ESTIMATED NUTRIENT INTAKE, FOOD SECURITY STATUS, AND FOOD RESOURCE AUGMENTATION BEHAVIORS OF LOW-INCOME WOMEN IN OKLAHOMA

By

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CHAPTER ONE

INTRODUCTION

Much has been written on the topic of food insecurity and food insufficiency. Food insufficiency is a concern for low-income families in Oklahoma. It is a phenomenon that can be experienced on various levels, from the uncertainty of being able to obtain food in socially acceptable ways to the physical and psychological results of hunger as a result of not getting enough food to eat (Frongillo, 1999).

Food stamps and other food assistance programs, such as WIC and food banks, attempt to alleviate some of these food insecurities for low-income families. Few local or state level studies have been conducted that measure the occurrence and other events that may surround food insufficiency in low-income women. The studies that have been performed have been done on a national level.

A few studies have been performed studying changes in nutrient intake in low-income families. Emmons (1986) found that nutrient intake in food stamp households varied over the month and overall was low. Protein, ascorbic acid, thiamin, niacin, riboflavin, vitamin B_{12}, vitamin A, and phosphorus were consumed at levels above the RDA while calories, vitamin E, vitamin D, calcium, zinc, iron, magnesium, vitamin B_6, and pantothenic acid were consumed at levels below the RDA.

Women aged 12-19 consumed large amounts of soft drinks and imitation fruit flavored drinks and the total ounces increased over the month (Emmons, 1986). Servings of food did not lessen considerably until the third week and decreased even more by the end of the month. In the African American group, a significant decrease was noted between weeks 1 and 4 in the servings of the high-protein foods, fruit, vegetables and soft drinks. Emmons (1986) identified a significant increase in the servings of lentils over the month for all groups. The percentage of calories from protein and carbohydrate increased by <1% and fat decreased by 2.5%. Emmons (1986) concluded that all subjects had significantly lower amounts of calories by week 4.

Food purchasing patterns may contribute to the nutritional insufficiency of low-income women. Little is known about the food purchasing patterns or food resource augmentation behaviors of low-income women. This may be because research conducted by US Department of Agriculture's (USDA) Nationwide Food Consumption Survey (NFCS) focused on middle-income groups (Mullis et al., 1998). Food-shopping and food allocation behaviors of low-income groups need to be considered when developing nutrition education programs. Nutrition educators need to recognize the struggles of low-income families when considering their capability to acquire food that is nutritious as well as inexpensive.

Purpose

The first purpose of the present study was to determine the nutrient intake and food insufficiency status of low-income women receiving food stamps compared to those not receiving food stamps. The second purpose of the present study was to determine the Food Resource Allocation Behaviors (FRAB) of food secure and food insecure low-income women.

Objectives

Objective 1: To determine if the nutrient intake of low-income women differs due to food stamp participation.

Objective 2: To determine if the nutrient intake of non-food stamp participants varies during the month (day 1-14 vs. 15-31).

Objective 3: To determine if the perception of food insufficiency differs in low-income women due to food stamp participation.

Objective 4: To determine the association between different methods to measure food sufficiency and security.

Objective 5: To determine if the food resource augmentation behaviors of low-income women differs due to food security status.

Objective 6: To determine the food allocation distribution amounts to household members by low-income women.

Definitions of Terms

Disrupted eating patterns-not eating the socially prescribed three meals a day (Radimer et al., 1990).

Food anxiety-the uncertainty about whether one's food supply would last (Radimer et al., 1990).

Food depletion-running out of one's usual food supply (Radimer et al., 1990)

Food insufficiency-a household reporting that they sometimes or often do not get enough to eat. Food insufficiency is a proxy for hunger (Rose and Oliveira, 1997A).

Food insecurity-the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain (Anderson, 1990).

Food insecure with hunger not evident-when a household had limited or uncertain availability (anxiety, adjustments to budget management, adjustments to food quality) of food or resource augmentation via socially unacceptable ways (Hamilton et al., 1997).

Food insecure with evidence of hunger-when a household had severely limited availability (reduced intake and other indicators) of food (Hamilton et al., 1997).

Food resource augmentation behaviors-the behaviors that allow a low-income person to acquire food in socially acceptable ways to prevent food insufficiency and food insecurity. May also be referred to as coping behaviors (Hamilton et al., 1997).

