubMed using keywords such as “nutrition education”, “pregnancy nutrition”, “maternal health”, and “EFNEP”. Priority was given to articles published from 2016 onward. Reference lists of relevant articles were also reviewed to identify additional studies. Key findings from this review guided the main content themes that were included in the adapted curriculum to align with the most recent, evidence-based recommendations.

Curriculum Adaptation:

The *UGA Food Talk: Baby & Me* curriculum adaptation process took place from fall 2022-spring 2023. Curriculum adaptations were led by a research team including a UGA Nutritional Sciences research faculty (Extension Specialist and Registered Dietitian) and a UGA Nutritional Sciences doctoral student and dietetic intern, with additional review and input provided by the UGA EFNEP state staff Registered Dietitian Nutritionist (RDN). The EFNEP pilot team also provided feedback on the proposed adaptations in January 2023 via Microsoft Forms.

The UGA EFNEP *Food Talk: Baby & Me* curriculum was adapted from the UGA EFNEP *Food Talk 3.1* (2022) curriculum. Existing *Food Talk* sessions were adapted to incorporate pregnancy-specific content, including the addition of clear objectives and goals that aligned with

the new content. The UGA EFNEP *Food Talk 3.1* & *Food Talk: Baby & Me* curricula both consist of a series of eight sixty-to-ninety-minute sessions, delivered once weekly over eight weeks or twice weekly over four weeks. For UGA EFNEP *Food Talk: Baby & Me*, major adaptations were made to sessions one, two, three, and five, while sessions four, six, seven, and eight remained mostly consistent with the original *Food Talk* curriculum. These additions were also aligned with EFNEP's core areas: diet quality, physical activity, food safety, food resource management, and food security. Each session incorporates a combination of educator-led discussions, interactive activities, and a food demonstration. Each session also includes an educational extender for participants to reinforce learning and promote continued behavior change at home. An overview of the major components of the program is outlined in **Table 1.2**.

Participant Recruitment:

UGA EFNEP Extension Supervising Agents identified and connected with local agencies in their counties that provide services to pregnant women in the community. The agencies included pregnancy resource centers, low-cost clinics, and public health department offices. Recruitment flyers (**Figure 1.1**) were distributed to potential agencies as well as other community locations, including grocery stores and community centers.

As part of the usual UGA EFNEP requirements, Extension Supervising Agents facilitated the completion of partnership agreements (**Figure 1.2**) between UGA Cooperative Extension Services and county agencies that wanted to receive UGA EFNEP *Food Talk: Baby & Me* programming.

Implementation:

Following the completion of Partnership Agreement forms, local agencies facilitate the recruitment of participants for the UGA EFNEP *Food Talk: Baby & Me* program. Once a group of participants had been recruited, the agencies provided a class schedule and space for PA's to implement the program. The UGA EFNEP *Food Talk: Baby & Me* program was delivered in-person, with sessions offered once a week for eight weeks or twice a week for four weeks.

Evaluation:

A pre/post design is used for EFNEP programming, with a standard, validated 30-question questionnaire used across the country[103]. The pre-program form is called the "entry form" and the post-program form is called the "exit form". This form includes 30 nutrition-related behavior questions (**Figure 1.3**). The EFNEP 30-question questionnaire is divided into evaluative questions targeting participant behavior change related to the core areas of diet quality, food safety, food resource management, food security, and physical activity. Questions 1-11 target diet quality, questions 12-14 evaluate physical activity practices, questions 15-18 ask about food safety, questions 19-27 focus on food resource management, and questions 28-30 assess food security.

To further assess participants pregnancy-specific knowledge and behavior change, a 10-question questionnaire (**Figure 1.4**) was adapted from a previously validated survey to be used as part of the evaluation process[104]. Survey questions and answer choices were adapted to match the format and wording of the standard EFNEP 30-question questionnaire, for continuity across the entire survey.

Baseline questionnaire data were summarized using descriptive statistics. For scaled questions, results are presented as means and standard deviations. For categorical or frequency-

based items, the number and percentage of participants selecting each response option are reported. Program graduates' data (pre/post) were analyzed using a Wilcoxon signed rank test using Python (version 3.13.5).

RESULTS

Needs Assessment:

The main finding from the informal interviews conducted with UGA EFNEP Extension Supervising Agents was that these Agents and their PA's felt unprepared to provide pregnancy-specific nutrition guidance to participants. A pregnancy-specific curriculum was desired, along with related training and resources. This feedback supported the need for adapting the UGA EFNEP *Food Talk* curriculum to include pregnancy-specific information, along with related training (*described further in Chapter 4*).

Upon exploration of the current literature of EFNEP offerings across the country, limited pregnancy-specific options were found. The Colorado EFNEP Eating Smart Being Active and the North Carolina EFNEP Eat Smart Move More curricula were found to include pregnancy, post-partum, and/or breastfeeding related information[105,106]. Supplementary sessions can be added at the end of these curricula for pregnant, post-partum, or breastfeeding participants, as needed[105,106]. An EFNEP curriculum that had been adapted to include integrated pregnancy-specific information throughout was not found in the literature when evaluating current offerings across the country, supporting the need for this study.

Literature Review:

Key findings from this review of literature guided the main content themes that were included in the adapted curriculum to align with the most recent, evidence-based

recommendations. The Dietary Guidelines for Americans 2020-2025 (DGAs) served as a foundational resource, with the American College of Obstetrics & Gynecology, MyPlate, and the Food and Drug Administration (FDA) and Environmental Protection Agency (EPA) guidelines providing additional support[4,30,42,107,108]. The main topics identified from the literature include: MyPlate and pregnancy-specific dietary recommendations, prenatal dietary supplements, food safety, physical activity, energy needs, and gestational weight gain (studies described in **Table 1.3**).

UGA EFNEP *Food Talk: Baby & Me* Pilot Team Adaptation Ideas Poll

The UGA EFNEP pilot team provided feedback on the proposed adaptations in January 2023 via Microsoft Forms. Feedback for new educational extenders, which help participants apply skills learned in classes, revealed that a portion plate (MyPlate) was the most liked option. Open ended responses included additional ideas, with an "exercise band" and a "safe seafood handout" being added as educational extenders/skill builders (**Figure 1.5**). The pilot team also voted for the curriculum name and the new recipes, with the name and recipes with the highest ratings being implemented into the adapted curriculum.

Adapted activities were rated on a scale of one through five, with five being the highest score (**Figure 1.6**). Based on scores, three adapted activities were incorporated into the UGA EFNEP *Food Talk: Baby & Me* curriculum: "Follow your Gut", "Families Fight BAC!", and "Pregnancy Power Moves". The lowest scoring activity, "MyPlate Matching", was incorporated into *Food Talk: Baby & Me* as an optional activity.

Curriculum Adaptation:

In both UGA EFNEP *Food Talk* and *Food Talk: Baby & Me* each session contains an introduction section for PA's. This section includes an overview of the session, outcome/impacts for participants, and materials needed for the session. Outcome/impact statements were developed for *Food Talk: Baby & Me* to link them to corresponding evaluation questions in the 10-question pregnancy-specific questionnaire (**Table 1.4**).

Next, activities and discussions were adapted to include pregnancy-specific information, outlined below:

(1) "Follow Your Gut" adaptations:

a. "Fishbowl" activity: This is an interactive activity where peer-educators share a bowl that includes slips of paper for participants to select. Each slip contains two food items. Educators are prompted to ask participants which food item they prefer, if their preferences have changed since becoming pregnant, and if they have cravings/aversions to either food item.
b. "My Plate" activity: This is an interactive activity where participants are given a flash card with the name and image of a food item and asked to match that item with the appropriate food group on their MyPlate educational extender.
c. "MyPlate" educational extender: This extender is used as part of the "MyPlate" activity.

(2) "Safety for Baby & Me" adaptations:

a. "Safety for Baby & Me" activity: This activity includes a peer-educator led discussion on prenatal supplements and preconceived notions that participants have surrounding supplements. Participants will then be guided through reading the label on a prenatal supplement bottle and learn to identify what nutrients are included and if they have been evaluated for safety (**Figure 1.7 & Figure 1.8**).

b. “Salmon Croquet” & “Dilly Dip” food demonstration (**Figure 1.9**)

(3) “Pregnancy Power Moves” adaptations:

a. “Turkey & Squash Dinner” food demonstration (**Figure 1.10**)

b. “Pregnancy Power Moves” activity: This activity includes peer-educator led stretches and strength-building movements that are safe for pregnancy. The peer-educator discussion during this activity also includes physical activity guidelines for pregnancy.

c. Exercise Band educational extender: This extender is used in the “Pregnancy Power Moves” activity.

(4) “Save with Smart Shopping” Adaptations

a. Tuna Salad food demonstration discussion prompt was adapted to include information on safe seafood for pregnancy and WIC program food packages (i.e. when canned tuna is offered).

(5) “Color Me Healthy” adaptations:

a. “Watch Your Baby Grow” discussion and handout was added to allow peer-educators to share energy needs and gestational weight gain recommendations with participants (**Figure 1.11**).

b. “Food Coloring” activity: This activity was adapted to include ways to add nutrient-dense calories to snacks and to give participants an idea of what an additional 340-452 calories would look like as a snack or small meal (**Figure 1.12**)

(6) “Eat Well on the Go” adaptations:

a. Reminder to cook deli meats in context of eating out (subs)

(7) “Become a Nutrition Detective”:

a. No adaptations made

(8) “Keep Your Health out of Jeopardy” adaptations:

a. A Jeopardy game, with twenty-five questions divided into five categories, is used to review curriculum content. One new pregnancy-specific review question was added to each Jeopardy category for UGA EFNEP *Food Talk: Baby & Me* (**Table 1.5**).

Implementation:

Three PA’s implemented UGA EFNEP *Food Talk: Baby & Me* in three Georgia counties: Richmond, Doughtery, and Colquitt. A total of 35 participants completed enrollment paperwork and 7 completed exit paperwork and graduated from the program (**Table 1.6**).

Evaluation:

As mentioned previously, the standard EFNEP evaluation and an additional 10-question pregnancy-specific questionnaire were used to evaluate UGA EFNEP *Food Talk: Baby & Me*. Pre-intervention, or baseline, behavior and knowledge were collected for all participants (n=35) at the first session. Post-intervention data is available for participants who completed at least six of the eight sessions and completed an exit form survey (n=7).

EFNEP 30-question questionnaire:

Diet quality:

Generally, at baseline participants consume all food groups during the week (**Table 1.7**). Participants report consuming fruits and vegetables once or twice a day and consuming two kinds of vegetables a day on average. Vegetable subgroups (red and orange vegetables; dark green vegetables; and beans, peas, and lentils) were each reported to be consumed about two or three days a week. Dairy intake included milk or soymilk once a day and yogurt or smoothies

about two days per week. Cereal with milk was also consumed about two days each week. Participants cooked dinner at home most of the week, averaging about four to five days of cooking at home at baseline. While findings were not statistically significant, some positive trends in behavior change can be seen among graduates (**Table 1.8**). For example, dark green vegetable intake increased from an average of two days a week to three days a week (p=0.28). Cereal with milk intake also increased from an average of two days a week to three days a week (p=0.06).

Food Safety:

Most participants reported that they follow food safety guidelines related to hand washing and thawing meat safely, however, using a meat thermometer to check if meat was at the proper temperature was not a common practice (**Table 1.9**). Among graduates, we did not see statistically significant changes in food safety practices (**Table 1.10**). Handwashing and washing surfaces after cutting raw meat and seafood had high baseline values (80-100% of the time), potentially contributing to limited changes. However, baseline use of meat thermometer use was low and remained low at graduation.

Food security:

Over half (61.1%) of participants reported that it was sometimes (40% of the time) or often (60% of the time) true that they did not budget enough for groceries and did not have enough money to buy more food (**Table 1.11**). 46.9% of participants reported they could not afford to eat balanced meals and 34.4% reported they needed to cut the size of meals or skip meals because there wasn't enough food. Similarly, food security measures did not change significantly from baseline to graduation (**Table 1.12**). More participants reported sometimes-

never true, rather than often true-sometimes true regarding the statement “the food I bought just didn’t last, and I didn’t have money to get more”, suggesting a potential trend towards improvements in food security.

Food resource management:

Participants reported often (about 60% of the time) planning their meals and checking their pantry before shopping, but rarely (about 20% of the time) make a weekly or monthly grocery budget (**Table 1.13**). Although not statistically significant, positive trends could be seen regarding food resource management behaviors (**Table 1.14**). For example, graduates increased meal planning before shopping increased from sometimes (about 40% of the time) to often (about 60% of the time) (p=0.56). Participants also reported an increase from sometimes budgeting enough money for food to often budgeting enough for food (p=0.69).

Physical activity:

Participants reported working about 3 days each week, including one to two days a week of strength building activities (**Table 1.15**). Graduates’ physical activity practices decreased from pre-intervention to post-intervention but reported an increase from sometimes to often making changes on purpose to be more active, (p=0.75) (**Table 1.16**).

10-question pregnancy-specific questionnaire:

Baseline pregnancy questionnaire data revealed that over half of participants take a prenatal supplement usually (80% of the time) or always. Most participants were also aware of fluid intake recommendations for pregnant women. Participants were less confident regarding weight gain and energy need recommendations, with 36.6% and 21.9%, respectively, correctly identifying those recommendations at baseline. Further, half of participants did not correctly

identify the seafood option with high-Mercury and 11.8% of participants thought seafood was not safe for pregnant women at all (**Table 1.17**). Graduates showed positive improvements in knowledge related to safe seafood during pregnancy, including an increase from 57% of staff correctly identifying swordfish as a high-Mercury seafood to 71% post-eLearning (p=0.5) and an increase from three to four UGA EFNEP staff correctly recalling the recommended intake of seafood during pregnancy (p=0.5) (**Table 1.18**).

CONCLUSION

Discussion:

Consistent with findings from the *Partners for Life* study, the adaptation of an existing EFNEP curriculum to develop a pregnancy-specific nutrition education program was found to be feasible[62]. The UGA EFNEP *Food Talk* curriculum was successfully adapted and implemented in three Georgia counties, for a total of 35 enrolled participants. However, participant retention was low in both studies[62]. The cohort in Dougherty County had the highest graduate rate, at 40%, which may be in response to this cohort being taught twice a week over four weeks compared to cohorts in Richmond and Colquitt counties taught once a week over eight weeks, with graduation rates of 27% and 11%. Participants in the Partners for Life study reported that the length of the program was a main reason for attrition[62]. These findings suggest that 8-weeks may be too long of a program duration for this population, but a 4-week program may be more accepted.

Limited research exists on series-based, peer-educator led nutrition education programs for low-income pregnant women in the community setting. Home-based interventions are another method that has been used with low-income pregnant women to improve accessibility, considering that another potential barrier to participant attendance could be a lack of reliable

transportation. Reifsnider et al. (2018) recruited pregnant women who were participating in the WIC program to receive at-home counseling from trained peer-educators. Participant attrition for this study was ~30% for the control and intervention groups in this study, suggesting a potential benefit for retention with in-home counseling. UGA EFNEP Program Assistants have conducted make-up sessions at participants' homes or over Zoom, which may be a delivery method to explore more widely for future programs.

Clinical interventions are another method used to provide nutrition education to pregnant women. However, research has found that nutrition providers' goals for nutrition counseling may be disconnected to the needs of pregnant women[69]. The UGA EFNEP peer-educator model is a useful tool for connecting participants with a trained educator who is more in-tune to participant needs, since they typically come from a similar background. Further, pregnant women report that nutrition professionals and physicians do not often have enough time to thoroughly explain nutrition topics and may not have time to answer all their questions at that visit[69]. While providing nutrition education during prenatal visits is beneficial, pregnant women still report needed additional resources. Another future adaptation for this program could include working more closely with healthcare providers to offer UGA EFNEP nutrition counseling before or after prenatal visits, thus increasing the amount of time pregnant women can learn and understand nutrition topics. Gross (2018) conducted a study with participants of the Special Supplemental Program for Women, Infants, and Children (WIC) to evaluate the effect of combining Obstetrical care with WIC nutrition services[11]. This study found that the combined prenatal care with nutrition education led to improvements in postpartum weight retention, supporting the feasibility and potential benefit of combining Obstetrical care with community nutrition education programming[11]. This study partnered with community agencies who offered prenatal

care but did not make those connections with providers and peer-educators to coordinate prenatal care appointments with nutrition education sessions. This could be an area to explore with future implementation of UGA EFNEP pregnancy-specific nutrition programming.

UGA EFNEP PA retention also posed a challenge with this study, as peer-educators may face similar challenges to participants impacting their ability to deliver the intervention. This is demonstrated in this study, as only three of the six PA's that received training ended up delivering the program. Based on this, future studies may need to prepare to over recruit PA's to compensate for educator attrition.

Findings from this study suggest trends towards improvements in diet quality and food resource management behaviors among graduates. Previous research evaluating changes in diet quality following EFNEP programming in non-pregnant adults has found similar results[63,109]. Guenther, P. & Luick, B. (2015) found that female participants in the Mountain Region of North Carolina increased their consumption of dark green vegetables following participation in EFNEP, as was found in this study[109]. Perkins (2020) also found improvements in vegetable and whole grain intake among adult EFNEP participants in Maine following participation in the program[63]. However, to the authors knowledge, studies specific to diet quality change among pregnant women participating in a pregnancy-specific EFNEP program are not present in the literature. A study evaluating the changes in diet quality among WIC has also found improvements following nutrition education. Ritchie et al. (2010) conducted a study to evaluate the impact of implementing a structured nutrition education curriculum on three main behaviors: fruit and vegetables, whole grain, and low-fat milk among California WIC families[10]. Following the intervention, WIC participants had increased recognition of fruit and vegetable health messaging and increased intention to consume more fruits and vegetables.

Strengths and limitations:

The pre/post evaluation design, using the nationally standardized EFNEP 30-question questionnaire along with an additional 10-question, pregnancy-specific questionnaire, offers a robust approach for assessing both general and pregnancy-specific nutrition knowledge and behavior change. Although changes found in this study were not statistically significant, findings offer insights into potential benefits of offering a pregnancy-specific EFNEP curriculum and identify potential areas for further improvement.

Another strength of the UGA EFNEP *Food Talk: Baby & Me* adaptation process was the use of an established curriculum and delivery framework, which minimized training demands for UGA EFNEP PA's. The inclusion of evidence-based guidelines and basis in several proven theoretical frameworks, like Andragogy and the Best Practices for Nutrition Education for Low-Income Audiences, are other strengths of the program[98,100]. Program components, including educational extenders and interactive activities, reinforce adult learning principles and support sustained behavior change outside of the EFNEP class setting.

Despite having strengths, this study does have limitations. The small sample size limits generalizability, and absence of a control group prevents causal inference. Further evaluation among a larger sample will be needed to fully assess program outcomes. Additionally, retention was lower than anticipated across the program, with only 20% of enrolled participants graduating. As mentioned previously, exploration of alternate delivery methods and adjustments to program length may be needed to support retention in this population.

Next steps:

Future directions include continued refinement of curriculum content based on participant feedback, expansion of evaluation tools to include birth and postpartum outcomes where feasible, and exploration of delivery models (e.g., hybrid or fully virtual formats) to increase reach. Importantly, the development and implementation of UGA EFNEP *Food Talk: Baby & Me* aligns with the broader mission of Cooperative Extension to deliver research-based, community-focused solutions that address critical public health challenges. By centering the unique needs of pregnant women in limited-resource communities UGA EFNEP *Food Talk: Baby & Me* represents a promising tool for addressing maternal health disparities in Georgia.

Conclusion:

Recruitment of EFNEP-eligible pregnant women was feasible, but further work is needed to improve retention strategies among this population. For example, further exploration into ideal delivery mode and timeframe is needed. Preliminary feedback from UGA EFNEP staff who implemented the program (*described further in Chapter 5*) suggests that a shorter program duration or virtual program delivery may be helpful methods for improving retention. UGA EFNEP staff also highlighted that period of gestation at the start of the program is important, as women starting late into their pregnancy may deliver before the 8-week program is completed. Opening enrollment into this pregnancy-specific curriculum to teens and young adults who plan to become pregnant may be an advantageous next step in improving access to pregnancy-specific nutrition education for communities with limited resources in Georgia. Overall, this program had many strengths and challenges that offered a plethora of learning opportunities that will be able to inform future nutrition education programs for UGA EFNEP participants.

TABLES AND FIGURES

Table 1.1. EFNEP Pilot Team Characteristics

Characteristic	Supervisors (n=2)	Program Assistants (n=3)
Gender Female	 2 (100%)	 3 (100%)
Race/ Hispanic ethnicity Black/ African American White Hispanic/Latina	 1 (50%) 1 (50%)	 1 (33.3%) 2 (66.6%)
Georgia EFNEP region Northeast Southwest	 1 (50%) 1 (50%)	 1 (33.3%) 2 (66.6%)

Table 1.2. Overview of Sessions for UGA *Food Talk: Baby & Me*

Session	Session Title	Recipe/s	Educational Extenders & Handouts	Session Topics
1	Follow Your Gut	Creamy chicken and noodles Harvest muffins	Calendar MyPlate plate	MyPlate Voice by Choice EFNEP enrollment paperwork
2	Safety for Baby & Me	Salmon croquettes Dilly dip	"Safety for Baby & Me" handout "Safe Seafood" handout Cutting boards	Food Safety Seafood intake guidelines Supplements
3	Pregnancy Power Moves	Turkey & Squash Dinner	Exercise band "ACOG pregnancy exercises" handout "Pregnancy Power Moves" handout	Physical activity Sodium intake Discomforts of pregnancy
4	Save with Smart Shopping	Festive tuna salad Ranch sauce with carrots	"Smart shopping" handout Reuseable grocery list & bag Dry erase menu planner "What's in season?" magnet	Seasonal produce Unit pricing Reading food labels Meal planning
5	Color Me Healthy	Fiesta quesadilla Peach crumble	Measuring spoon Measuring cup "Color Me Healthy" handout	Fruits & vegetables Energy needs

				Gestational weight gain
6	Eat Well on the Go	Breakfast burritos Fruity parfait	Reuseable lunch bag Ice pack	Fats Lean protein Eating out
7	Become a Nutrition Detective	Garden fresh "tortizza" 4-fruit smoothie	Reuseable water bottle	Added sugar Fiber Grains
8	Keep Your Health out of Jeopardy	Skillet spaghetti Crunchy apple salad	"Meals in Minutes" recipe book EFNEP certificate	Review (Jeopardy) EFNEP exit paperwork

Nutrition for Expecting Parents

UNIVERSITY OF GEORGIA EXTENSION

University of Georgia (UGA) Extension invites you to participate in a research study for expecting mothers and their families. In this study you will learn more about nutrition and food security during pregnancy, and how to eat healthy for you and your baby.

Participation includes:

- **Eight (8) 1-hour long weekly nutrition lessons**
- **Completing questions about nutrition during pregnancy (2 surveys)**

– compensation $50/ survey

The research study is called *A Community Nutrition Initiative to Promote Healthy Behavior Changes and Food Security in Expecting Families by Utilizing the UGA Expanded Food and Nutrition Education Program (EFNEP)*. You may be eligible to participate in this study if you are also interested in being a part of the EFNEP Food Talk Program and are an expecting mother or partner.

Healthy GEORGIA

Expanded Food & Nutrition Education Program

Learn and taste new recipes weekly! Please call or email Dr. Sarah T. Henes if you would like to know more about this study!

phone: (706) 542-0541
email: sarah.henes@uga.edu

Figure 1.1. Recruitment Flyer

FY25

Group Code: _____ *State Office Use Only*

Group Name: _____

Expanded Food & Nutrition Education Program

UNIVERSITY OF GEORGIA EXTENSION

Adult Programming Partnership Agreement between _____ County Cooperative Extension University of Georgia and _____

The _____ County Cooperative Extension will partner with _____ to implement the UGA Expanded Food and Nutrition Education Program (EFNEP). This partnership agreement acknowledges the understanding of the partnership between _____ County Cooperative Extension and _____.

_____ will appoint a site contact to assist with recruitment, coordination, and scheduling of each session. The appointee is:

Contact Name: _____ Street Address: _____

Phone Number: _____ City: _____

Email: _____ Zip: _____

1. MISSION

- _____ County Cooperative Extension offers programming to a diverse audience of adults and youth with limited financial resources. EFNEP's focus is on reaching families. Specifically, EFNEP audiences include:
  - i. Low-income **parents and other adult caregivers** (such as grandparents or legal guardians) who have primary responsibility for obtaining and preparing food for their children
  - ii. Low-income pregnant women and teens
  - iii. Low-income children and adolescents (ages 5–19)
  - iv. Emerging Parents/Adults - ages 18-24 who are not parents yet.
- _____ County Cooperative Extension EFNEP offers Food Talk, an eight-week series of evidence-based, interactive sessions implemented through a peer-educator model. Each session is about an hour long. The Food Talk curriculum encompasses four core elements: diet quality and physical activity, food resource management, food safety, and food security. Our paraprofessionals are trained to implement a pre and post survey that evaluates our participants' behavior changes.

2. PURPOSE

_____ County Cooperative Extension and _____ will partner to implement Food Talk with an EFNEP-eligible audience. Using the peer-educator model, Food Talk equips participants with the knowledge and skills to make health behavior changes. Food Talk lessons contain simple nutrition messages conveyed in an interactive manner, through activities and discussions.

Expanded Food & Nutrition Education Program

UNIVERSITY OF GEORGIA EXTENSION

This Partnership Includes:

☐ **Virtual Programming for Adults**

If Virtual Programming is agreed upon:

EFNEP WILL:

- Deliver each Food Talk session in its entirety and distribute educational materials after the series is complete.
- Meet with site contact through yearly virtual meetings. The Nutrition Education Program Supervisor is mandated to represent UGA EFNEP during a yearly meeting. Example topics for discussion at this meeting include:
  - **Participant eligibility**
  - **Participant retention for graduation of program**
  - **Impact of program**
  - **Opportunities for growth**
  - **Referrals to other programs**

PARTNERING AGENCY WILL:

- Facilitate an electronic sign-in process for participants
- Facilitate communication between agency and EFNEP nutrition educator on best ways to set up UGA Zoom classes for participants

Will participants gather as a group at the agency location, and provide the technology for participants to participant via UGA Zoom?

☐ GROUP ☐ INDIVIDUAL

What is the preferred platform for virtual programming?

☐ **UGA Zoom facilitated by an EFNEP staff member**

UGA Zoom offers the use of a Zoom Pro account which has more secure provisions than a free version of zoom. Further information about UGA's Zoom platform can be found here - **https://eits.uga.edu/learning_and_training/zoom/**

☐ **Partnering Agency Platform -** _____

What security and privacy measures are in place for the use of this platform?

- Facilitate a **90-minute time** window (60 minutes at minimum) for session delivery. Our classes take about an hour, but a 90-minute window is preferred to allow for conversation

Expanded Food & Nutrition Education Program

UNIVERSITY OF GEORGIA EXTENSION

☐ Face to Face Programming for Adults

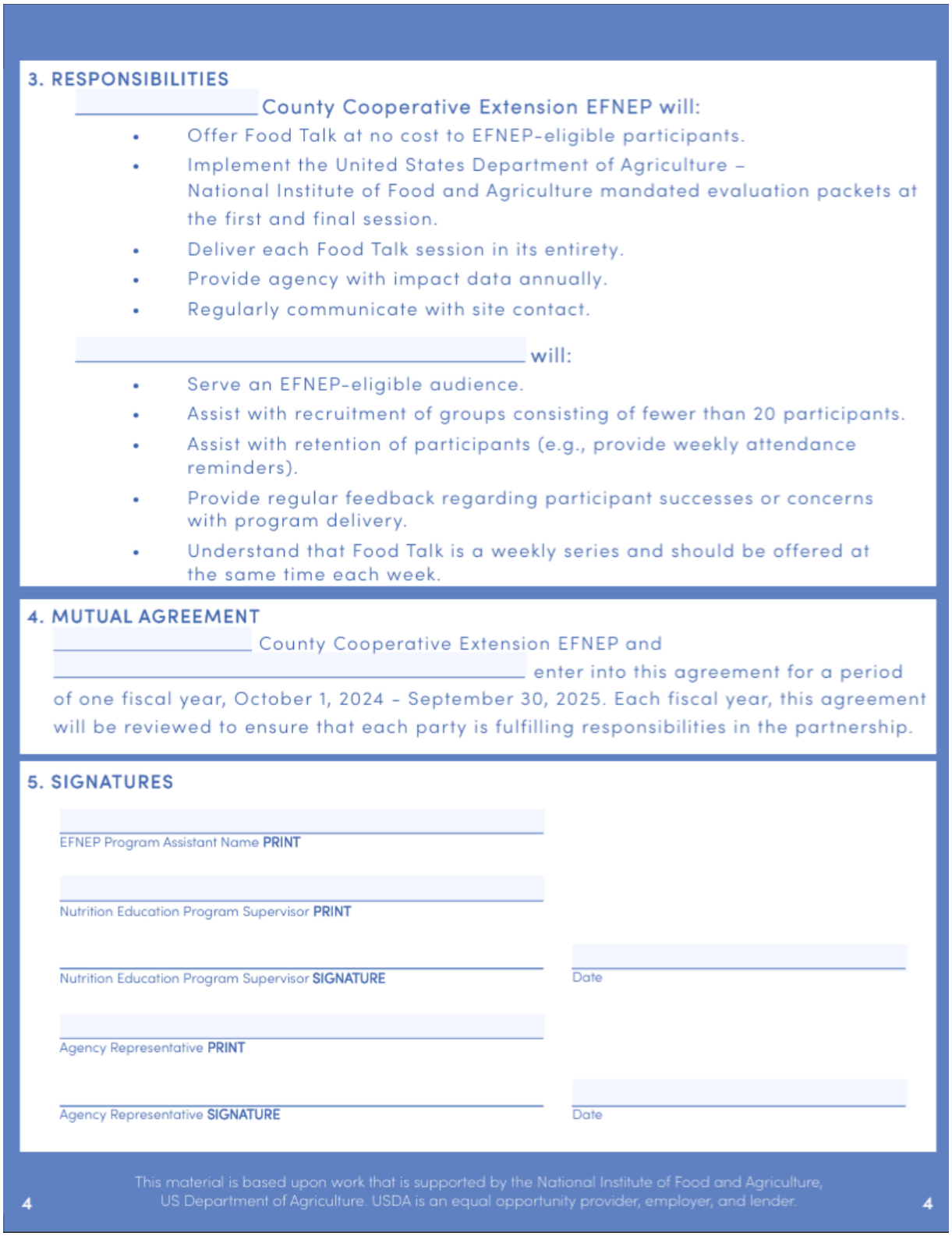
If Face to Face/In Person Programming is agreed upon:

EFNEP WILL:

- Provide cooking demonstrations which allow participants to try meals that are both healthy and affordable.
- Provide educational material which is distributed to help participants put into practice what they learned.
- Distribute meal samples and educational materials following food safety recommendations as outlined by UGA Extension.
- Staff will wear masks and practice social distancing as outlined by UGA Extension and/or the current public health situation.
- Meet with site contact through yearly meetings. The Nutrition Education Program Supervisor is mandated to represent UGA EFNEP during a yearly meeting. Example topics for discussion at this meeting include:
  - **Participant eligibility**
  - **Participant retention for graduation of program**
  - **Impact of program**
  - **Opportunities for growth**
  - **Referrals to other programs**

PARTNERING AGENCY WILL:

- Provide a room with electricity and a table.
- Agree to social distancing measures in the meeting space according to UGA Extension recommendations or the needs of any current public health situation.
- Facilitate a **90-minute** time window (60 minutes at minimum) for session delivery. Our classes take about an hour, but a 90-minute window is preferred to allow for conversation, set up, and clean up.



3. RESPONSIBILITIES

_____ County Cooperative Extension EFNEP will:

- Offer Food Talk at no cost to EFNEP-eligible participants.
- Implement the United States Department of Agriculture – National Institute of Food and Agriculture mandated evaluation packets at the first and final session.
- Deliver each Food Talk session in its entirety.
- Provide agency with impact data annually.
- Regularly communicate with site contact.

_____ will:

- Serve an EFNEP-eligible audience.
- Assist with recruitment of groups consisting of fewer than 20 participants.
- Assist with retention of participants (e.g., provide weekly attendance reminders).
- Provide regular feedback regarding participant successes or concerns with program delivery.
- Understand that Food Talk is a weekly series and should be offered at the same time each week.

4. MUTUAL AGREEMENT

_____ County Cooperative Extension EFNEP and _____ enter into this agreement for a period of one fiscal year, October 1, 2024 - September 30, 2025. Each fiscal year, this agreement will be reviewed to ensure that each party is fulfilling responsibilities in the partnership.

5. SIGNATURES

_____
EFNEP Program Assistant Name **PRINT**

_____
Nutrition Education Program Supervisor **PRINT**

_____ _____
Nutrition Education Program Supervisor **SIGNATURE** Date

_____
Agency Representative **PRINT**

_____ _____
Agency Representative **SIGNATURE** Date

This material is based upon work that is supported by the National Institute of Food and Agriculture, US Department of Agriculture. USDA is an equal opportunity provider, employer, and lender.

4 4

Figure 1.2. Partnership Agreement Form

EFNEP
Expanded Food and Nutrition Education Program

Adult Questionnaire

Please mark the response that **best** describes how you **usually** do things.

1. How many **times a day** do you eat fruit?

Examples of fruits are apples, bananas, oranges, grapes, raisins, melon and berries. Include fresh, frozen, dried, or canned fruit. *Do not include juice.*

- ☐ I rarely eat fruit
- ☐ Less than 1 time a day (a couple times a week)
- ☐ 1 time a day
- ☐ 2 times a day
- ☐ 3 times a day
- ☐ 4 or more times a day

2. How many **times a day** do you eat vegetables?

Examples of vegetables are green salad, corn, green beans, carrots, potatoes, greens, and squash. Include fresh, canned, and frozen vegetables. *Do not count french fries, potato chips, or rice.*

- ☐ I rarely eat vegetables
- ☐ Less than 1 time a day (a couple times a week)
- ☐ 1 time a day
- ☐ 2 times a day
- ☐ 3 times a day
- ☐ 4 or more times a day

3. How many different kinds of vegetables do you usually eat a day?

- ☐ I rarely eat vegetables
- ☐ 1 kind a day
- ☐ 2 kinds a day
- ☐ 3 kinds a day
- ☐ 4 or more kinds a day

4. How many **times a day** do you drink milk or soymilk?

Do not count almond or coconut milk, or milk with cereal.

- ☐ I do not drink milk
- ☐ I rarely drink milk
- ☐ 1 time a day
- ☐ 2 times a day
- ☐ 3 or more times a day

5. Over the last week, **how many days** did you eat red and orange vegetables?

Examples of red or orange vegetables are tomatoes, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.

- ☐ I did not eat red or orange vegetables
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

Turn page over for more ➡

May 2020

6. Over the last week, **how many days** did you eat dark green vegetables?

Examples of dark green vegetables are broccoli, spinach, dark green lettuce, turnip greens, or mustard greens.

- ☐ I did not eat green vegetables
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

7. Over the last week, **how many days** did you eat beans and peas?

Examples of beans and peas include pinto beans, black beans, navy beans, chili beans, refried beans, pork and beans, bean soup, barbeque beans, chickpeas, split peas, and black eyed peas. Include beans from a can or cooked from dry.

- ☐ I did not eat beans and peas
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

8. Over the last week, **how many days** did you eat yogurt or drink smoothies with yogurt?

- ☐ I did not eat yogurt
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

9. Over the last week, **how many days** did you eat cereal with milk?

- ☐ I did not eat cereal with milk
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

10. How many **days a week** do you cook dinner (your main meal) at home?

- ☐ I rarely cook dinner at home
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

11. How often do you drink regular sodas (not diet)?

- ☐ Never
- ☐ 1-3 times a week
- ☐ 4-6 times a week
- ☐ 1 time a day
- ☐ 2 times a day
- ☐ 3 times a day
- ☐ 4 or more times a day

There is more on the next page ➡

May 2020

12. In the past week, **how many days** did you exercise for at least 30 minutes?

This includes things like jogging, playing soccer, and doing fitness or dance classes, or exercise videos. This 30 minutes could be all at once or a few minutes at a time. *Do not count housework, taking care of your kids, or walking from place to place.*

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days
- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

13. In the past week, **how many days** did you do workouts to build and strengthen your muscles?

This includes things like lifting weights and doing push-ups, sit-ups, or planks.

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days
- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

14. How often do you make small changes on purpose to be more active?

This includes things like walking instead of driving, getting off the bus one stop early, doing a few minutes of exercise, or moving around instead of sitting while watching TV.

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

15. How often do you wash your hands with soap and running water before preparing food?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

16. After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

17. How often do you thaw frozen food on the counter or in the sink at room temperature?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

Turn page over for more ➡

May 2020

18. How often do you use a meat thermometer to see if meat is cooked to a safe temperature?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

19. How often do you compare food prices to save money?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

20. How often do you plan your meals before you shop for groceries?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

21. How often do you look in the refrigerator or cupboard to see what you need before you go shopping?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

22. How often do you make a list before going shopping?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

23. How often do you use food coupons for food purchases?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

24. How often do you use a written weekly or monthly food spending plan?

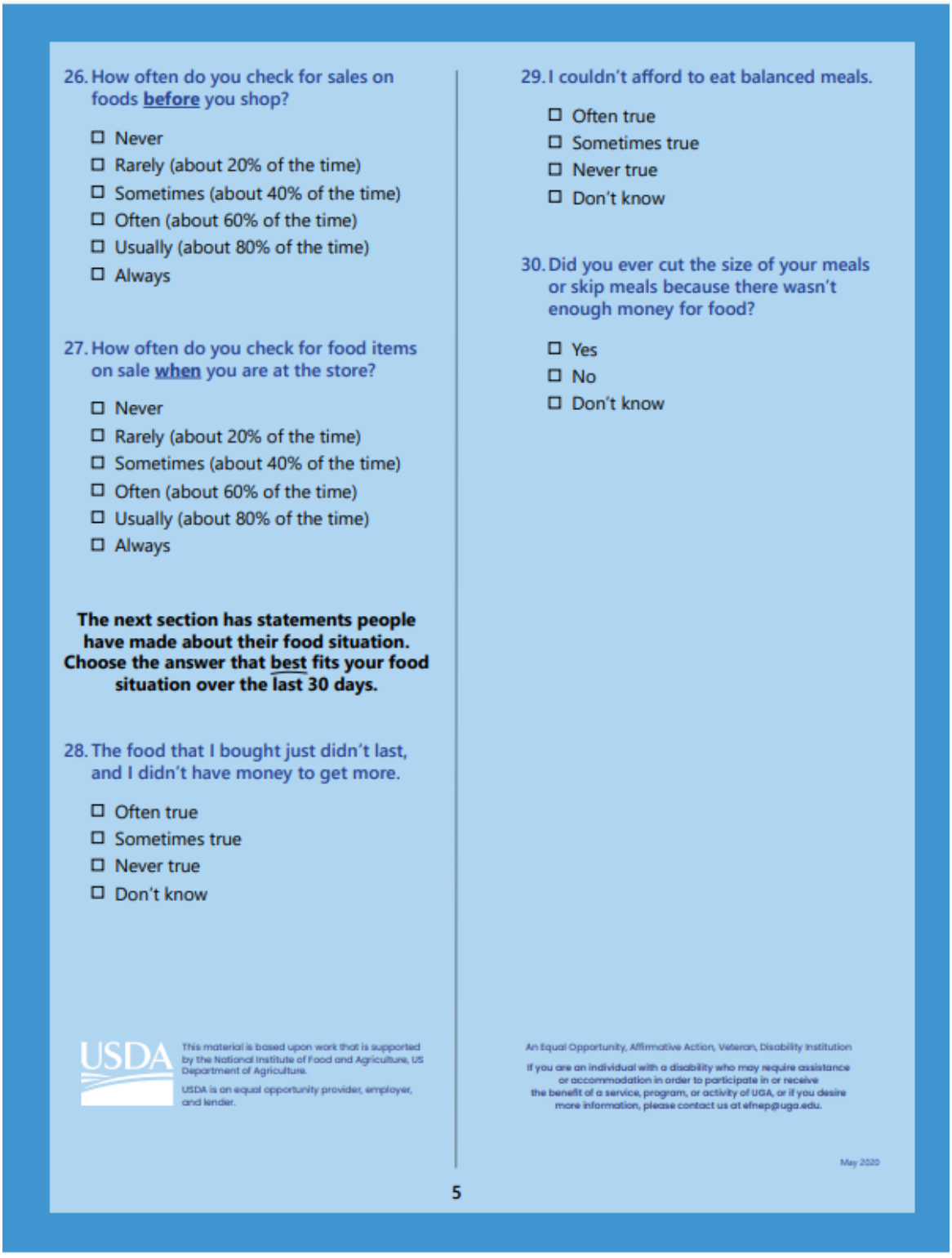
- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

25. How often do you budget enough money for food purchases?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

There is more on the next page ➡

May 2020



26. How often do you check for sales on foods **before** you shop?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

27. How often do you check for food items on sale **when** you are at the store?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

The next section has statements people have made about their food situation. Choose the answer that best fits your food situation over the last 30 days.