Food security-access by all people at all times to enough food for an active healthy life and includes at a minimum: a) the ready availability of nutritionally adequate and safe foods, and b) the assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, and other coping strategies) (Anderson, 1990).

Food unsuitability-not being able to buy the quality and kinds of food considered appropriate (Radimer et al., 1990).

Hunger-the inability to acquire or consume an adequate quantity or sufficient quality of food in socially acceptable ways, or the uncertainty that one will be able to do so (Radimer et al., 1990,1992).

Intake insufficiency-an individual's problem of adequately consuming an acceptable quantity of food (Radimer et al., 1990).

Oklahoma Nutrition Education (ONE) program-nutrition education program for low-income families that receive food stamps so that they might bring their food intake in line with the recommendations for Healthy People 2000.

The Special Supplementation Nutrition Program for Women, Infants, and Children (WIC)-Created in 1978, but originally authorized in 1972 by the Food and Nutrition Service of the USDA. To be eligible for this program one must be a pregnant or postpartum woman up to 6 months after delivery if not breastfeeding and up to 12 months if breastfeeding; infants; children up to 5 years of age that are at nutritional risk and members of low income families (Owen et al., 1999).

Assumptions

Researchers assumed that all participants were trained by the paraprofessionals to report their dietary intake. Paraprofessionals reviewed the three 1-day food records for completeness, and it was assumed that they asked for clarification from the participants. Researchers assumed that subjects accurately completed the three 1-day food records due to paraprofessionals' training.

Researchers assumed that the participant completed the food resource augmentation behaviors survey accurately. Researchers assumed that the subjects' accurately allocated amounts of beans to members of their households.

Limitations

The sample in the nutrient intake phase of the study was a low-income population; only three 1-day food records and one 24-hour food recall were used to measure nutrient intake. Validity of the four 1-day food records was dependent on the ability of the subject to complete the forms. It was not indicated if the four 1-day food records were atypical for the subject completing them.

The sample in the FRAB phase of the study was also a low-income population. Even though the FRAB survey was piloted, there was still confusion in answering some questions. For example, the series of questions concerning changing of type of store where foods were purchased was problematic for some participants.

Subjects completing the FFDA may have interpreted the question, "If this was all the food you had to give to your family for an entire day, how would you distribute it among members of your household?", as a severe state of depletion in household food stores. Some subjects interpreted this question as "food for rest of the month", as indicated by subjects' comments. This may have caused subjects to distribute the beans under different contexts.

Another limitation of this study was that two different groups of women were used for the nutrient intake and the FRAB parts of the study. Researchers were unable to do comparisons across the two phases of the study.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

A comprehensive literature search provided information in the following areas: food insufficiency and food insecurity, measuring food insecurity and food insufficiency, characteristics of food insufficient households, nutrient intake of low-income women, food stamp program's effects on nutrient intake of low-income women, measuring nutrient intake, food resource augmentation and allocation behaviors.

Food Sufficiency and Food Security

Food Insufficiency vs. Food Insecurity

The older literature in the area of food security research uses the terms food insufficiency (Rose et al., 1999) and food insecurity (Kendall et al., 1996, Radimer et al., 1990, 1992, Kendall et al., 1995) interchangeably, but more recent literature is more specific and tends not to use them interchangeably. The present study measured food insufficiency and insecurity, and the review of literature includes studies on both.

Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain (Anderson, 1990, Kendall et al., 1996). Kendall et al. (1996) indicated that food insecurity occurs on three levels and each level is considered more severe than the previous level. Hunger was the determining variable for each level of food insecurity. Hunger is defined as the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so (Radimer et al., 1990,1992). Food insecurity without hunger (level 1), the lowest level of severity for insecurity, occurs when food insecurity is evident in households' concerns and in adjustments to households' food management, including reduced quality of diets. There is little or no reduction in household members' food intake. Food insecurity with moderate hunger (level 2), the next level of severity for insecurity, is present when adults in the households have decreased food intake to the point where they have repeatedly experienced the physical sensation of hunger. Such reductions are not observed at this stage for children in the household. Food insecurity with severe hunger (level 3), the greatest level of severity for insecurity, is present when households with children have reduced the children's food intake to an extent that implies that the children have experienced the physical sensation of hunger. Adults in households with and without children have more extensive reductions in food intake at level 3.