28. The food that I bought just didn't last, and I didn't have money to get more.

- ☐ Often true
- ☐ Sometimes true
- ☐ Never true
- ☐ Don't know

29. I couldn't afford to eat balanced meals.

- ☐ Often true
- ☐ Sometimes true
- ☐ Never true
- ☐ Don't know

30. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?

- ☐ Yes
- ☐ No
- ☐ Don't know

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Figure 1.3. Entry form for UGA EFNEP *Food Talk: Baby & Me* program; including the standard EFNEP 30-question questionnaire.

EFNEP Pregnancy Nutrition Questionnaire

1. If you want to increase the amount of iron in your diet, which serving of food would be the best choice?

- ☐ Tuna salad
- ☐ Pasta carbonara
- ☐ Lentil Soup
- ☐ Egg Sandwich

2. I take a prenatal supplement:

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

3. How much fluid is recommended for pregnant women each day?

- ☐ 6-10 cups
- ☐ 8-12 cups
- ☐ 12-16 cups
- ☐ 14-18 cups

4. What are reasons why folic acid supplements are recommended?

- ☐ To prevent spina bifida
- ☐ To prevent cleft lip
- ☐ To prevent heart defects
- ☐ To prevent gestational diabetes

5. How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy?

- ☐ 7-10 pounds
- ☐ 15-25 pounds
- ☐ 25-35 pounds
- ☐ 35-45 pounds

6. To meet energy needs during the first 3 months of pregnancy, pregnancy women need:

- ☐ No extra energy
- ☐ 210 additional calories
- ☐ 340 additional calories
- ☐ 452 additional calories

7. Which of these fish or seafood has high amounts of mercury?

- ☐ Canned Tuna
- ☐ Swordfish
- ☐ Shrimp
- ☐ Salmon

8. During pregnancy, fish with low levels of mercury should be limited to:

- ☐ 2-3 servings (8-12 ounces) per week
- ☐ 1 serving (4 ounces) per week
- ☐ 1 serving (4 ounces) every 2 weeks
- ☐ None, seafood is not safe during pregnancy

9. How many servings of fruit and vegetables a day do you think experts advise pregnant women to eat daily?

- ☐ 1-2 cups of fruits and vegetables
- ☐ 2-3 cups of fruits and vegetables
- ☐ 3-4 cups of fruits and vegetables
- ☐ 4-5 cups of fruits and vegetables
- ☐ 5-6 cups of fruits and vegetables

10. Over the last week, how many days did you choose foods with reduced sodium, or without added sodium?

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days
- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

9

Figure 1.4. Additional 10-question pregnancy-specific questionnaire adapted for UGA EFNEP *Food Talk: Baby & Me*.

Table 1.3. Literature Review Findings

Author(s), Year	Study Purpose	Population	Setting	Key Findings	Relevance to Curriculum
Jun et al., 2020	Estimate prevalence of use and micronutrient contribution of dietary supplements	Pregnant, lactating, and nonpregnant and nonlactating women	United States (national)	Prevalence of prenatal supplement use was 52.4% among women in the first trimester, increasing to 80% among those in the second and third trimester. Folate and iron intake were of concern among pregnant women not using supplements.	Supports the inclusion of education on prenatal supplements and micronutrient needs during pregnancy.
Bailey et al., 2019	Estimate usual nutrient intake from diet and supplements compared to DRI's	Pregnant women	United States (national)	Many pregnant people were not meeting recommendations for several vitamins and minerals but were at risk of excessive intake of others.	Supports inclusion of details on prenatal micronutrient supplements.
Crawford et al., 2023	Compare estimated intake from food and dietary supplements to the DRI's	Pregnant women	United States (national)	Supplement intake improved the intake of micronutrients for most, but 80% remained below the AI for choline, 52.5% for potassium, and 30% for	Emphasizes the importance of including information on increased micronutrient needs during pregnancy and having

				magnesium. Folate and iron intake were above the UL for 80% and 19% of supplement users, respectively.	PA's encourage participants to discuss Individual prenatal supplements are needed with their doctor.
Ramos do Nascimento et al., 2019	Evaluate gestational diabetes risk related to physical activity	Pregnant women with low-income	Brazil	Sedentary lifestyle was associated with higher odds of gestational diabetes mellitus.	Supports session on physical activity during pregnancy.
Nasiri-Amiri et al., 2016	Evaluate the association between physical activity and gestational diabetes mellitus	Pregnant women	Iran	Increased amount and duration of physical activity during pregnancy was associated with lower risk of gestational diabetes mellitus	Inclusion of physical activity guidelines during pregnancy, exercise band, and physical activity handouts
Hoffman et al., 2019	Evaluate the effect of physical activity on gestational weight gain.	Pregnant women	Germany	Lifestyle counseling improved physical activity practices and physical activity was associated with lower gestational weight gain.	Supports education on physical activity during pregnancy and gestational weight gain.
Garnaes et al., 2016	Evaluate whether exercise training in pregnancy can	Pregnant women with overweight/obesity	Norway	Physical activity reduced gestational diabetes	Findings support the inclusion of education on physical

	reduce gestational weight gain in women with pre-pregnancy overweight/ obesity.			mellitus and blood pressure in late pregnancy, did not reduce gestational weight gain.	activity guidelines during pregnancy.
Stickford et al., 2023	Examine beliefs and behaviors related to physical activity	Pregnant and postpartum women in rural communities	Western North Carolina (Appalachia)	Knowledge related to safe physical activity practices in limited and most are not meeting physical activity guidelines.	Supports education on physical activity guidelines.
Jeffs et al., 2020	Examine knowledge of food safety guidelines and adherence to food safety practices	Pregnant women	New Zealand	Knowledge of food safety was higher than actual food safety guidelines adherence.	Session on food safety during pregnancy, plus food safety handouts.
Aseidu et al., 2021	Assessed the sociodemographic factors influencing knowledge and implementation of food safety practices	Pregnant women	Ghana	~87% of pregnant women had knowledge of food safety, but 50% exhibited unsatisfactory practices at home	Food safety education and handouts.
Kendall et al., 2017	Evaluated food safety knowledge and related behaviors after a pathogen-specific or basic food safety class	Pregnant women	Colorado and Ohio	Pathogen-specific and basic food safety instruction improved knowledge and food handling behaviors.	Inclusion of food safety education and guidelines, including training on specific pathogens for PA's.

Murphy et al., 2021	Estimate protein intake and sources compared to DRI's.	Pregnant women	United States (national)	~12% of women were under the EAR for protein. Animal sources accounted for 66% of total protein.	Inclusion of education of protein sources, including seafood, lean animal protein, and plant-based proteins.

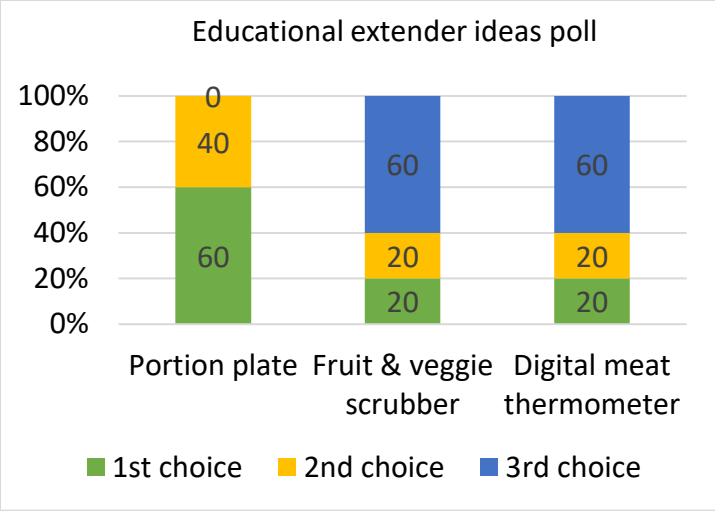

Figure 1.5. Bar graph of the EFNEP pilot team's educational extender choices.

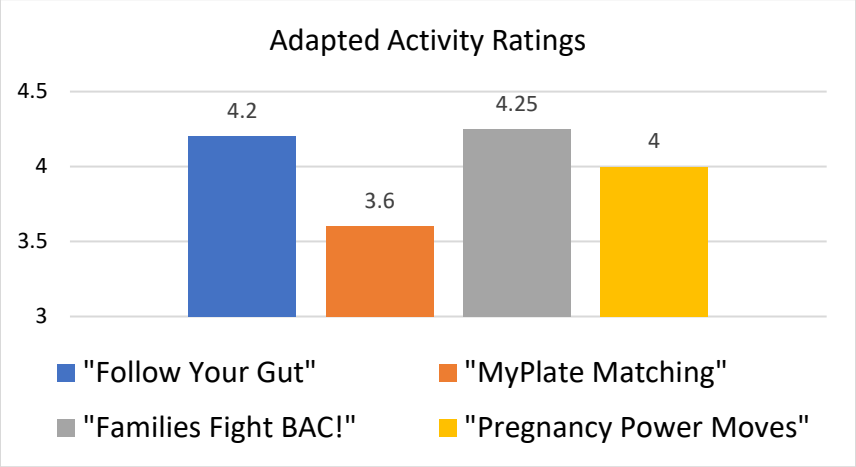

Figure 1.6. Bar graph showing the EFNEP pilot team's ratings of the adapted activities.

Table 1.4. UGA EFNEP *Food Talk: Baby & Me* Outcome/Impact statements with paired 10-question pregnancy-specific questionnaire evaluation question.

Session	Outcome/Impact	Evaluation: 10-Question Pregnancy-Specific Questionnaire
1	Increase frequency of thinking about recommended servings of fruits and vegetables	How many servings of fruits and vegetables a day do you think experts advise pregnant women to eat daily? a) 1-2 cups b) 2-3 cups c) 3-4 cups d) 4-5 cups e) 5-6 cups
2	Increased frequency of taking a prenatal supplement during pregnancy	I take a prenatal supplement: a) Never b) Rarely (about 20% of the time) c) Sometimes (about 40% of the time) d) Often (about 60% of the time) e) Usually (about 80% of the time) f) Always
2	Increased likelihood of meeting iron needs through diet choices	If you want to increase the amount of iron in your diet, which serving of food would be the best choice? a) Tuna salad b) Pasta carbonara c) Lentil soup d) Egg sandwich
2	Increased likelihood of choosing low-mercury seafood options during pregnancy	Which of these fish or seafood has high amounts of mercury? a) Canned tuna b) Swordfish c) Shrimp d) Salmon During pregnancy fish with low levels of mercury should be limited to: a) 2-3 servings (8-12 ounces) per week b) 1 serving (4 ounces) per week c) 1 serving (4 ounces) every 2 weeks d) None, seafood is not safe during pregnancy
2	Increased understanding of the importance of folic acid supplementation during pregnancy	What are the reasons why folic acid supplements are recommended? a) To prevent spina bifida b) To prevent cleft lip c) To prevent heart defects d) To prevent gestational diabetes

3	Increase fluid intake during pregnancy	How much fluid is recommended for pregnant women each day? a) 6-10 cups b) 8-12 cups c) 12-16 cups d) 14-18 cups
3	Increased frequency of choosing foods with reduced, or no added sodium.	Over the last week, how many days did you choose foods with reduced sodium, or without added sodium? a) 0 days b) 1 day c) 2 days d) 3 days e) 4 days f) 5 days g) 6 days h) 7 days
5	Increase knowledge of recommended weight gain during pregnancy	How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy? a) 7-10 pounds b) 15-25 pounds c) 25-35 pounds d) 35-45 pounds
5	Increased knowledge of caloric needs during each trimester of pregnancy	To meet energy needs during the first 3 months of pregnancy, pregnant women need: a) No extra energy b) 210 additional calories c) 340 additional calories d) 452 additional calories

EFNEP

FOOD TALK Baby & Me

Safety for Baby and Me!

Supplement Facts

Serving Size 2 Gummies
Servings Per Container 30

Amount Per Serving	% Daily Value for Pregnant Women and Lactating Women
Calories 30	
Total Carbohydrate 7 g	3%**
Total Sugars 5 g	*
Includes 5 g Added Sugars	9%**
Protein less than 1 g	
Vitamin A (as Retinyl Acetate) 650 mcg	50%
Vitamin C (as Ascorbic Acid) 30 mg	25%
Vitamin D_3 (as Cholecalciferol) 25 mcg (1000 IU)	167%
Vitamin E (as dl-Alpha Tocopheryl Acetate) 15 mg	79%
Niacin (as Niacinamide) 18 mg	100%
Vitamin B_6 (as Pyridoxine Hydrochloride) 2 mg	100%
Folate 600 mcg DFE (360 mcg Folic Acid)	100%
Vitamin B_{12} (as Cyanocobalamin) 5.2 mcg	186%
Biotin 35 mcg	100%
Choline (as Choline Bitartrate) 55 mg	10%
Calcium (as Tricalcium Phosphate) 130 mg	10%
Iodine (as Potassium Iodide) 150 mcg	52%
Magnesium (as Magnesium Citrate) 40 mg	10%
Zinc (as Zinc Sulfate) 2.6 mg	20%
Sodium 10 mg	< 1%
Fish Oil 263 mg	*
Total EPA & DHA 70 mg	*
Omega-3 DHA (Docosahexaenoic Acid) 58 mg	*
Omega-3 EPA (Eicosapentaenoic Acid) 12 mg	*

*Daily Value not established.
**Percent Daily Values are based on a 2,000 calorie diet.

- ✓ No Artificial Flavors – Natural Fruit Flavors
- ✓ No Synthetic Dyes – Color Derived From Natural Source
- ✓ No High Fructose Corn Syrup
- ✓ No Artificial Sweeteners
- ✓ Gluten Free

SUGGESTED USE: **Adults, chew 2 gummies daily. This product does not contain iron. Consult with your physician as to specific iron supplementation needs.**

Store tightly closed, in a cool, dry place, out of reach of children.

Do not use if imprinted seal under cap is broken or missing.

CAUTION: If you are taking medications or have blood clotting issues, consult your physician before use. Biotin may interfere with lab tests. If you are planning to undergo lab testing, consult your physician before use.

OTHER INGREDIENTS: Sugar, Glucose Syrup, Water, Gelatin, Lactic Acid, Calcium Lactate, Citric Acid, Malic Acid, Sucrose Fatty Acid Esters, Color Added, Natural Flavors, Tocopherols.

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Figure 1.7. "Safety for Baby & Me" handout

EFNEP

FOOD TALK Baby & Me

Safe Seafood *During Pregnancy*

Seafood intake during pregnancy is recommended because it can help your baby's cognitive development.

Salmon Fillet

Canned Sardines

Canned Tuna Melt

Choosing seafood low in Mercury during pregnancy is the best for you and your baby!

Mercury in seafood can be harmful to the brain and nervous system if exposed to too much of it over time.

Some low-Mercury options are cod, crab, crawfish, salmon, sardines, shrimp, canned light tuna, and more!

Breaded Cod

Shrimp and Grits

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Figure 1.8. "Safe Seafood" handout

Salmon Croquettes

Nutrition Facts

4 servings per container
Serving size **2 patties (139g)**

Amount per serving	
Calories	**220**
	% Daily Value*
Total Fat 7g	**9%**
Saturated Fat 1.5g	**7%**
Trans Fat 0g	
Cholesterol 135mg	**44%**
Sodium 520mg	**22%**
Total Carbohydrate 10g	**4%**
Dietary Fiber 1g	**3%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 28g	
Vitamin D 15.4mcg	80%
Calcium 340mg	25%
Iron 1.9mg	10%
Potassium 420mg	8%

* The % Daily Values (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

- Salmon is high in Omega-3 fatty acids that can help support heart health.
- Canned Salmon is easy to keep on hand for days you are short on time to cook.
- Making canned salmon into patties is a fun way to change up traditional ground beef burgers.
- Serve on a whole grain bun. Top with veggies, a side of fruit and a glass of milk for a well-rounded meal!

This work is supported in part by The Expanded Food and Nutrition Education Program [GRANT12471309] from the USDA National Institute of Food and Agriculture.
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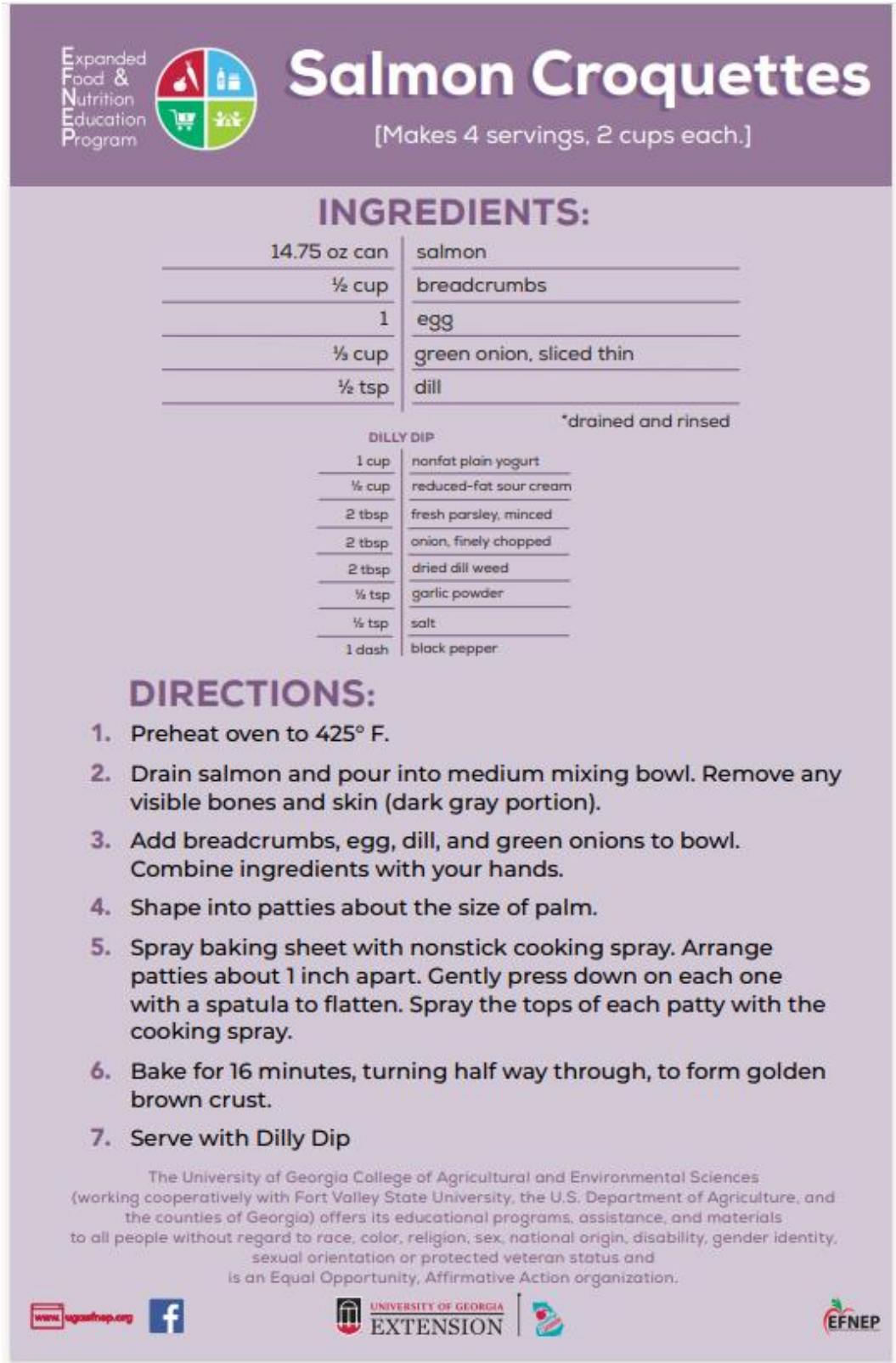

Figure 1.9. "Salmon Croquet" & "Dilly Dip" recipe card

Turkey'N'Squash

Nutrition Facts

6 servings per container

Serving size	1 cup (269g)
Amount per serving	
Calories	**130**
	% Daily Value*
Total Fat 6g	**7%**
Saturated Fat 2.5g	**12%**
Trans Fat 0g	
Cholesterol 55mg	**18%**
Sodium 75mg	**3%**
Total Carbohydrate 7g	**2%**
Dietary Fiber 3g	**10%**
Total Sugars 5g	
Includes 0g Added Sugars	**0%**
Protein 17g	
Vitamin D 0mcg 0%	Calcium 40mg 4%
Iron 1.8mg 10%	Potassium 440mg 10%

* The % Daily Values (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Ingredients: Ground turkey, no salt added canned diced tomatoes, yellow squash, zucchini, bell pepper, ground black pepper

- Ground turkey is a lean protein option that is low in saturated fat, making it a heart healthy option.
- Squash is a large crop in Georgia, and summer squash are usually available at farmers markets and grocery stores for cheaper from August-October during their peak season.
- Try serving over brown rice or with whole grain pasta to make a fiber-rich entree!

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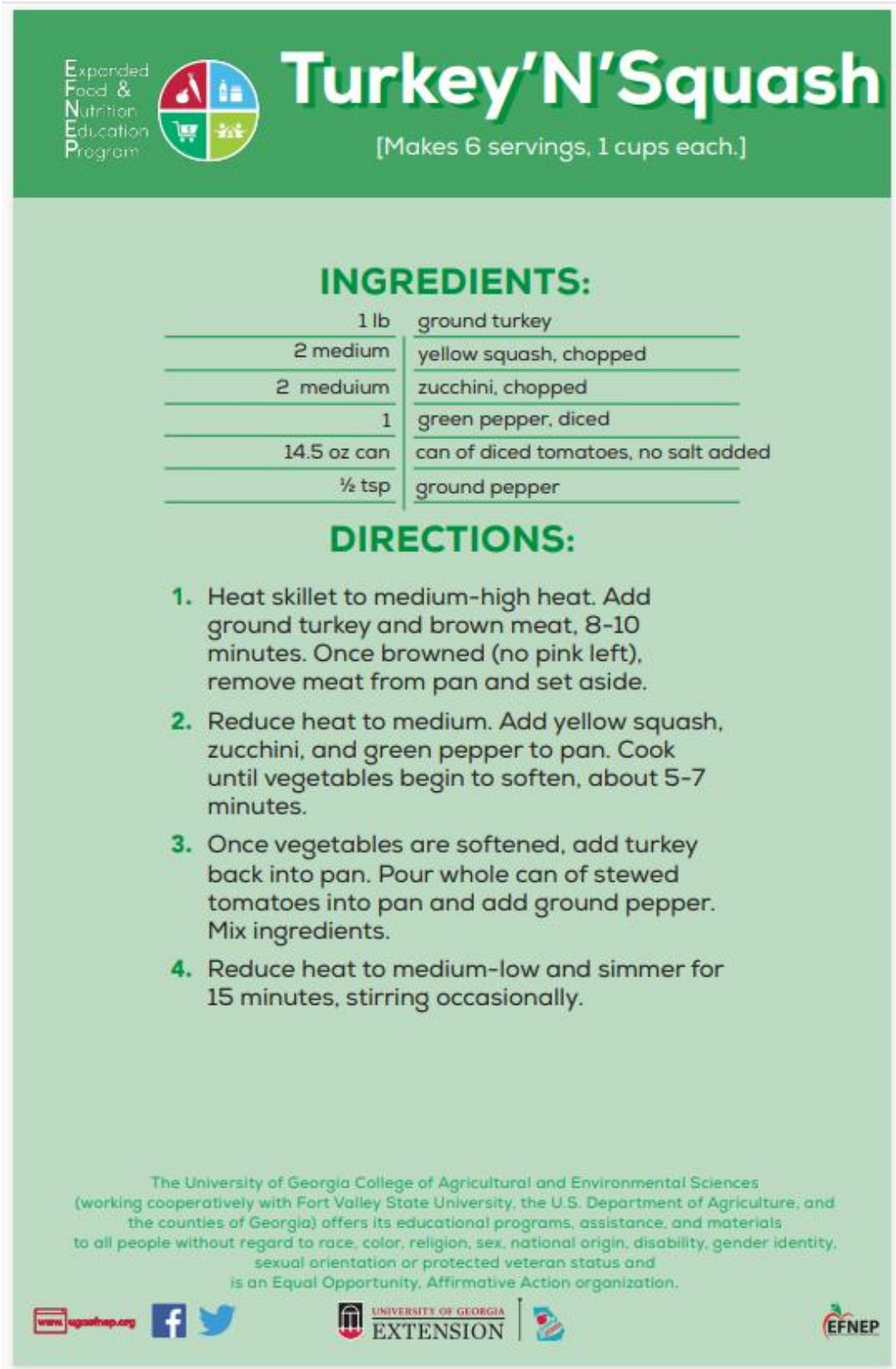


Figure 1.10. "Turkey & Squash Dinner" recipe card

EFNEP

FOOD TALK Baby & Me

Energy Needs During Pregnancy

Changes in Energy Needs

1st trimester

+0 calories/day

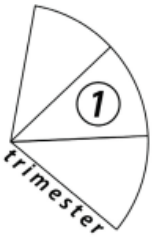
2nd trimester

+340 calories/day

3rd trimester

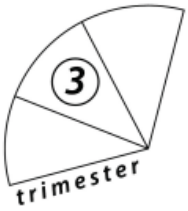
+452 calories/day

Changes in Weight Gain Recommendations



1-4 pounds over 1st trimester

½ to 1 pound gained per week during 2nd trimester



Regular visits with your doctor can help make sure you're eating enough to support you and your baby!

½ to 1 pound gained per week during 3rd trimester

Adapted from: www.texaswic.org; www.dietaryguidelines.gov; www.hopkinsmedicine.org; www.tuftsmedicalcenter.org

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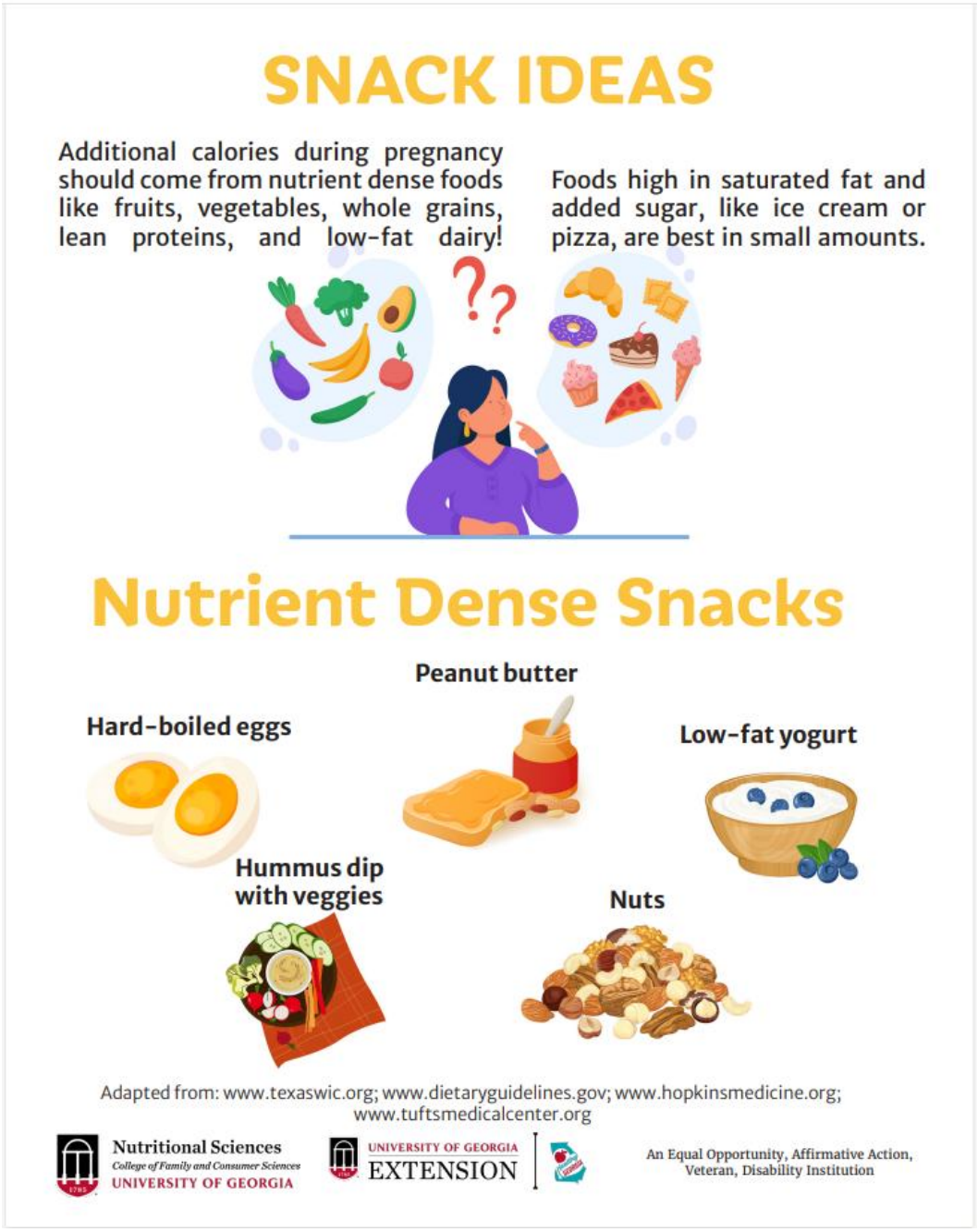

Figure 1.11. "Watch Your Baby Grow" handout

Scrambled eggs
Ask: **What are ways to add color to eggs?**
Allow participants to discuss.
Mention the options below if they don't come up:
- vegetables: onion, green peppers, tomatoes, zucchini
-low-fat dairy: shredded cheese
-whole grains: over English muffin, toast, or in a tortilla

**For Baby and Me:* *(2) Scrambled eggs, 1 slice low fat cheese, 1 c peppers and onions (cooked in oil) over 1 English muffin = 425 kcal: extra calories 3rd Trimester; Using (1) egg= 355 calories= extra calories 2nd Trimester*

Figure 1.12. Example of adaptations made to the "Food Coloring" Activity

Table 1.5. *UGA Food Talk: Baby & Me* Pregnancy-specific Jeopardy Questions

Category	Question	Answer
What's on Your Plate?	True or False? The saying "you're eating for two" during pregnancy means that you should double your food intake to meet the needs of you and your baby?	False. During the first trimester of pregnancy, you actually do not need extra calories. During the second and third trimester additional calories are needed, but only a few hundred, which is equivalent to a snack or small meal, not a whole day's worth of food.
Money on my Mind	While at the store you are looking at juice and want to decide between a bottle of 100% orange juice for $3 or a fruit juice blend for $2. Which would be the best option for your money?	The 100% orange juice would be the better option for your money since it has higher nutritional value and likely less added sugars than the fruit juice blend.
Attack BAC	True or False? It is safe for pregnant women to eat cold deli meats?	False. Cold deli meat should be heated to 165 degrees Fahrenheit or until steaming. Use a meat thermometer in the thickest part of the meat.
Planning Ahead	Since becoming pregnant you have been dealing with heartburn after dinner, what are some ways to plan ahead to avoid some of this discomfort?	Prepare and eat dinner 2-3 hours before laying down for bed and try and eat smaller, more frequent meals throughout the day to avoid eating too large of a serving at dinner.
What Would You Do (WWYD)?	Your friend who has a child and claims she drank alcohol during her pregnancy without any side effects offers you a cocktail at a party, should you take the drink or ask for a mocktail option?	No amount of alcohol has been shown to be safe during pregnancy. Choose a mocktail option without alcohol to keep you and your baby safe while still participating in social events.

Table 1.6. Agency details and participant enrollment and graduation rates by site

Region	County	Agency	# enrolled	# graduated	Graduation rate
Northeast	Richmond	Augusta Care Pregnancy Center	11	3	27%
Southwest	Dougherty	Alpha Pregnancy	5	2	40%
Southwest	Colquitt	Hope House	19	2	11%

Table 1.7. Pre-intervention 30-question questionnaire mean and standard deviation of all enrolled participant responses for diet quality questions (1-11)

Questionnaire Question	Mean (SD)	Interpretation
1. How many times a day do you eat fruit?	2.9 (1.3)	~2 times a day
2. How many times a day do you eat vegetables	2.5 (1.3)	1-2 times a day
3. How many different kinds of vegetables do you usually eat a day?	2.1 (1.1)	~2 kinds a day
4. How many times a day do you drink milk or soymilk?	1.9 (0.9)	~1 time a day
5. Over the last week, how many days did you eat red and orange vegetables?	2.1 (1.3)	~2 days a week
6. Over the last week, how many days did you eat dark green vegetables?	2.5 (1.7)	2-3 days a week
7. Over the last week, how many days did you eat beans and peas?	2.4 (1.6)	2-3 days a week
8. Over the last week, how many days did you eat yogurt or drink smoothies with yogurt?	2.2 (1.6)	~2 days a week
9. Over the last week, how many days did you eat cereal with milk?	2.4 (1.8)	~2-3 days a week
10. How many days a week do you cook dinner (your main meal) at home?	4.3 (2.2)	~4-5 days a week
11. How often do you drink regular soda (not diet)?	2.0 (1.5)	4-6 times a week

Table 1.8. Pre/Post 30-question questionnaire mean, standard deviation, and p-value for diet quality questions, graduates-only

Questionnaire Question	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Interpretation	p-value
1. How many times a day do you eat fruit?	3.6 (.5)	3.7 (1.0)	~2 times a day	0.625
2. How many times a day do you eat vegetables	3.0 (1.8)	3.3 (1.6)	1-2 times a day	1
3. How many different kinds of vegetables do you usually eat a day?	2.1 (1.2)	1.9 (1.1)	~2 kinds a day	0.5
4. How many times a day do you drink milk or soymilk?	2.1 (0.9)	2.6 (1.5)	Increase from 1 to 2 times a day	0.44
5. Over the last week, how many days did you eat red and orange vegetables?	2.0 (1.3)	2.4 (1.9)	~2-3 days a week	0.75
6. Over the last week, how many days did you eat dark green vegetables?	2.1 (1.9)	3.1 (1.2)	Increase from 2 to 3 days a week	**0.28**
7. Over the last week, how many days did you eat beans and peas?	3.0 (2.1)	2.4 (1.6)	Decrease from 3 days to 2 days a week	0.38
8. Over the last week, how many days did you eat yogurt or drink smoothies with yogurt?	3.4 (1.6)	2.7 (1.0)	~2 days a week	0.75
9. Over the last week, how many days did you eat cereal with milk?	2.4 (1.6)	3.1 (1.9)	Increase from 2 to 3 days a week	**0.06**
10. How many days a week do you cook dinner (your main meal) at home?	4.4 (2.3)	3.9 (2.2)	~4 days a week	0.5
11. How often do you drink regular soda (not diet)?	1.3 (0.8)	2.3 (2.1)	Increase from 1-3 times to 4-6 times a week	0.38

Table 1.9. Pre-intervention 30-question questionnaire mean and standard deviation of all enrolled participant responses for food safety questions

Questionnaire Question	Mean (SD)	Interpretation
15. How often do you wash your hands with soap and running water before preparing food?	5.8 (0.9)	Usually (about 80% of the time)-Always
16. After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods?	5.7 (0.9)	Usually (about 80% of the time)-Always
17. How often do you thaw frozen food on the counter or in the sink at room temperature?	3.3 (1.7)	Sometimes (about 40% of the time)
18. How often do you use a meat thermometer to see if meat is cooked to a safe temperature?	1.6 (1.3)	Never-Rarely (about 20% of the time)

Table 1.10. Pre/Post 30-question questionnaire mean, standard deviation, and p-value for food safety questions, graduates-only

Questionnaire Question	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Interpretation	p-value
15. How often do you wash your hands with soap and running water before preparing food?	5.1 (1.9)	5.3 (1.9)	Usually (about 80% of the time)-Always	1
16. After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods?	5.0 (1.8)	5.3 (1.9)	Usually (about 80% of the time)-Always	0.5
17. How often do you thaw frozen food on the counter or in the sink at room temperature?	3.1 (1.5)	2.3 (1.8)	Sometimes (about 40% of the time)	0.75
18. How often do you use a meat thermometer to see if meat is cooked to a safe temperature?	1.7 (1.0)	1.7 (1.0)	Never-Rarely (about 20% of the time)	1

Table 1.11. Pre-intervention 30-question questionnaire response frequency for all enrolled participants for food security questions

Questionnaire Question	Response option	n (%)
28. The food that I bought just didn't last, and I didn't have money to get more.	Often true	5 (15.6%)
	Sometimes true	15 (45.5%)
	Never true	11 (34.4%)
	Don't know	2 (6.3%)
	Total respondents	33
	No response	2
29. I couldn't afford to eat balanced meals	Often true	3 (9.4%)
	Sometimes true	12 (37.5%)
	Never true	14 (43.8%)
	Don't know	3 (9.4%)
	Total respondents	33
	No response	2
30. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	11 (34.4%)
	No	18 (56.3%)
	Don't know	3 (9.4%)
	Total respondents	33
	No response	2

Table 1.12. Pre/post-intervention 30-question questionnaire response frequency and p-value for food security questions, graduates only

Question	Response option	Pre-intervention, graduates only n (%)	Post-intervention, graduates only n (%)	p-value
28. The food that I bought just didn't last, and I didn't have money to get more.	Often true	1	0	0.25
	Sometimes true	4	2	
	Never true	2	3	
	Don't know	0	2	
	Total respondents	7	7	
	No response	0	0	
29. I couldn't afford to eat balanced meals	Often true	1	0	1
	Sometimes true	2	2	
	Never true	3	4	
	Don't know	1	1	
	Total respondents	7	7	
	No response	0	0	
30. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	2	2	1
	No	5	4	
	Don't know	0	1	
	Total respondents	7	7	
	No response	0	0	

Table 1.13. Pre-intervention 30-question questionnaire mean and standard deviation of all enrolled participant responses for food resource management questions

Questionnaire Question	Mean (SD)	Interpretation
19. How often do you compare food prices to save money?	4.2 (1.7)	Often (about 60% of the time)
20. How often do you plan your meals before you shop for groceries?	3.8 (1.6)	Often (about 60% of the time)
21. How often do you look in the refrigerator or cupboard to see what you need before you go shopping?	3.9 (1.8)	Often (about 60% of the time)
22. How often do you make a list before going shopping?	3.8 (1.6)	Often (about 60% of the time)
23. How often do you use food coupons for food purchases?	2.1 (1.4)	Rarely (about 20% of the time)
24. How often do you use a written weekly or monthly food spending plan?	2.0 (1.4)	Rarely (about 20% of the time)
25. How often do you budget enough money for food purchases?	3.2 (1.9)	Sometimes (about 40% of the time)
26. How often do you check for sales on foods before you shop?	3.2 (1.8)	Sometimes (about 40% of the time)
27. How often do you check for food items on sale when you are at the store?	3.5 (1.9)	Sometimes (about 40% of the time)-Often (about 60% of the time)

Table 1.14. Pre/post-intervention 30-question questionnaire response frequency and p-value for food resource management questions, graduates only