The USDA, Food and Consumer Service (Hamilton et al., 1997) stated that households with children that had to reduce the children's food intake

indicated that the household could be classified as having food insecurity with severe hunger. Adults in households with and without children that have had to make food intake reductions repeatedly, implied more food insecurity at this stage (USDA, Food and Consumer Service, 1997). Rose (1999) indicated similar findings.

Households reporting that they sometimes or often do not get enough to eat have been termed food insufficient (Rose and Oliveira, 1997A). Rose (1999) defined food insufficiency as the lack of an adequate supply of food. It has been shown that food insufficiency may affect mental and physical well-being through decreased nutrient intake or independent of decreased nutrient intake such as price differences in housing, food, or health care (Rose and Oliveira, 1997A).

Measuring Food Security and Food Sufficiency

Food Sufficiency 1-Item Question used in NHANES and CSFII.

Briefel and Woteki (1992) described the development of the food sufficiency question used in the Third National Health and Nutrition Examination Survey (NHANES III). Questions from the Community Childhood Hunger Identification Project (CCHIP) and the USDA food consumption surveys were chosen for further assessment on the cognitive features of survey design, including question wording and ordering, readability and comprehension, reference periods, and response categories. The Questionnaire Design Research Laboratory (QDRL) at the National Center for Health Statistics (NCHS) performed the assessment of

these questions and indicated that the USDA question from the 1977-78 and 1987-88 Nationwide Food Consumption Surveys "Which of the following statements best describes the food eaten in your household?" was selected for use in NHANES III after it was pilot tested. The pilot test revealed that the response category of "enough but not always what [I/We] want to eat" confused food sufficiency with what the individual prefers to eat and not a true food shortage. This indicated that the individuals might be misclassified as food insufficient when they are not. Briefel and Woteki (1992) added three questions to measure household status and six questions were added to measure individual status to confirm that the single food sufficiency question was categorizing both household and individual by food sufficiency status in the same way as a more detailed series of questions. Briefel and Woteki (1992) concluded that this single question could assess food insufficiency status.

Rose and Oliveira (1997B) compared the 1989-1991 Continuing Survey of Food Intake by Individuals (CSFII) data for the way the 1-item food sufficiency question categorized households by mean nutrient intake to validate the 1-item food sufficiency question. Food insufficiency, independent of other variables that affect diet (e.g. household size), was significantly related to decreased estimated nutrients intake of food energy, calcium, iron, vitamin B_6, and folate ($p<0.05$). Rose and Oliveira (1997B) stated that self-reported measures of food sufficiency, like the USDA "food sufficiency question" (same as the 1-item question present on the NHANES and CSFII), were practical to use in the Nation's nutrition monitoring system.

Frongillo et al. (1997) indicated that the NHANES III food sufficiency question estimated the prevalence of food insufficiency as 17%, when compared to the Radimer/Cornell measure estimating 53% as food insecure and the CCHIP measure estimating 48% as food insufficient for 193 households. Frongillo et al. (1997) stated the NHANES III question estimated a low prevalence of household food insecurity than the prevalence estimated from the household level quantitative and individual level qualitative items in the Radimer/Cornell and CCHIP measures, but this result did not indicate that there was anything inaccurate with the NHANES III food sufficiency question. However, Frongillo et al. (1997) concluded that a single item alone, such as the NHANES III food sufficiency question, is not sufficient for assessing hunger and food insecurity

Radimer/Cornell Food Security and Hunger Scale. Radimer et al. (1990, 1992) conducted a two-part study to develop an instrument to assess hunger in low-income women and children. The first part of the study was qualitative and generated items for a food security and hunger measurement instrument. The second part of the study was the food security and hunger measurement instrument reliability testing and validation.

The first part of the study was performed with a sample of 32 women in Upstate New York who said they had experienced hunger. The women were interviewed from March through November 1987 in a naturalistic inquiry style by a trained qualitative interviewer. Similar responses to questions were grouped to

begin scale development. The three initial groups of questions were labeled household, women's, and children's hunger.