Questionnaire Question	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Interpretation	p-value
19. How often do you compare food prices to save money?	4.4 (1.1)	4.6 (1.5)	Often (about 60% of the time)	1
20. How often do you plan your meals before you shop for groceries?	3.4 (2.1)	4.0 (2.0)	Often (about 60% of the time)	0.56
21. How often do you look in the refrigerator or cupboard to see what you need before you go shopping?	4.1 (2.1)	4.6 (1.7)	Often (about 60% of the time)	0.75
22. How often do you make a list before going shopping?	4.3 (1.7)	3.7 (2.3)	Often (about 60% of the time)	0.5
23. How often do you use food coupons for food purchases?	2.6 (1.4)	2.9 (2.0)	Rarely (about 20% of the time)	0.94
24. How often do you use a written weekly or monthly food spending plan?	2.6 (1.8)	3.3 (1.9)	Rarely (about 20% of the time)	0.5
25. How often do you budget enough money for food purchases?	3.0 (2.0)	3.6 (1.8)	Increase from sometimes (about 40% of the time) to often (about 60% of the time)	0.69
26. How often do you check for sales on foods before you shop?	3.4 (2.1)	2.7 (2.1)	Sometimes (about 40% of the time)	0.75
27. How often do you check for food items on sale when you are at the store?	3.9 (2.0)	3.7 (1.9)	Sometimes (about 40% of the time)-Often (about 60% of the time)	1

Table 1.15. Pre-intervention 30-question questionnaire mean and standard deviation of all enrolled participant responses for physical activity questions

Questionnaire Question	Mean (SD)	Interpretation
12. In the past week, how many days did you exercise for at least 30 minutes?	3.2 (2.3)	~3 days
13. In the past week, how many days did you do workouts to build and strengthen your muscles?	1.7 (1.9)	~1-2 days
14. How often do you make small changes on purpose to be more active?	3.1 (1.1)	Sometimes (about 40% of the time)

Table 1.16. Pre/post-intervention 30-question questionnaire response frequency and p-value for physical activity questions, graduates only

Questionnaire Question	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Interpretation	p-value
12. In the past week, how many days did you exercise for at least 30 minutes?	3.7 (2.0)	2.4 (2.4)	2-3 days	0.53
13. In the past week, how many days did you do workouts to build and strengthen your muscles?	2.6 (1.9)	1.4 (1.5)	~1-2 days	0.31
14. How often do you make small changes on purpose to be more active?	3.0 (0.8)	3.6 (1.6)	Sometimes (about 40% of the time)	0.75

Table 1.17. Pre-intervention pregnancy-specific questionnaire responses, all enrolled participants

Question	Answer choices	Pre-intervention, all enrolled n (%)
1.If you want to increase the amount of iron in your diet, which serving of food would be the best choice?	**Tuna salad**	**14 (43.8%)**
	Pasta carbonara	0
	Lentil soup	3 (9.4%)
	Egg sandwich	15 (46.9%)
	Total respondents	32
	No response	3
2.I take a prenatal supplement:	Never	8 (23.5%)
	Rarely (about 20% of the time)	1 (2.9%)
	Sometimes (about 40% of the time)	3 (8.8%)
	Often (about 60% of the time)	3 (8.8%)
	Usually (about 80% of the time)	7 (20.6%)
	Always	12 (35.3%)
	Total respondents	34
	No response	1
3.How much fluid is recommended for pregnant women each day?	6-10 cups	2 (6.1%)
	8-12 cups	**23 (69.7%)**
	12-16 cups	6 (18.2%)
	14-18 cups	2 (6.1%)
	Total respondents	33
	No response	2
4.What are the reasons why folic acid supplements are recommended?	**To prevent spina bifida**	**8 (26.7%)**
	To prevent cleft lip	2 (6.7%)
	To prevent heart defects	12 (40%)
	To prevent gestational diabetes	8 (26.7%)
	Total respondents	30
	No response	5
5.How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy?	7-10 pounds	7 (21.2%)
	15-25 pounds	12 (36.4%)
	25-35 pounds	**12 (36.4%)**
	35-45 pounds	2 (6.1%)
	Total respondents	33
	No response	2
6.To meet energy needs during the first 3 months	**No extra energy**	**7 (21.9%)**
	210 additional calories	11 (34.4%)

of pregnancy, pregnant women need:	340 additional calories	14 (43.8%)
	452 additional calories	0
	Total respondents	32
	No response	3
7.Which of these fish or seafood has high amounts of mercury?	Canned tuna	7 (23.3)
	Swordfish	**15 (50%)**
	Shrimp	4 (13.3%)
	Salmon	4 (13.3.%)
	Total respondents	30
	No response	5
8.During pregnancy fish with low levels of mercury should be limited to:	**2-3 servings (8-12 ounces) per week**	**14 (41.2%)**
	1 serving (4 ounces) per week	10 (29.4%)
	1 serving (4 ounces) every 2 weeks	6 (17.6%)
	None, seafood is not safe during pregnancy	4 (11.8%)
	Total respondents	34
	No response	1
9.How many servings of fruits and vegetables a day do you think experts advise pregnant women to eat daily?	1-2 cups	2 (6.1%)
	2-3 cups	12 (36.4%)
	3-4 cups	12 (36.4%)
	4-5 cups	**6 (18.2%)**
	5-6 cups	1 (3%)
	Total respondents	33
	No response	2
10.Over the last week, how many days did you choose foods with reduced sodium, or without added sodium?	0 days	6 (17.6%)
	1 day	6 (17.6%)
	2 days	3 (8.8%)
	3 days	9 (26.5%)
	4 days	4 (11.8%)
	5 days	1 (2.9%)
	6 days	0
	7 days	5 (14.7%)
	Total respondents	34
	No response	1

Table 1.18. Pre/Post pregnancy-specific questionnaire changes in response frequencies and p-values, graduates only

Question	Answer choices	Pre-intervention, graduates n (%)	Post-intervention, graduates n (%)	p-value
1.If you want to increase the amount of iron in your diet, which serving of food would be the best choice?	**Tuna salad**	**1 (14.3%)**	**2 (28.6)**	1
	Pasta carbonara	0	0	
	Lentil soup	1 (14.3%)	2 (28.6)	
	Egg sandwich	5 (71.4%)	3 (42.9%)	
	Total respondents	7	7	
	No response	0	0	
2.I take a prenatal supplement:	Never	1 (14.3%)	1 (14.3%)	1
	Rarely (about 20% of the time)	1 (14.3%)	1 (14.3%)	
	Sometimes (about 40% of the time)	0	0	
	Often (about 60% of the time)	2 (28.6)	1 (14.3%)	
	Usually (about 80% of the time)	0	1 (14.3%)	
	Always	3 (42.9%)	3 (42.9%)	
	Total respondents	7	7	
	No response	0	0	
3.How much fluid is recommended for pregnant women each day?	6-10 cups	0	0	1
	8-12 cups	**6 (85.7%)**	**7 (100%)**	
	12-16 cups	1 (14.3%)	0	
	14-18 cups	0	0	
	Total respondents	7	7	
	No response	0	0	
4.What are the reasons why folic acid supplements are recommended?	**To prevent spina bifida**	**2 (33.3%)**	**3 (50%)**	1
	To prevent cleft lip	0	0	
	To prevent heart defects	3 (50%)	2 (33.3%)	
	To prevent gestational diabetes	1 (16.7%)	1 (16.7%)	
	Total respondents	6	6	
	No response	1	1	
	7-10 pounds	2 (28.6)	2 (28.6)	1

5.How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy?	15-25 pounds	3 (42.9%)	3 (42.9%)	
	25-35 pounds	**2 (28.6)**	**2 (28.6)**	
	35-45 pounds	0	0	
	Total respondents	7	7	
	No response	0	0	
6.To meet energy needs during the first 3 months of pregnancy, pregnant women need:	**No extra energy**	**3 (42.9%)**	**3 (42.9%)**	1
	210 additional calories	2 (28.6)	3 (42.9%)	
	340 additional calories	2 (28.6)	1 (14.3%)	
	452 additional calories	0	0	
	Total respondents	7	7	
	No response	0	0	
7.Which of these fish or seafood has high amounts of mercury?	Canned tuna	0	0	0.5
	Swordfish	**4 (57.1%)**	**6 (71.4%)**	
	Shrimp	0	0	
	Salmon	3 (42.9%)	1 (14.3%)	
	Total respondents	7	7	
	No response	0	0	
8.During pregnancy fish with low levels of mercury should be limited to:	**2-3 servings (8-12 ounces) per week**	**3 (42.9%)**	**4 (57.1%)**	0.5
	1 serving (4 ounces) per week	0	1 (14.3%)	
	1 serving (4 ounces) every 2 weeks	3 (42.9%)	2 (28.6)	
	None, seafood is not safe during pregnancy	1 (14.3%)	0	
	Total respondents	7	7	
	No response	0	0	
9.How many servings of fruits and vegetables a day do you think experts advise pregnant women to eat daily?	1-2 cups	0	1 (14.3%)	0.75
	2-3 cups	4 (57.1%)	3 (42.9%)	
	3-4 cups	2 (28.6)	3 (42.9%)	
	4-5 cups	**1 (14.3%)**	**0**	
	5-6 cups	0	0	
	Total respondents	7	7	
	No response	0	0	
10.Over the last week, how many days did you choose foods with reduced sodium, or without added sodium?	0 days	2 (28.6)	2 (28.6)	1
	1 day	0	0	
	2 days	0	0	
	3 days	2 (28.6)	1 (14.3%)	
	4 days	1 (14.3%)	1 (14.3%)	
	5 days	0	1 (14.3%)	

	6 days	0	1 (14.3%)	
	7 days	2 (28.6)	1 (14.3%)	
	Total respondents	7	7	
	No response	0	0	

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CHAPTER 4

AN EXTENSION TRAINING MODEL FOR A PREGNANCY-SPECIFIC UNIVERSITY OF GEORGIA (UGA) EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP) CURRICULUM: *FOOD TALK: BABY & ME*[2]

[2]Mouser, C., Rollins, L., Gallo, S., Anderson, A., Henes, S. To be submitted to the Journal of Extension.

ABSTRACT

Background: EFNEP is a federal nutrition education program that includes pregnant women as a priority audience nationally. However, UGA EFNEP does not currently offer a pregnancy-specific curriculum or specialized staff training for this population.

Introduction: A hybrid training model was developed and piloted to prepare a pilot group of UGA EFNEP staff to deliver an adapted pregnancy-specific nutrition education curriculum. The training aimed to enhance staff knowledge and provide tools for educators to better support pregnant participants.

Methods: The training model combined self-paced eLearning modules, in-person hands-on training sessions, and follow-up Zoom sessions. The in-person training was guided by the Land Grant University (LGU) EFNEP and SNAP-Ed Core Competencies to orient staff to key skills. The eLearning was evaluated with a pre- and post-training knowledge quiz. The in-person training was assessed through a post-training survey, which included Likert-scale items measuring the effectiveness of the training at helping staff meet their Core Competencies, along with open-ended survey questions for qualitative feedback.

Results: The eLearning modules led to improved pregnancy-specific nutrition knowledge among UGA EFNEP staff. The in-person training was rated favorably, but additional training and resources were still desired.

Discussion: This study demonstrates the feasibility of a hybrid training model for preparing UGA EFNEP staff to deliver pregnancy-specific nutrition education. Pilot team feedback will continue to guide revisions to the training protocol, with plans to expand access to these resources to additional UGA EFNEP staff in the future.

BACKGROUND

The Expanded Food and Nutrition Education Program (EFNEP) is a federally funded nutrition education program for low-income populations, including priority audiences of adult caregivers with children, teens, and pregnant women/teens[1]. Pregnant women/teens are a unique population, due to the nutritional implications of pregnancy[2]. The nutritional needs of pregnant women differ from general dietary guidelines for adults, highlighting the need for tailored programming[3]. University of Georgia (UGA) EFNEP piloted an adapted *Food Talk* curriculum for pregnant women, *Food Talk: Baby & Me*, from September 2023-June 2025 (*described in Chapter 3*). In preparation for delivering the adapted curriculum, a need was identified for a tailored training protocol to prepare UGA EFNEP staff to teach the pregnancy-specific curriculum: *Food Talk: Baby & Me*.

INTRODUCTION

A unique component of EFNEP delivery is that trained paraprofessional peer-educators, called Program Assistants (PA's), deliver programming[4]. Peer-educators have been used across public health interventions, and have been found to be effective at delivering nutrition education programming while also benefitting from their role as a peer-educator[5,6]. For example, Oliver (2020) found that peer-educators who were trained to teach a series of workshops on cooking skills, healthy eating, and easy recipes successfully delivered the sessions and reported feeling empowered by their increased knowledge[6].

EFNEP Program Assistants typically live in the community where they provide education and have similar backgrounds to the participants they are teaching[7]. UGA EFNEP PA's are typically trained by Extension Supervising Agents in-person, for a minimum of eight required

training hours each month. Regional and State level training also occurs for all-staff and Extension Supervising Agents throughout the year, organized by the State staff team, including the UGA EFNEP State staff Registered Dietitian Nutritionist (RDN). EFNEP training protocols across the country vary and a need has been identified for accessible and standardized training and review materials[8–10].

Chlipalski et al. (2018) evaluated the training needs of EFNEP PA's through interviews and found that there was a need and want for online training[10]. Online training was liked by EFNEP staff due to being consistently and easily accessible. EFNEP staff identified challenges of in-person training, such as being time-consuming for Supervising Agents and leaving PA's still in need of ongoing review materials[10]. Further, a need for organizational support, through protected and scheduled time to complete training, was also expressed[10]. These findings support the need for developing online, readily available training and review materials for EFNEP PA's.

The following study explores the feasibility of delivering hybrid training to UGA EFNEP staff and the effectiveness of the hybrid training model at preparing UGA EFNEP PA's to teach the adapted, pregnancy-specific curriculum. Principles of the Adult Learning Theory guided training development, a theory that supports self-paced online learning as an effective method for adult learners[11]. Additionally, LGU EFNEP and SNAP-Ed Core Competencies, a national-level tool for guiding staff training and evaluation, were used to orient staff during the in-person training[12]. This study aims to fill a gap in UGA EFNEP training materials by expanding resources available to staff to include online and in-person pregnancy-specific information.

METHODS

Pilot team recruitment:

In December 2022, the UGA EFNEP State Coordinator contacted five Extension Supervising Agents and five PA's (PA's) who had either previously worked with pregnant individuals or who had expressed an interest in expanding their reach to this population. Of the five Extension Supervising Agents emailed, two were interested in participating in the pilot study, along with four PA's. An additional PA, who is supervised by one of the Supervising Agents who was already part of the pilot study, joined the pilot team in November 2024. Overall, two Extension Supervising Agents and five PA's were involved at some point during the pilot study; the rationale behind changes in staffing are described further in the results section.

Training protocol:

The UGA EFNEP *Food Talk: Baby & Me* training model was developed alongside the adapted curriculum to equip educators with foundational knowledge and practical skills. Training components included (1) asynchronous eLearning modules, (2) in-person training, (3) video calls (Zoom), and (4) ongoing email communication and support from the research team.

eLearning training modules:

The eLearning modules, launched in February 2023 for EFNEP peer educators and supervisors involved in the UGA *Food Talk: Baby & Me* pilot, were designed to provide base knowledge on pregnancy-specific nutrition recommendations, with the Dietary Guidelines for Americans (DGAs) serving as the primary resource4. Other resources utilized to develop this training material included the American College of Obstetrics & Gynecology, MyPlate, and the FDA and EPA seafood guidelines[13–15].

Developed using iSpring Suite and PowerPoint, the modules were posted on UGA's private learning platform (UGA eLC) for flexible access. The training consisted of four self-paced modules divided into eight submodules, each taking 10–15 minutes to complete. The modules covered information on dietary recommendations for pregnant women, energy needs during pregnancy and gestational weight gain, dietary supplementation during pregnancy, and food safety (**Table 2.1**). These submodules incorporated voiceovers, integrated review questions, and a pre/post quiz to assess knowledge gains. The pre/post quiz included a combination of multiple-choice, true or false, multi-select, and matching questions (**Table 2.2**). The pre/post quiz results were analyzed with a related samples Wilcoxon signed rank test using SPSS (Version 26.0, IBM Corp, 2019).

In-person Training:

The in-person training followed completion of the virtual training modules, serving as a tool to reinforce learning and provide hands-on application. The research team guided pilot staff through the adapted curriculum, highlighting pregnancy-specific material. As the curriculum was reviewed, the team simulated the adapted activities and related discussions. The pilot team then worked in pairs to prepare the two new recipes and practice conversation points related to the meals. Two in-person training sessions were held, the first (in March 2023) took place over 2 half-days (with an overnight stay on-site), and the second (in January 2025) took place over one workday at a central County Extension Office. The March 2023 training took place at the Rock Eagle 4-H center in Eatonton, GA. This training site was chosen because it offered a central meeting location and on-site dining and lodging. This overnight training was done to accommodate the travel time for all the staff involved. The second training, in January 2025, was done as a day training because it was only for staff from one region, allowing the research team

to travel to their local office to conduct the training. The agendas for the March 2023 training (**Figure 2.1**) and the January 2025 training (**Figure 2.2**) are included below for reference.

LGU EFNEP & SNAP-Ed Core Competencies:

The Land Grant University (LGU) EFNEP & SNAP-Ed Core Competencies for paraprofessional peer-educators and program supervisors guided the identification of specific skills and knowledge addressed during in-person training, ensuring consistency, program effectiveness, and professional development (**Figure 2.3**)[12].

The effectiveness of the training at meeting the core competencies was evaluated using a Likert scale survey (1=not helpful, 2=somewhat helpful, 3=helpful, 4=very helpful, 5=extremely helpful) administered via Microsoft Forms the week following the in-person training (**Figure 2.4**)[16]. The survey was adapted from a standardized UGA EFNEP template that was developed by the UGA EFNEP state dietitian as an evaluative survey for all staff trainings. Mean and standard deviation were calculated using SPSS (Version 26.0, IBM Corp, 2019)[16]. Rating and free-response questions were also included in the Microsoft Forms survey (**Figure 2.5**).

Follow-up & support:

Two weeks following the in-person training sessions a virtual follow-up meeting was held on Zoom to answer questions and prepare paraprofessional peer-educators to begin teaching the curriculum. The research team was present to answer questions related to the adapted curriculum and the specifics of data collection for the pilot study. Following this meeting UGA EFNEP supervisors and peer-educators connected with local agencies in their community (i.e. pregnancy resource centers, community health centers, WIC clinics) to begin recruitment.

RESULTS

Two Extension supervising agents and five EFNEP peer-educators participated in the training and provided at least one form of feedback. One Extension Supervising Agent and four PA's completed the eLearning modules and associated pre/post quiz in February 2023. Two Agents and four PA's participated in the March 2023 in-person training, but two decided not to continue with the pilot study and did not complete the post-training evaluation. One new PA completed the eLearning modules and pre/post quiz in November 2024. In January 2025, the new PA and a returning Agent and PA participated in the second in-person training. Ultimately, two Supervising Agents and three PA's would complete all training and continue on to implement the program.

eLearning training:

The eLearning quiz results include responses from one Extension Supervising Agent and five PA's. The Agent and four PA's completed the eLearning and quiz in February 2023, then one PA completed the eLearning and quiz in November 2024. All staff responses (n=6) are combined in the reported results.

Following completion of the eLearning modules, Staff showed improvements in knowledge of the recommended servings of each food group, with increases in the amount of correct matches between food groups and serving size for fruits, vegetables, protein, and grains (**Table 2.3**). Staff also showed improvements in questions related to gestational weight gain, with all staff correctly identifying that all pregnant women are recommended to gain weight during pregnancy. Further, 66.7% correctly identified the amount of weight gain recommended for a women starting pregnancy with a healthy weight and 83.3% correctly identified that

pregnant women need no additional calories during the first trimester of pregnancy (**Table 2.4**). Overall quiz scores (n=6) show a positive trend from pre-training (5.8 ± 1.5 out of a total possible score of 10) to post-training (7.7 ± 1.9). Although the change in quiz scores was not statistically significant (p=.075), it suggests a trend toward improved knowledge.

In-person training:

Two Extension Supervising Agents and four PA's attended the March 2023 in-person training. Following the March 2023 in-person training, two Extension Supervising Agents and three PA's provided feedback (n=5). Two PA's did not continue with the pilot study at this point. Based on the feedback provided via the Microsoft forms survey administered after the in-person training session, UGA EFNEP staff (n=5) rated the eLearning modules 4.2 out of 5 ("very helpful") for their effectiveness in preparing them to teach the adapted curriculum. These results suggest that there may be some benefit to providing asynchronous eLearning modules for UGA EFNEP paraprofessionals as part of a training protocol. EFNEP staff reported "the virtual training modules were a quality source of introduction to the material", supporting the use of virtual training to build a knowledge base followed by hands-on in-person training sessions.

UGA EFNEP staff feedback reported through Microsoft Forms found that staff desire "in-depth presentations of activities and curriculum prior to expected execution by PA's" and shared that "it is helpful when State staff leaders teach new materials and lessons to provide a visual example for employees". All staff rated the in-person training as ranging from 'helpful' to 'extremely helpful' in strengthening EFNEP core competencies related to program delivery (**Table 2.5**). They specifically noted improvements in teaching evidence-based curricula and in encouraging participants to apply new information and skills for goal-setting.

CONCLUSION

Discussion:

The eLearning modules were effective at improving UGA EFNEP foundational knowledge of pregnancy-specific nutrition guidelines, while the in-person training allowed educators to apply this knowledge through hands-on activities, discussions, and skill practice. Previous research supports that paraprofessionals benefit from the inclusion of virtual, self-paced learning options[17]. For example, Chlipalski (2019) developed online training modules to prepare EFNEP PA's to deliver a prenatal nutrition lesson, as part of the *Eating Smart Being Active (ESBA)* curriculum[17]. These modules were found to have a positive impact on PA reported self-efficacy and knowledge, supporting the feasibility of training PA's to teach pregnancy-specific nutrition using an online training model[17]. This study also found that eLearning was effective at improving participant knowledge related to pregnancy-specific nutrition guidelines.

Feedback from UGA EFNEP staff included a desire for additional training sessions. Longer training time may be needed to support peer-educator confidence in teaching new material. Vivian, E. & Flanagan, C. (2022) trained older African American women as part of the Diabetes Prevention Program (DPP) to develop a community of peer-educators that could support other members of their community at-risk of developing diabetes[18]. Peer-educators in this study received thirty-two hours of in-person training, offered two hours each week over sixteen weeks. The UGA EFNEP *Food Talk: Baby & Me* training included approximately two hours of virtual training, eight hours of in-person training, and a two-hour follow-up Zoom call. Interviews with the DPP peer-educators revealed that they benefited from the training sessions and felt prepared to support others in their community, while UGA EFNEP staff from this current study felt they needed more training prior to feeling confident enough to deliver the

adapted program[18]. These findings support the feedback from the UGA EFNEP team that more training time may be needed to prepare peer-educators to implement new material in the community.

Feedback from UGA EFNEP staff also included requests for video demonstrations of the curriculum sessions being taught by an experienced educator or State staff member. The development of these videos will be time-consuming and will also require continued revisions as nutrition guidelines change. Another suggestion from UGA EFNEP PA's was to have help facilitating practice sessions with other PA's prior to implementing the program in the community. Since this study was conducted on a smaller scale the participating PA's were several hours away from each other, making collaboration difficult, however this would be something to consider with more widely dispersed programs.

Strengths and Limitations:

A strength of the UGA EFNEP *Food Talk: Baby & Me* training protocol is the hybrid format that combines eLearning with in-person training. As mentioned previously, UGA EFNEP training has typically been done in-person, but previous research and this study support the effectiveness of eLearning as a tool to help UGA EFNEP staff gain knowledge on new topics[17]. Further, alignment of the in-person training with the LGU EFNEP Core Competencies was essential in ensuring that UGA EFNEP staff were equipped with the knowledge and skills necessary to effectively deliver the adapted UGA EFNEP *Food Talk: Baby & Me* curriculum. Core competencies provide a structured foundation for training, guiding the development of content that directly addresses the skills EFNEP peer-educators and Extension supervising agents need to effectively deliver programming. By linking training activities to these competencies, the program ensured staff could confidently deliver evidence-based nutrition education, engage

participants effectively, and adapt teaching strategies to meet diverse learning needs. This competency-based approach also strengthened program accountability, allowing for clearer evaluation of staff preparedness and training impact.

Evaluation of UGA EFNEP staff feedback regarding the effectiveness of the in-person training at preparing them to meet their Core Competencies revealed areas where the training met educator needs as well as areas of improvement. The amount of Core Competencies applied to the training was reduced from the first in-person training to the second in-person training based on feedback gathered after the first training. PA's had more than the standard UGA EFNEP amount of Core Competencies applied to the first training, which may have been a reason for the poor ratings from some PA's. Typically, UGA EFNEP applies four to six Core Competencies to trainings, but nine were applied to PA's for this training. Extension Supervising Agents had four Core Competencies assigned to the training, which may have promoted increased confidence in feeling prepared to meet those Competencies, and therefore resulted in higher ratings.

Despite its strengths, the training model had some limitations, including time constraints for in-person sessions and the need for ongoing technical support for eLearning access. Future enhancements could include additional refresher modules, increased peer collaboration opportunities, and more interactive elements within the virtual training. Ongoing State staff or Supervising Agent involvement would be needed to maintain and update the training modules on eLC.

Further limitations of this study include the small sample size for pilot group evaluation data. As mentioned previously, the UGA EFNEP staff in this pilot study were selected intentionally for their motivation and passion for working with pregnant women. Despite being a

small group, the pilot group provided depth and quality in their feedback, highlighting the impact that staff perspectives can provide to program developers.

Next Steps:

UGA EFNEP addressed the need for pregnancy-specific nutrition education in Georgia with the development of the UGA EFNEP *Food Talk: Baby & Me* curriculum. Staff feedback on the training process was constructive, guiding future training protocol development. Moving forward, improvements will be made based on this pilot group feedback, with plans to expand the training to UGA EFNEP peer educators and Extension Supervising Agents across the state. Additional eLearning modules, training videos, and a series of in-person training sessions will be the goal for future UGA EFNEP trainings for new curricula implementation. These insights will guide efforts to strengthen competency-based training and improve participant outcomes, ensuring that pregnant women participating in EFNEP receive high-quality, evidence-based nutrition education.

Conclusion:

In summary, a hybrid training model that includes virtual/eLearning, in-person training, and ongoing support may be a more comprehensive approach to training UGA EFNEP staff, ensuring they obtain the confidence and skills needed for effective program implementation and delivery. Additionally, aligning Extension training programs with standardized competencies may ultimately promote program fidelity by clearly outlining goals and objectives for staff. UGA EFNEP staff showed improvements in pregnancy-specific nutrition knowledge following completion of the eLearning modules and on average felt that the in-person training prepared them to meet their Core Competencies. Further improvements to future training protocols can be

informed by the feedback provided by UGA EFNEP staff in this pilot study, including detailed demonstration videos and ongoing training review opportunities.

TABLES AND FIGURES

Table 2.1. Virtual Training Modules Outline

Module	Details
1. Introduction to Nutrition Guidelines (Dietary Guidelines for Americans) During Pregnancy	Information on pregnancy-specific nutrition guidelines, as outlines in the Dietary Guidelines for Americans. Including a review of My Plate, food groups, and serving sizes.
2. Energy Needs Among Pregnant Women	Guidelines for energy needs & weight gain throughout pregnancy. Common discomforts of pregnancy and evidence-based recommendations for relieving these symptoms. A review of physical activity guidelines and safe physical activity practices for pregnant participants.
3. Supplementation Recommendations for Pregnant Women	Important micronutrients for pregnant women, their role in supporting a healthy pregnancy and supplementation guidelines based on the Dietary Guidelines for Americans
4. Food Safety During Pregnancy	Food safety practices during pregnancy, including specific information on food-bourne illness and how to reduce the risk of illness.

Table 2.2. Training quiz questions asked of pilot staff before and after completion of virtual training modules

Question	Question Type	Answer choices	
How many servings a day of each food group do you think experts advise pregnant women to eat?	Matching	1. 1.5-2.5 cups 2. 2.5-3.5 cups 3. 3 cups 4. 6-8 ounces 5. 5-7 ounces	1. Fruits 2. Vegetables 3. Dairy 4. Grains 5. Protein
If you want to increase the amount of iron in your diet, which serving of food would be the best choice?	Multiple Choice	1. Tuna salad 2. Pasta 3. Lentil soup 4. Egg sandwich	
Are all pregnant women recommended to take a prenatal supplement?	True or False	1. True 2. False	
How much fluid is recommended for pregnant women each day?	Multiple Choice	1. 8-12 cups 2. 4-8 cups 3. 12-16 cups	
What is the reason folic acid supplements are recommended during pregnancy?	Multi-select	1. To prevent neural tube defects 2. To prevent cleft lip 3. To prevent heart defects	
All women are recommended to gain weight during pregnancy.	True or False	1. True 2. False	
How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy?	Multiple Choice	1. 10-20 pounds 2. 15-25 pounds 3. 20-25 pounds 4. 25-35 pounds	
To meet energy needs during the first 3 months of pregnancy, pregnant women need:	Multiple Choice	1. No extra energy 2. 340 additional calories 3. 452 additional calories	
Which of the following fish or seafood have high amounts of mercury?	Multi-select	1. Canned tuna 2. Shark 3. Swordfish 4. Salmon 5. Shrimp	
During pregnancy seafood should be limited to:	Mult-select	1. 8-12 ounces of low-mercury seafood options per week 2. 4 ounces of moderate-mercury seafood options per week 3. 12-16 ounces of low-mercury seafood options per week 4. 8 ounces of moderate-mercury seafood options per week	

Figure 2.1. March 2023 Training Agenda

Figure 2.2. January 2025 Training Agenda

EFNEP Baby & Me
2023 Training

CORE COMPETENCIES

Review of Baby and Me Curriculum and Activities

Wednesday, March 15th

Audience	Competency	Area
Peer Educator	B. Plan Programs/ Logistics	B-1 Discuss and agree upon program expectations and logistics with agency partners
		B-2 Educate and recruit eligible audiences about the program (e.g., adults, youth, agencies)
		B-6 Use evidence-based, program-approved educational curricula and materials
	C. Deliver Programs	C-3 Teach evidence-based approved program curricula to meet the needs of participants
		C-4 Use approved and appropriate teaching methodologies (food activities, technology, games, etc.)
		C-6 ·Facilitate learner-centered activities
	D. Evaluate Programs	D-1 Follow program approved methods (script, instructions, props) to direct participants to complete entry/exit paperwork
		D-2 ·Collect required forms (such as sign-in sheets, class attendance records, participant consent forms, photograph consent forms, 24-hour dietary recalls, physical activity consent form, entry/exit forms, teacher evaluations, etc.)
		D-6 ·Prepare, submit and/or enter data in a timely manner
Supervisor/ Agent	B. Build and maintain internal and external partnerships	B-4 ·Seek opportunities to build program and/or community capacity
	D. Provide professional development	D-4 ·Facilitate staff training
		D-5 ·Evaluate training (e.g., content, training approach/method)
		D-6 ·Share educational resources to support staff development

Expanded Food & Nutrition Education Program

UNIVERSITY OF GEORGIA EXTENSION

Healthy Georgia

Georgia CTSA

FOODTALK

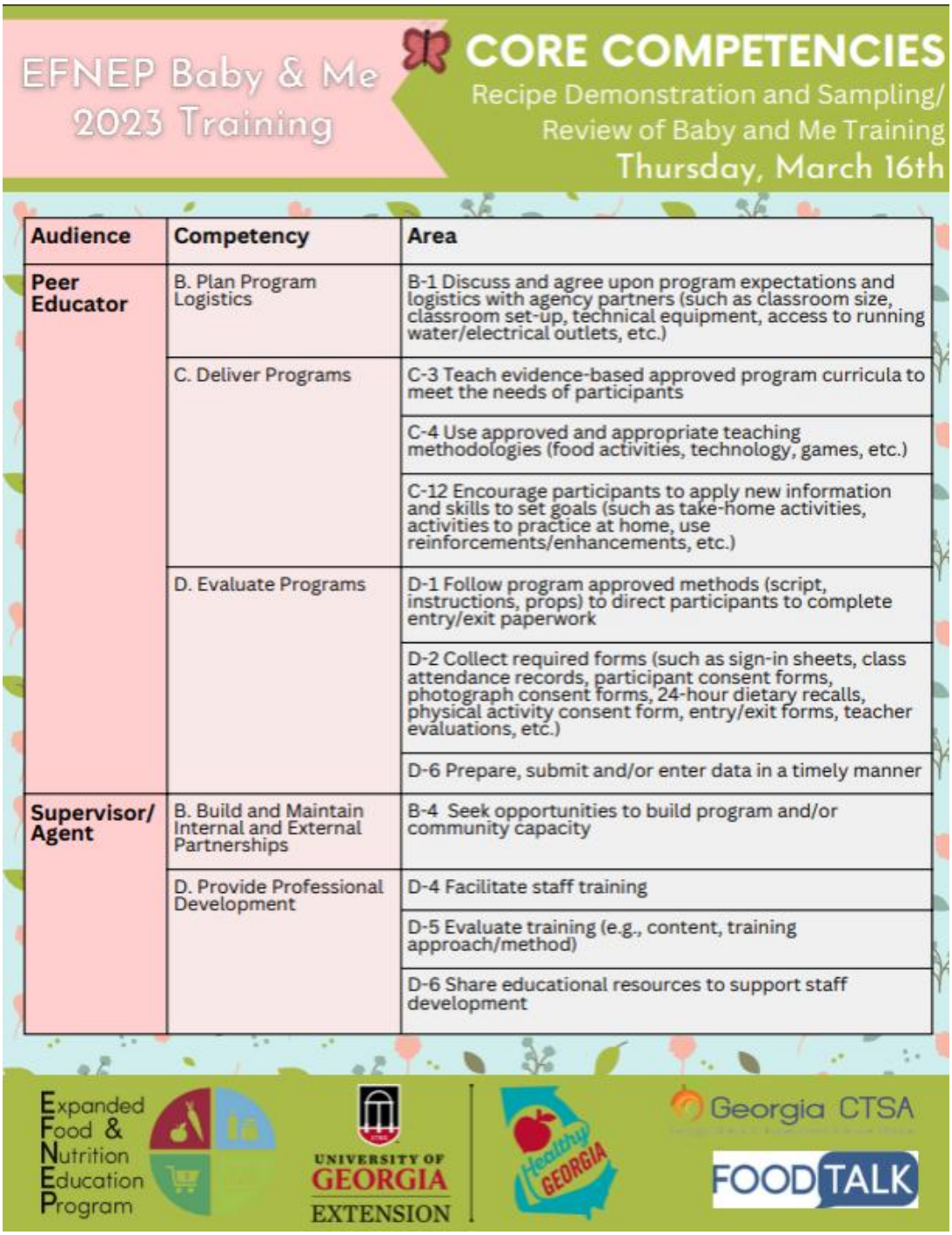

Figure 2.3. LGU EFNEP & SNAP-Ed Core Competencies

Core Competencies Wednesday, March 15th

Peer Educator Core Competencies for Review of Baby and Me Curriculum and Activities

2. Please indicate the degree to which the March 15th Food Talk for Baby and Me training session has helped you with the following program delivery skills.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Teach evidence-based program curricula to meet the needs of participants (C-3)	○	○	○	○	○	○
Use approved and appropriate teaching methodologies (activities, recipes) (C-4)	○	○	○	○	○	○
Facilitate learner-centered activities (C-6)	○	○	○	○	○	○

3. Please indicate the degree to which the March 15th Food Talk for Baby and Me training session has helped you with the following program planning and logistics skills.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Discuss and agree upon program expectations and logistics with agency partners (B-1)	○	○	○	○	○	○
Educate and recruit eligible audiences about the program (B-2)	○	○	○	○	○	○
Use evidence based, program-approved educational curricula and materials (B-6)	○	○	○	○	○	○

4. Please indicate the degree to which the March 15th Food Talk for Baby and Me training session has helped you with the following program evaluation skills.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very Helpful	Extremely helpful
Follow program approved methods to direct participants to complete entry/exit paperwork (D-1)	◯	◯	◯	◯	◯	◯
Collect required forms (D-2)	◯	◯	◯	◯	◯	◯
Prepare, submit, and/or enter data in a timely manner (D-6)	◯	◯	◯	◯	◯	◯

Core Competencies Wednesday, March 15th

Supervisor Core Competencies for Review of Baby and Me Curriculum and Activities

5. Please indicate the degree to which the March 15th Food Talk for Baby and Me training session has helped you with the following skills for building and maintaining internal and external partnerships.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Seek opportunities to build program and/or community capacity (B-4)	◯	◯	◯	◯	◯	◯

6. Please indicate the degree to which the March 15th Food Talk for Baby and Me training session has helped you provide professional development.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Facilitate staff training (D-4)	◯	◯	◯	◯	◯	◯
Evaluate training (D-5)	◯	◯	◯	◯	◯	◯
Share educational resources to support staff development (D-6)	◯	◯	◯	◯	◯	◯

Core Competencies Thursday, March 16th

Peer Educator Core Competencies for Recipe Demonstration and Sampling/Review of Baby and Me Training

7. Please indicate the degree to which the March 16th Food Talk for Baby and Me training session has helped you with the following program planning/ logistics skills.

	Did not attend	Not Helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Discuss and agree upon program expectations and logistics with agency partners (B-1)	◯	◯	◯	◯	◯	◯

8. Please indicate the degree to which the March 16th Food Talk for Baby and Me training session has helped you with the following program delivery skills.

	Did not attend	Not Helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Teach evidence-based approved program curricula to meet the needs of participants (C-3)	◯	◯	◯	◯	◯	◯
Use approved and appropriate teaching methodologies (food activities, technology, games) (C-4)	◯	◯	◯	◯	◯	◯
Encourage participants to apply new information and skills to set goals (such as take-home activities) (C-12)	◯	◯	◯	◯	◯	◯

9. Please indicate the degree to which the March 16th Food Talk for Baby and Me training session has helped you with the following program evaluation skills.

	Did not attend	Not Helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Follow program approved methods (script, instructions, props) to direct participants to complete entry/exit paperwork (D-1)	○	○	○	○	○	○
Collect required forms (D-2)	○	○	○	○	○	○
Prepare, submit and/or enter data in a timely manner (D-6)	○	○	○	○	○	○

Core Competencies Thursday, March 16th

Supervisor Core Competencies for Recipe Demonstration and Sampling/Review of Baby and Me Training

10. Please indicate the degree to which the March 16th Food Talk for Baby and Me training session has helped you with the following skills for building and maintaining internal and external partnerships.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Seek opportunities to build program and/or community capacity (B-4)	○	○	○	○	○	○

11. Please indicate the degree to which the March 16th Food Talk for Baby and Me training session has helped you provide the following professional development.

	Did not attend	Not helpful	Somewhat helpful	Helpful	Very helpful	Extremely helpful
Facilitate staff training (D-4)	○	○	○	○	○	○
Evaluate training (D-5)	○	○	○	○	○	○
Share educational resources to support staff development (D-6)	○	○	○	○	○	○

Figure 2.4. Microsoft Forms survey with Likert-scale question used to evaluate the effectiveness of the in-person training and meeting LGU Core Competencies.

Training Evaluation

12. Please rate the virtual training sessions on eLC from 1-5, with 1 being the lowest and 5 being the highest.

☆ ☆ ☆ ☆ ☆

13. What feedback do you have regarding the virtual training modules that could help them be more effective in the future?

14. Please rate the facilities at the Founder's Lodge, with 1 being the lowest and 5 being the highest.

☆ ☆ ☆ ☆ ☆

15. Is Eatonton (Rock Eagle) an equitable location for future trainings?

- ◯ Yes
- ◯ No
- ◯ Maybe

16. The following training times were reasonable for my schedule:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Having an overnight stay (Wed-Thurs)	◯	◯	◯	◯	◯
Ending at 1pm on Thursday	◯	◯	◯	◯	◯
Starting at 11:30am on Wednesday	◯	◯	◯	◯	◯

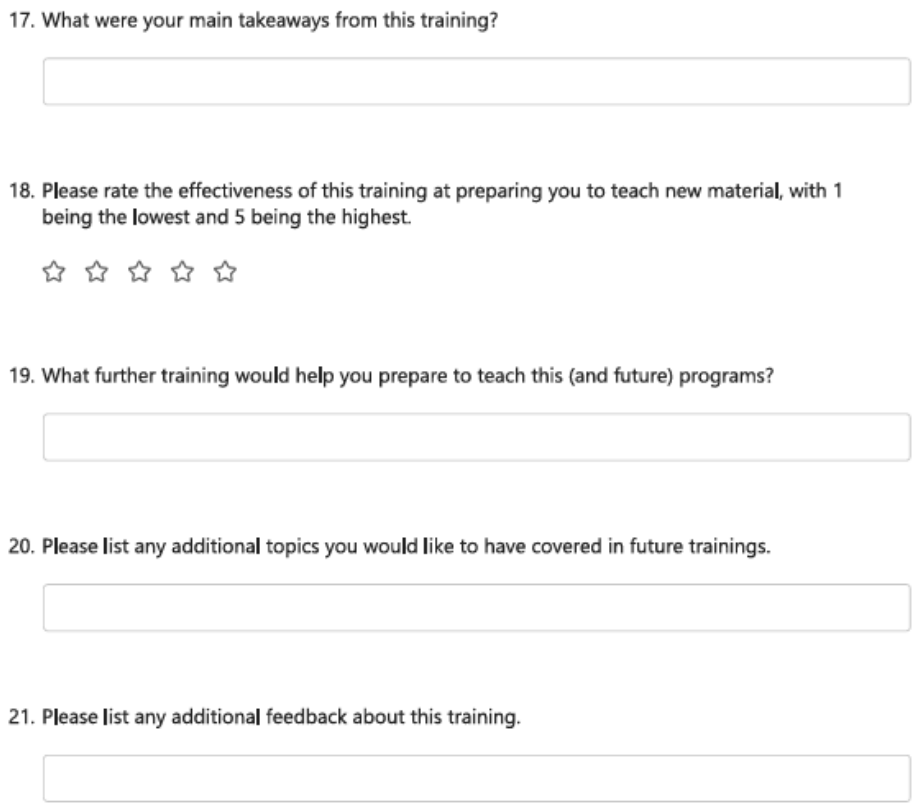

Figure 2.5. Microsoft Forms survey, free-response and rating questions.

Table 2.3. Pre/post training quiz question 1 (*How many servings a day of each food group do you think experts advise pregnant women to eat?*) responses.

Food group	Servings/day recommended	Pre-quiz n (%) of staff with correct match	Post-quiz n (%) of staff with correct match
Fruits	1.5-2.5 cups/day	0	4 (66.7%)
Vegetables	2.5-3.5 cups/day	0	3 (50%)
Dairy	3 cups/day	3 (50%)	3 (50%)
Protein	5-7 ounces/day	1 (16.7%)	4 (66.7%)
Grains	6-8 ounces/day	2 (33.3%)	3 (50%)

Table 2.4. Pre/post training quiz questions 2-10 response choice frequencies

Question	Answer choices (correct choice/s in bold):	Pre n (%)	Post n (%)
2.If you want to increase the amount of iron in your diet, which serving of food would be the best choice? (multiple-choice)	**Tuna salad**	**5 (83.3%)**	**4 (66.7%)**
	Pasta	0	0
	Egg sandwich	0	0
	Lentil soup	1 (16.7%)	2 (33.3%)
3.Are all pregnant women recommended to take a prenatal supplement? (true or false)	**True**	**5 (83.3%)**	**5 (83.3%)**
	False	1 (16.7%)	1 (16.7%)
4.How much fluid is recommended for pregnant women each day? (multiple-choice)	12-16 cups	1 (16.7%)	1 (16.7%)
	8-12 cups	**4 (66.7%)**	**5 (83.3%)**
	4-8 cups	1 (16.7%)	0
5.What is the reason folic acid supplements are recommended during pregnancy? (multi-select)	To prevent cleft lip	0	0
	To prevent neural tube defects (i.e. spina bifida)	**5 (83.3%)**	**6 (100%)**
	To prevent heart defects	1 (16.7%)	0
	True	**3 (50%)**	**6 (100%)**

6.All women are recommended to gain weight during pregnancy. (true or false)	False	3	0
7.How much weight is recommended for women of a healthy weight before pregnancy to gain during pregnancy? (multiple-choice)	20-25 pounds	0	1 (16.7%)
	10-20 pounds	3 (50%)	1 (16.7%)
	25-35 pounds	**3 (50%)**	**4 (66.7%)**
	15-25 pounds	0	0
8.To meet energy needs during the first 3 months of pregnancy, pregnant women need: (multiple-choice)	**No extra energy**	**2 (33.3%)**	**5 (83.3%)**
	340 additional calories	2 (33.3%)	1 (16.7%)
	452 additional calories	2 (33.3%)	0
9.Which of the following fish or seafood have high amounts of mercury? (multi-select)	**Swordfish**	**4 (66.7%)**	**3 (50%)**
	Shrimp	1 (16.7%)	
	Shark	**1 (16.7%)**	**1 (16.7%)**
	Salmon	0	0
	Canned tuna	0	1 (16.7%)
	8 ounces of moderate-Mercury seafood options per week	**2 (33.3%)**	**0**

10.During pregnancy seafood should be limited to: (multi-select)	4 ounces of moderate-Mercury seafood options per week	1 (16.7%)	1 (16.7%)
	12-16 ounces of low-Mercury seafood options per week	**0**	**0**
	8-12 ounces of low-Mercury seafood options per week	**3 (50%)**	**4 (66.7%)**

Table 2.5. Means and Standard Deviations of Ratings of the Effectiveness of the In-person Training at meeting LGU EFNEP & SNAP-Ed Core Competencies

	Number of responses (n)	Mean	Standard Deviation
Peer-educators	3	3.7	1.3
Extension supervising agents	2	4.1	0.3
Combined	5	3.8	1.1

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CHAPTER 5

PERSPECTIVES ON THE DEVELOPMENT AND IMPLEMENTATION OF A PREGNENCY-SPECIFIC UNIVERSITY OF GEORGIA (UGA) EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP) CURRICULUM: A QUALITATIVE RESEARCH STUDY [3]

[3]Mouser, C., Rollins, L., Gallo, S., Anderson, A., Henes, S. *To be submitted to the Journal of Nutrition Education and Behavior*.

ABSTRACT

Background: The *Food Talk: Baby & Me* curriculum was adapted from the University of Georgia (UGA) EFNEP *Food Talk* curriculum to include additional information and guidance regarding diet quality, food safety, and physical activity during pregnancy.

Objective: Explore the perspectives of UGA EFNEP supervisors and educators on implementation of the UGA EFNEP *Food Talk: Baby & Me* curriculum, including strengths, challenges, and areas of improvement.

Methods: This research was structured as a qualitative research study including semi-structured interviews with UGA EFNEP supervising agents and peer-educators involved with piloting the UGA EFNEP *Food Talk: Baby & Me* curriculum. A purposive sampling technique was used to recruit UGA EFNEP staff for interviews. Semi-structured interviews were selected as the data collection method due to the small set of educators who were involved with the study (n=5).

Results: Five UGA EFNEP staff members participated in the UGA EFNEP *Food Talk: Baby & Me* pilot study and agreed to be interviewed about their experience with learning the adapted curriculum and implementing it into their community. The overarching themes identified were "meeting participants where they're at", "population-specific barriers", and "support and training".

Conclusion: Effective adaptation of community-based education programs, like UGA EFNEP *Food Talk: Baby & Me*, will require researchers to have open communication with their front-line staff and participants to ensure the program is appropriate for its target audience.

BACKGROUND

The Expanded Food and Nutrition Education Program (EFNEP) is a federally funded nutrition education program for low-income populations across the United States. Specifically, EFNEP provides series-based nutrition education to low-income caregivers with children, pregnant women and teens, and youth and is administered through the 1862 and 1890 Land Grant Universities (LGU's) Cooperative Extension services across the country[1]. EFNEP aims to use evidence- and series-based nutrition education to improve participants' nutrition-related health behaviors across the country. EFNEP programming is delivered nationally by using a paraprofessional peer-educator model. EFNEP peer-educators, called Program Assistants (PA's), are trained by EFNEP Extension Supervising Agents to deliver evidence- and series-based nutrition education programs.

The adult nutrition education curriculum, UGA EFNEP *Food Talk*, has been used to deliver nutrition education to all EFNEP-enrolled adults in Georgia, including pregnant women, since 2008[2]. Pregnant women have unique nutrition needs from the general adult population, which prompted the development of an adapted *Food Talk* curriculum, UGA EFNEP *Food Talk: Baby & Me (described in Chapter 3)*. The UGA EFNEP *Food Talk: Baby & Me* curriculum was implemented from September 2023-June 2025 by a pilot team of UGA EFNEP staff, including two Extension Supervising Agents and three PA's.

INTRODUCTION

Participation in federal nutrition programs, like EFNEP and the Special Supplemental Program for Women, Infants, and Children (WIC), have been found to have positive impacts on participant diet quality[3–6]. EFNEP and WIC provide nutrition education services to multiple audiences, including pregnant women, in the United States (U.S.)[1,7]. EFNEP and WIC services

are complimentary, as EFNEP provides series-based nutrition education and WIC provides supplemental foods and educational support. As mentioned previously, UGA EFNEP developed a pregnancy-specific nutrition education curriculum to address this need (*described in Chapter 3*), along with a training model (*described in Chapter 4*) to prepare UGA EFNEP staff to deliver the newly adapted curriculum. This study aims to explore the perspectives of the UGA EFNEP staff involved in the pilot study on the process of developing and implementing the UGA EFNEP *Food Talk: Baby & Me* program.

The UGA EFNEP *Food Talk: Baby & Me* pilot study included development of an adapted *Food Talk* curriculum to include pregnancy-specific nutrition information, a training protocol to prepare a pilot team of UGA EFNEP staff to teach the adapted curriculum, and finally, implementation of UGA EFNEP *Food Talk: Baby & Me* in several Georgia communities. The pilot team included UGA EFNEP Extension Supervising Agents and PA's. Extension Supervising Agents make connections with local agencies to promote program recruitment and provide supervision and support for the PA's in their respective counties[2]. PA's deliver programming and typically live in the community where they provide education[2]. Based on their involvement with the community and first-hand experience with the UGA EFNEP *Food Talk: Baby & Me* program, UGA EFNEP staff are well-positioned to provide relevant feedback and input on the program development and implementation process.

Interviews, a commonly used qualitative data collection method, were used to gain insights from those directly implementing the program[8]. Interviews with frontline staff can provide valuable information about feasibility, training needs, and further adaptations needed to improve programmatic outcomes[9]. Thematic qualitative analysis methodology has been used in public health, including use with SNAP-Ed and EFNEP nutrition educators[9]. Stotz et al. (2023)

applied a thematic qualitative analysis method to evaluate themes across a set of interviews, surveys, and a focus group aiming to learn more about approaches used by USDA nutrition educators, supporting feasibility of applying this methodology in the community nutrition setting[9]. This study aims to fill a gap in the current literature surrounding feedback of front-line UGA ENFEP educators regarding development and implementation of a newly adapted curriculum.

METHODS

Recruitment:

A purposive sampling technique was used to recruit UGA EFNEP staff who participated in the UGA EFNEP *Food Talk: Baby & Me* pilot study for interviews (*details on recruitment of UGA EFNEP staff to participate in the pilot study are further described in Chapter 3*). Two Extension Supervising Agents and three Program Assistants implemented the UGA EFNEP *Food Talk: Baby & Me* curriculum, and all five of these UGA EFNEP staff members agreed to participate in interviews (**Table 3.1**).

Interviews:

This qualitative research study collected UGA EFNEP staff perspectives and feedback on the UGA EFNEP *Food Talk: Baby & Me* pilot program through semi-structured interviews. Semi-structured interviews were selected as the data collection method due to the small number of UGA EFNEP staff who were involved with the pilot study (n=5). All interviews were conducted virtually using Zoom video calls. Supervising Agent interviews took between twenty-five to thirty minutes and PA interviews lasted fifteen to twenty-five minutes. The interview guide used for this study was adapted from discussion guides used for evaluation of the Project

DINE study (**Appendix A**)118. Interview questions were the same for Supervising Agents and PA's and were designed to gather feedback on strengths, challenges, and areas of improvement regarding development, training, and implementation of the *Food Talk: Baby & Me* program.

Following interviews, the Zoom audio and video recordings were downloaded by the lead doctoral student researcher who transcribed all the interviews. One researcher transcribed all interviews to promote consistency in transcription across transcripts. The audio-video recordings of the Zoom interviews were replayed, and transcribed word for word. The transcripts were replayed multiple times to ensure accurate transcription. Consistency in punctuation and recorded visual/audio cues (like facial expressions, laughs, sighs, etc.) were ensured by having one researcher work on all the transcripts. All transcripts were blinded prior to being shared with the other two researchers by removing all names, counties, agencies, and other potential identifying information to help reduce potential bias.

UGA EFNEP *Food Talk: Baby & Me* Codebook:

Three Nutritional Sciences doctoral student researchers, referred to in this study as the research team, who were familiar with UGA EFNEP and qualitative methodology worked together to create a codebook based on the PRISM framework. The PRISM Framework outlines domains and key elements (**Table 3.2**), that were defined by the research team within the context of the UGA EFNEP *Food Talk: Baby & Me* research study (**Figure 3.1**)119. The UGA EFNEP *Food Talk: Baby & Me* codebook (**Table 3.3**) was used by the research team to assign codes to quotes identified within UGA EFNEP staff transcripts.

Thematic Analysis:

Blinded transcripts were uploaded to the qualitative data analysis program Atlas.ti (version 25). The research team individually reviewed each transcript and applied codes to the UGA EFNEP staff quotes. Intercoder agreement was evaluated by calculating the reliability coefficient, Krippendorff's c-Alpha-binary. Following individual coding, the research team met and discussed their codes applied to quotes throughout each transcript. The quotes and applied codes were discussed until the research team reached agreement on the final codes to be applied to the quotes. Following identification of the final agreed upon codes, the lead doctoral student researcher grouped the codes most frequently used to define participant quotes to identify main themes across the transcripts.

RESULTS

Overall, five UGA EFNEP staff members participated in the UGA EFNEP *Food Talk: Baby & Me* pilot study and agreed to be interviewed about their experience with learning the adapted curriculum and implementing it into their community. The intercoder agreement between the research team was found to be strong (Kippendorff's c-Alpha-binary=0.69), supporting the reliability of the coded data. Code frequency (**Table 3.4**) was used to identify repeated themes throughout the data. Several overarching themes emerged from interviews with UGA EFNEP staff regarding the curriculum adaptation and implementation process. The overarching themes and representative quotes are reported below:

(1) "Meeting Participants where they're at"

Theme Definition: Statements related to adapting or changing protocols to meet the needs of pregnant women who participated in the UGA EFNEP *Food Talk: Baby & Me* pilot program.

Peer-educators reported several adaptations that were made, or should be made, to improve participant experience in the program. For example, modifying recipes to accommodate pregnancy side-effects and allowing children to attend to reduce participant burden.

Example quotes that demonstrate overarching theme 1:

> *I don't, I don't know if they, you know what is exact- I understand, it's the salmon, because maybe we could just bring them in and give them the recipe that is already made. It could be a solution for it. But we have, you know we have… I'm trying to think what, which one. We have some salads that could've been easier for them to make, and I think the recipes, you know, if they're in the summertime, we should add some fresh fruits.* (PA 2)

> *I mean, it's a great program. I get it, it really is a great program, but we have to I guess work around these ladies.* (PA 1)

> *So, I mean it's, it's, I had some of them brought their kids along with them. The kids actually enjoyed it, I think, more than the adults did. Yeah, they, they did. I had one little boy, he um I think second or third grade. He was, I mean he was more engaged than any participant that I've ever had. In Baby & Me or regular Food Talk. So, he was very engaged, and it was very interesting to him.* (PA 1)

"Population-Specific Barriers"

Theme definition: Statements related to pregnancy-specific barriers to participation.

Peer-educators reported barriers that participants faced specific to being pregnant, including unexpected health challenges. For example, participants may not complete the program due to early delivery, physician-prescribed bed rest, or other discomforts of pregnancy that limit their mobility.

Example quotes that demonstrate overarching theme 2:

> *The only other problem I had was we did the salmon croquets. I had one to get up and leave out because the smell actually made her sick.* (PA 1)

Umm, One, I think she had the baby early. (PA 1)

Participant: So, she couldn't make it to the last session. She did, she made, she made all of them that she was supposed to do except that last session. So, I'm sure I can do a make up session with her. I think that would be the greatest problem with the pregnant ladies depending on what time they come in. Again, to know what time they come in, how far along they are already pregnant. That would be a problem, and then, trying to get back to them to finish that make up session. So I, I think that was the worst problem. um.. besides them getting there. You know, most of them. I wanna say, one was on um bed rest and then, you know, we, we were in the middle of summer. So it was hot too. So they don't, they don't wanna get out and do anything while they pregnant, and I can speak from, you know, carrying a baby myself.
Interviewer: Right
Participant: Being pregnant all summer and I did not want to go anywhere.
Interviewer: And then didn't [laugh]
Participant: Exactly, and I didn't. I did doctors appointments. And that was it… (PA 1)

Um, I understand, you know, all of them are pregnant ladies and most… sometimes they just don't feel good. (PA 3)

"Support and Training"

Theme definition: Statements related to communication with State staff and training.

Extension Supervising Agents and PA's reported acceptability of the program and were appreciative of the support and training provided in preparation for the UGA EFNEP *Food Talk: Baby & Me* pilot study. Supervising Agents acknowledged aspects of training that were beneficial to their PA's and reported feeling that their PA's seemed ready to teach the *Food Talk: Baby & Me* curriculum.

<u>Example quotes that demonstrate overarching theme 3:</u>

No, I think the curriculum was very well written and, and I think with you using, you know, some of the EFNEP stuff, and just kind of switching things around. It made it easier for the program assistants to actually teach the course. And so with that in regards it was easy for like I, said [PA], to teach and I think it was done really well. And I think for this we always say it's like food talk. So it's conversational, and I think it made it easier for the

participants to open up and talk about. You know different things as far as what was going on with their pregnancy. Because it wasn't a doctor's office. It wasn't like something official, you know. It was just, you know, just a nutrition class, you know you're learning some healthy ways, you know, for you to each for your child and yourself. So I think it was just more of more like laid back for them versus, you know, in a hospital setting or doctors office setting, and the information was good cause, a lot of them did try some of the recipes at home. So that was good, that they were trying that. And, you know, trying to eat more fruits and vegetables and understanding, you know, the importance of it, and why they were eating certain things, so I think that was good, and handouts for them to take and try to implement at home was good as well. (Supervising Agent 1)

So I was, you know, able to see everything and see them go through everything. So I was able to ask questions. you know, just as we were going through stuff. I was like, Okay, they're real. They're really well prepared for the group they're about to work with. (Supervising Agent 1)

Well, I-I mean, I do wanna say, you know, when I first heard of reaching prenatal moms, I was so excited because we work with a couple of agencies that directly work with prenatal moms. And I said, this will be perfect for us. (Supervising Agent 2)

Participant: I think our, like the location where we were teaching, it was a safe location. They were comfortable there. And then also, if you get a chance to speak to the program assistant that does teaching, she's very energetic and just loves-she loves what she does. And I think that helps with keeping our participants interested in programming, especially the Baby & Me programming.
Interviewer: Great, great so would you say that that was probably the most successful part of retaining participants, was that environment that you all created, or would you say it was something else?
Participant: Well, I-I think it's a combination. I-I think it was, you know, just her energy, and then the location, and then also the material. I know a lot of the materials been revised. And so, it's very geared towards, you know, prenatal moms and dads. And just you know, focusing on that healthy diet during their time of pregnancy. (Supervising Agent 2)

And I say I'm going to refer to my supervisor and the people that is, you know, implementing the program. But if you don't want to do it, it's ok. Just stick to your doctor, what your doctor tells you. (PA 3)

CONCLUSION

Discussion:

The general themes derived from the interviews were “meeting participants where they’re at”, “population-specific barriers”, and “support and training”. Through these interviews, PA’s shared the challenges of delivering nutrition education programming to pregnant women, highlighting the need for adapted protocols suitable for this population. Pregnant women experience adverse side-effects and are often faced with having unpredictable health challenges, as shared in these interviews. Recommendations for recipe and program delivery (in-person vs. online) changes were shared, highlighting the need for integrating educator feedback into the curriculum revision process. While these challenges were present, staff did have positive feedback regarding training and support during the project. Stotz (2023) identified similar main themes through interviews with USDA nutrition educators[9]. This study found that nutrition educators serve many roles, focus on participant centered programming, rely on community partnerships, and can identify solutions to challenges they face with programming[9]. UGA EFNEP staff also provided feedback that was participant centered and solution oriented.

Research on the use of technology for Extension program delivery has revealed both benefits and challenges that can come from offering virtual programming120. Anderson, A. & Barcinas, S. (2024) found that benefits to virtual programming can include increased accessibility for participants and reducing burden on Extension Nutrition Educators120. Challenges for UGA EFNEP PAs in this study included learning how to navigate technology and discomfort associated with not seeing participants faces or being able to offer hands-on learning120. Since virtual nutrition education delivery is still emerging as an option, this could

be an area to explore for this population considering the increased barriers present for pregnant women to attend in-person.

Strengths and Limitations:

Strengths of this study include the use of the UGA EFNEP peer-educators model, which provided a unique opportunity to interview educators who live in and are apart of the communities they serve providing insight into the program. Further, all staff who implemented the program agreed to participate in interviews. A limitation of this study is the small sample size available. Small sample size was an anticipated outcome due to the specific nature of the study and only those who participated in the pilot study could be recruited.

Next Steps:

Next steps for this project will include further evaluating staff feedback to identify priority areas of improvement for the program. Collecting feedback from participants of the UGA *Food Talk: Baby & Me* pilot program will be another next step to help inform future program adaptations. Effective adaptation of this program, and other community-based education program, will require researchers to have open communication with their front-line staff and participants to ensure the program is appropriate for its target audience.

Conclusion:

Overall feedback from the UGA EFNEP pilot team revealed program acceptability, despite several identified areas of improvement. Some barriers that pregnant women who participated in the UGA EFNEP *Food Talk: Baby & Me* pilot program faced that were not anticipated by the research team included adverse health outcomes, like bedrest and early delivery. This highlights the importance of including front-line educator perspectives and

experiences into the evaluation process. These findings can help to inform future program adaptation project methods, as the importance of support from the research team during training and implementation was highlighted in these interviews.

TABLES AND FIGURES

Table 3.1. UGA EFNEP pilot staff demographics

Characteristic	Supervisors (n=2)	Paraprofessionals (n=3)
Gender		
Female	2 (100%)	3 (100%)
Race/ ethnicity		
Black/African American	1 (50%)	1 (33.3%)
White	1 (50%)	
Hispanic/Latina		2 (66.6%)
Georgia EFNEP region		
Northeast	1 (50%)	1 (33.3%)
Southwest	1 (50%)	2 (66.6%)

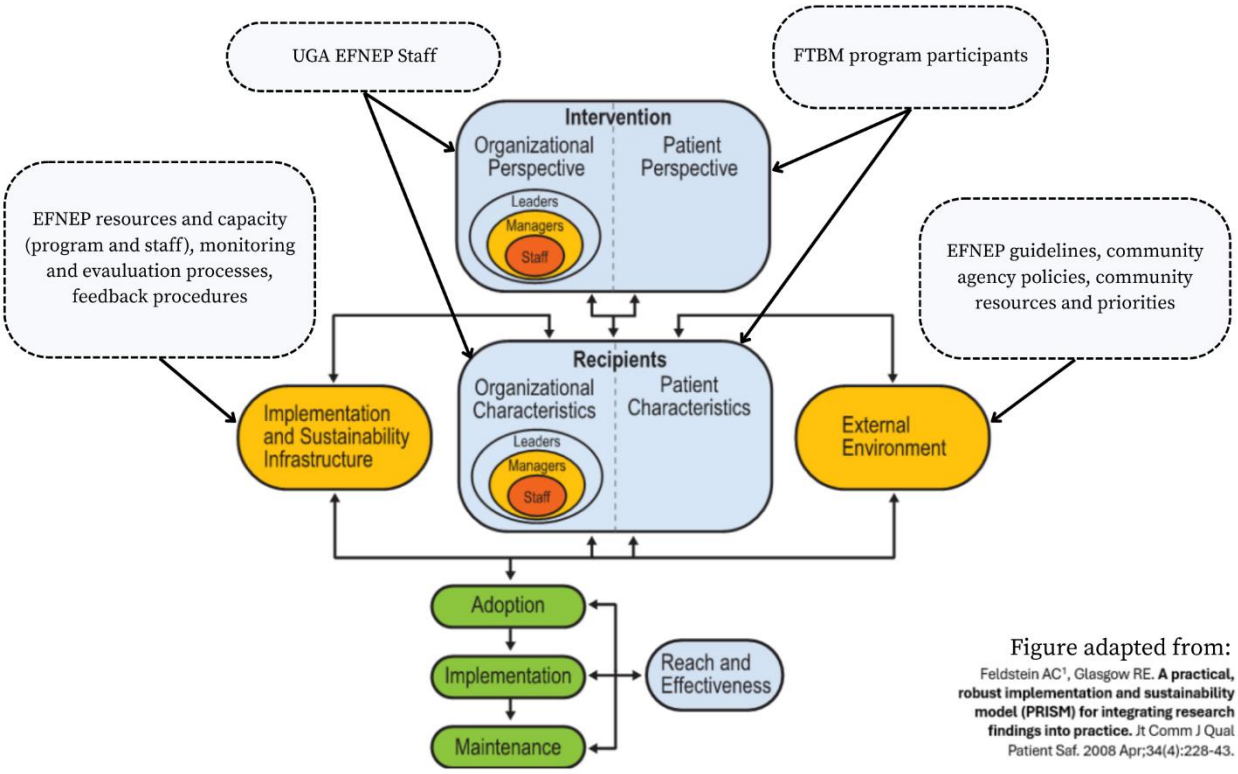

Figure 3.1. PRISM/RE-AIM Framework

Table 3.2. PRISM Framework Domains and Key Elements

PRISM Domain	Key Elements
Program (Intervention) Organizational Perspective	Readiness
	Strength of Evidence Base
	Addresses barriers of frontline staff
	Coordination across departments and specialties
	The burden the program presents (complexity and cost)
	Usability and adaptability
	Trialability and reversibility
	Ability to observe results
Program (Intervention) Participant Perspective History with similar programs, relationships required to deliver the intervention, trust among parties, models of intervention effects	Patient-centeredness
	Provides patient choices
	Addresses patient barriers
	Seamlessness of transition between program elements
	Service and access
	Patient burdens (complexity and cost)
	Feedback of results
Characteristics of Organizational Recipients	Organizational health and culture
	Management support and communication
	Shared goals and cooperation
	Clinical leadership
	Systems and training
	Data and decision support
	Staffing and incentives
	Expectation of sustainability
Characteristics of Patient Recipients Socio-demographic and other project relevant characteristics at multiple levels and extent of participation by different partners in the design, implementation and analysis	Demographics
	Disease burden
	Competing demands
	Knowledge and beliefs
External Environment Policies, guidelines, coverage, level and distribution of resources, current and historical community priorities	Payor satisfaction
	Competition
	Regulatory environment
	Reimbursement
	Community resources
Implementation and Sustainability Infrastructure Organizational commitment, resources, and capacity, staff roles and	Performance data
	Dedicated team
	Adopter training and support

responsibilities; monitoring, evaluation and supervision systems; existence of audit and feedback procedures	Relationship and communication with adopters (bridge researchers)
	Adaptable protocols and procedures
	Facilitation of sharing of best practices

Table 3.3. UGA EFNEP *Food Talk: Baby & Me* Codebook

PRISM Domain	Key Elements/ Codes	Code Definitions
Program (Intervention) Organizational Perspective Organization=EFNEP staff	Readiness	EFNEP staff discuss any structure/practices already in place that suggests readiness to work with a pregnant population
	Strength of Evidence Base	Mention of evidence-based resources used (Dietary Guidelines, MyPlate)
	Addresses barriers of frontline staff	Mention of meeting the educational needs of peer-educators to be able to provide information to pregnant participants
	coordination across departments and specialties	Mention of communication between State staff, peer-educators, and Extension supervising agents
	The burden the program presents (complexity and cost)	Discussion of burden on EFNEP staff to recruit and implement a new curriculum
	Usability and adaptability	Discussion on use of curriculum (scripts, discussion prompts) or ability to rearrange activities/recipes/discussions to meet the needs of the class
	Trialability and reversibility	Ability to pilot the program and continue modifying the curriculum as needed
	Ability to observe results	Peer-educator feedback regarding effectiveness of the program at promoting participant behavior change outcomes
Program (Intervention) Participant Perspective History with similar programs, relationships required to deliver the intervention, trust among parties, models of intervention effects	Patient-centeredness	Discussion of participant needs and how UGA EFNEP staff use their programming to identify and meet the needs of their individual participants
	Provides patient choices	Discussion of how UGA EFNEP staff work with participants to allow collaboration (allowing optional participation in class, option tasting of recipes)
	Addresses patient barriers	Discussion of how this program works to reduce and address patient barriers (scheduling class around participants, allowing children to attend class, choosing a central location)

	Seamlessness of transition between program elements	Discussion of how participants can translate program components into at-home behavior change
	Service and access	Mention of location of site and how it increases participant ease of access
	Patient burdens (complexity and cost)	Discussion of burden on participants to participate (cost, travel, childcare)
	Feedback of results	N/A
Characteristics of Organizational Recipients	Organizational health and culture	Mention of EFNEP characteristics
	Management support and communication	Mention of supervisor or State staff role with support and communication with peer-educators
	Shared goals and cooperation	Mention of program meeting needs of the community and will make a difference for their participants
	Clinical leadership	N/A
	Systems and training	Mention of UGA EFNEP training for staff, peer-educators working together to train
	Data and decision support	Mention of training on data collection and procedures for collecting participant data
	Staffing and incentives	Mention of reasons for UGA EFNEP staff to participate (training hours, participant numbers for end of year review), staffing needs (need more staff or have enough staff to meet needs)
	Expectation of sustainability	Mention of next steps for the program and long-term implementation
Characteristics of Patient Recipients Socio-demographic	Demographics	Any reference to participant background (i.e. SES, cultural background, age)

and other project relevant characteristics at multiple levels and extent of participation by different partners in the design, implementation and analysis	Disease burden	Mention of pregnancy-specific impacts participants face that affect their nutrition, PA, ability to attend program, etc.
	Competing demands	Mention of barriers participants face (children, work, health, etc.)
	Knowledge and beliefs	Mention of preexisting knowledge or beliefs participants have related to nutrition, PA, or the program
External Environment Policies, guidelines, coverage, level and distribution of resources, current and historical community priorities	Payor satisfaction	Mention of federal funding (USDA NIFA)
	Competition	Mention of other nutrition education programs like WIC
	Regulatory environment	Mention of federal requirements for the program (i.e. must be in-person, must have a day between classes)
	Reimbursement	N/A
	Community resources	Mention of community partners and community resources (pregnancy clinics, food banks)
Implementation and Sustainability Infrastructure Organizational commitment, resources, and capacity, staff roles and responsibilities; monitoring, evaluation and supervision systems; existence of audit and feedback procedures	Performance data	pre/post forms, graduation rates
	Dedicated team	Pilot team wants to continue implementing the program
	Adopter training and support	Specific training for UGA *Food Talk: Baby & Me* curriculum/ program (virtual and in-person)
	Relationship and communication with adopters (bridge researchers)	Peer-educator and supervisor relationship with State staff
	Adaptable protocols and procedures	Mention of how the curriculum can be adapted for different participants and sites (wanting to have virtual programming, shorter program length)
	Facilitation of sharing of best practices	Mention of continued meetings with pilot group to share experiences with their peers

Table 3.4. Overarching themes code frequency

Overarching Theme	PRISM Code	Frequency (of quotes)
"Meeting participants where they're at"	Addresses patient barriers	22
	Patient centeredness	32
	Shared goals and cooperation	16
	Usability and adaptability	21
"Support and training"	Community resources	19
	Management support and communication	8
	Readiness	9
"Population-specific barriers"	Patient burdens	15
	The burden the program presents	24
	Disease burden	8

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CHAPTER 6

CONCLUSIONS

Summary of the Problem

The state of maternal health in the United States:

The Unites States (U.S.) has the highest maternal mortality rate (MMR) when compared to other high-income, developed countries[121]. In 2023, the U.S. average MMR was seventeen maternal deaths per 100,000 live births, compared to twelve in Canada, eight in the United Kingdom, or three in Japan and Australia[121]. These disparities in MMR's become starker when evaluating racial differences in maternal health outcomes. In the U.S., during the same year, Black and African American women experienced MMR's of fifty deaths per 100,000 live births[2]. This is over double the rate for other racial and ethnic groups in the U.S., such as white, Asian, and Hispanic[2]. For perspective, developing nations including Columbia (MMR of fifty-nine), Ecuador (MMR of fifty-five), El Salvador (MMR of thirty-nine), Honduras (MMR of forty-seven), and Viet Nam (MMR of forty-eight) have similar MMR's to Black and African American women living in the United States[121].

In Georgia, MMR's were about twenty percent higher than the U.S. average in 2018[4]. Racial disparities persist in the state, with Black and African American women experiencing MMR's almost three times that of their non-Hispanic white counterparts[4]. Several potential factors have been identified to help explain this disparity in maternal health between the U.S. and

other developed nations, including lower Medicaid reimbursement rates compared to private insurance, reducing the amount of healthcare facilities available in low-income and remote areas; and nutrition education that is typically offered by a healthcare provider is limited due to a lack of OB-GYN providers in many low-income, rural communities[4]. These findings reveal a gap in maternal health coverage available to pregnant women in the U.S., especially low-income, rural, and Black and African American mothers.

Nutrition education for pregnant women:

Most pregnant women do not meet the Dietary Guidelines for Americans (2020-2025), but nutrition education during pregnancy has been shown to improve dietary intake and positively influence nutrition-related health outcomes for mothers and their infants[5–7]. Women who receive prenatal medical care are more likely to receive nutrition education, which in turn is associated with improved diet quality and reduced risk of complications[4,8–10]. However, Obstetrics/ Gynecological (OB-GYN) services for prenatal care remain limited for rural Georgia communities, limiting access to pregnancy-specific nutrition education providers[4]. Expanding access to nutrition education through community-based programming, like the Expanded Food and Nutrition Education Program (EFNEP) presents a strategy for reducing these disparities and improving health outcomes for pregnant women.

UGA EFNEP

In Georgia, the UGA EFNEP *Food Talk* curriculum has been used to deliver nutrition education to all adults, including pregnant women, since 2008[3]. As mentioned previously, Georgia experiences some of the worst maternal health outcomes in the country, highlighting a need for targeted interventions[4]. Pregnant women have unique nutritional needs from the general

adult population due to several physiological changes that occur to support the health of the mother and her growing fetus[11]. These changes in nutritional needs were not being met by the current UGA EFNEP *Food Talk* curriculum, emphasizing the need for an adapted, pregnancy-specific nutrition education curriculum in Georgia.

UGA EFNEP programming is delivered by training paraprofessional peer-educators, called Program Assistant's (PA's)[3]. To effectively develop and implement an adapted UGA EFNEP curriculum UGA EFNEP Extension Supervising Agents and their PA's required training on pregnancy-specific nutrition guidelines. A need was identified for training and review materials to prepare UGA EFNEP staff to implement the adapted, pregnancy-specific curriculum.

Summary of Findings

This dissertation project explored the feasibility of adapting an existing UGA EFNEP curriculum to address the unique needs of pregnant participants and implementing the adapted curriculum, the acceptability and effectiveness of a hybrid training model for preparing peer-educators to deliver the adapted curriculum, and an evaluation of UGA EFNEP educators' perspectives regarding the challenges, strengths, and lessons learned from their experience implementing the adapted program.

Chapter 3 found that adapting the UGA EFNEP *Food Talk* curriculum to include evidence-based, pregnancy-specific nutrition information and implementing the adapted curriculum in the community was feasible. Feasibility is shown through the successful implementation of the curriculum in three different Georgia counties, for an overall enrollment of thirty-five participants. Participant retention across sites was low, suggesting further

adaptations are needed to improve programmatic outcomes in the future. Participants that completed the program showed trends toward improvement in diet quality and food resource management, suggesting that there may be potential benefits to the program. Further research, with a larger sample is needed to fully evaluate the effectiveness of the intervention at improving participant diet quality.

Chapter 4 found that a hybrid training model was accepted and favored by UGA EFNEP staff. However, further training time and resources were still desired, helping to inform future UGA EFNEP training protocol needs. The eLearning modules led to improvements in pregnancy-specific nutrition knowledge among the pilot team and the in-person trainings were generally rated favorably in relation to their ability to meet the staff's assigned LGU EFNEP & SNAP-Ed Core Competencies. Overall, the training components offered were valuable, but expanding on these offerings for future training sessions will be helpful in ensuring UGA EFNEP staff feel adequately prepared to implement the adapted curriculum.

Chapter 5 explored the perspectives of UGA EFNEP staff on the process of adapting and implementing the UGA EFENP *Food Talk: Baby & Me* curriculum. UGA EFNEP staff shared insights regarding potential ways to improve program acceptability among participants, including recipe adaptation and alternative delivery formats. The findings from this study provided insight into further adaptation needs and factors that increased acceptability of the process among staff and participants.

Strengths & Limitations

The greatest strengths of this study include the ability to be integrated into the EFNEP model and expanded to additional sites. The UGA EFNEP pilot team was eager to continue offering the adapted curriculum and provided great insight into how to continue adapting the program to meet the needs of pregnant women in Georgia.

The greatest limitation to this study is the small sample size. In Chapter 3, Participant retention was a challenge, but with implementation of the suggestions provided by the UGA EFNEP pilot team, this can be addressed. Although the sample size for Chapters 4 and 5 is limited, this was an expected outcome of purposive sampling in our studies focused on UGA EFNEP staff feedback, which ensured that only those with highly relevant experiences were included. This strategy strengthened the study's rigor by prioritizing the richness and relevance of the data over breadth. The UGA EFNEP pilot team were selected to participate because they were able to provide insight into program adaptation and implementation.

As mentioned previously, participant sample size was limited, however, due to the novel nature of this research, the findings are useful for informing larger studies on nutrition education and curriculum development for pregnant women. Through the process of implementation and evaluation of the adapted curriculum, we have learned that pregnant women need to be reached earlier and for a shorter duration of time. Consistent feedback for suggestions to improve retention included recruiting women earlier in pregnancy and teaching more frequently, to avoid running into complications that inhibit pregnant women from attending sessions, like bedrest or early delivery.

A lesson learned from this study was that training and recruitment were a lengthier process than anticipated by the research team. While the adapted curriculum allowed for faster turn-around time between training and implementation, peer-educators still required several weeks of independent practice before feeling ready to teach a class.

Conclusion

Findings from this dissertation project suggest that pregnancy-specific nutrition education delivered through the EFNEP model may be a feasible, effective way to improve maternal diet, and in-turn maternal health. While these findings were inconclusive, they can help inform larger studies that can fully evaluate the efficacy of this type of nutrition education intervention. Exploration of other forms of delivery and community partnerships, as suggested by these findings, will also be useful in optimizing the reach of nutrition education for low-income pregnant women. Overall, the outcomes of this study provide useful direction for nutrition education program developers and implementers in the U.S. who are aiming to improve resources available to low-income, and nutritionally at-risk pregnant women.

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APPENDIX

Appendix A: Key Informant Interview Guide

Your participation is voluntary. There are no right or wrong answers to the questions I will ask you. All responses will be kept confidential and will only be reported in ways that share trends in responses for all partners. Please be honest, your responses will help us to improve.

This session will also be recorded just so that I can capture all your comments accurately.
Do you have any questions before we begin?

[START RECORDING]

1. First, we will start by asking about yourself and your role with EFNEP.
2. What is your position and what are your major responsibilities in your current position as it relates to this pilot project?
2. Were you involved in recruiting participants for the program?
3. Can you describe the main strategies that you use to recruit EFNEP participants?
4. Among the strategies you have just described to recruit participants, which ones were the most successful and why?
5. What challenges did you face with recruiting participants?
5. What resources or support mechanisms do you need to improve your experience and process for recruiting participants?
6. Would you say that the incentives were helpful in recruiting the participants?
7. What would you say where your main strategies for retaining the participants during the series?
8. What challenges did you face with retaining participants?
9. What components of the current *Food Talk* curriculum would you say directly applies to expecting parents?
10. What recommendations do you have to modify the current curriculum for expecting parents?
11. How would you describe the usefulness of recipes as an EFNEP component?

12. Do you have any other recommendations for recipes that will directly benefit expecting parents?
13. How would you describe the usefulness of educational extenders as tools to promote behavior change among participants?
14. Do you have any recommendations for educational extenders that would be useful for expecting parents in particular?
15. Do you have any recommendations for additional information or program components that would benefit expecting parents?
16. Is there anything else you would like to mention that I did not ask you about that you think is important?