In the first part of the study, broad and narrow concepts of hunger were developed from the interviews (Radimer et al. 1990,1992). The broader concept referred to household measures of hunger. Each measure was divided into two levels with each level divided into four components. The first level was individual and consisted of insufficient intake and nutritional inadequacy, a lack of choice, a feeling of deprivation, and disruption of the usual food intake pattern. The second level was household and consisted of food depletion, unsuitable food, food anxiety, and acquisition of food in a socially unacceptable way. The narrow concept was developed from the responses made to a question about "going hungry." A response indicating hunger usually meant insufficient food intake or going without food and included the physical sensation of hunger. From the interviews with the women, an instrument consisting of 30 items, was developed to measure food security and hunger. Twenty-seven of the 30 items were included in a factor analysis. Three factors emerged and were labeled household hunger, women's hunger, and children's hunger items. See Appendix K for individual items included in each factor.

Kendall et al. (1995, 1996) examined the use of the 10-item Radimer/Cornell measure in 193 women. Forty-seven percent of the sample, who responded negatively to all items, was classified as the food secure group. Twenty-five percent of the sample, who responded affirmatively to household items, was classified as the household insecure group. Seventeen percent of the

sample, who responded affirmatively to adult items or the items concerning the quality of the children's intake, was classified as the individual insecure group. Eleven percent of the sample, who responded affirmatively to items concerning the quantity of children's intake, was classified as the child hunger group. Kendall et al. (1995, 1996) stated that the 10-item Radimer/Cornell measure can be used to obtain information concerning household food supplies and the quality of diets, and could possibly be a valuable indicator of dietary differences in populations in danger of food insecurity.

Hamelin et al. (1999) explored household level food insecurity and defined hunger as a physical impairment that occurs from food insecurity. Ninety-eight subjects (83 women, 15 men) participated in 23 focus groups in Québec, Canada. Their responses to 12 open-ended questions defined each focus group's level of food insecurity. The criterion measured for this study was food insecurity status classification determined by two independent researchers and based on a definition by Frongillo et al. (1997). The Frongillo et al. (1997) definition was that a reasonable person could conclude that the household was insecure, considering the generally accepted definition of food security. This definition defined food security as access by all people at all times to enough food for an active healthy life and includes at a minimum: a) the ready availability of nutritionally adequate and safe foods, and b) the assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, and other coping strategies) (Anderson, 1990).

Hamelin et al. (1999), categorized 77 households as food insecure according to this study's criterion measure. Content analysis of respondents' transcripts resulted in three categories of food insecurity at the household level 1) physical impairment, 2) psychological suffering, and 3) sociofamilial perturbations, with each area also having a corollary with "social implications" (Hamelin et al., 1999). Food insecurity classification was determined by the two researchers without the knowledge of the participants' responses to the 13-item Radimer/Cornell measure. Hamelin et al. (1999), indicated a high agreement of household classification as secure vs. insecure between their method of classification and Radimer/Cornell classification.

Based on the Hamelin food security measure, 30 out of the 98 food insecure respondents reported hunger pangs, and approximately 40 reported fatigue and illness related to insufficient food (Hamelin et al., 1999). These types of physical symptoms may lead to lack of concentration at school or work, and low capability of work at home or work. Psychological issues and social implications were stress (e.g., fear of losing child custody) and decreased enjoyment of food (n=40), decreased enjoyment of activities preparing food (n=20), feelings of revolt (n=4), and violent antigovernment remarks (n=1).

Frongillo et al. (1997) used questionnaire-based measures to examine the ability to identify rural households with hunger and food insecurity. Frongillo et al. (1997) used the 13-item Radimer/Cornell food security items, the CCHIP items, and the food sufficiency question from the NHANES III. The study sampled 193 households. The definitive criterion measure used was created by

two independent researchers reviewing all the data from 15 subjects and listing the characteristics that defined a household as food insecure or secure. Households were classified by food security status using this criterion measure. The three test measures of food security and insufficiency were compared to this definitive criterion. The Radimer/Cornell and the CCHIP measures of food security agreed with the definitive criterion in that food secure households were classified correctly 85% of the time, probably food insecure households were classified correctly 76% of the time, and food insecure household were classified correctly 93% of the time. The NHANES III food insufficiency item's low sensitivity caused it to estimate a low prevalence of household food insecurity.

Campbell (1991) reviewed the Radimer/Cornell scale, the hunger scale of CCHIP, and the questions included in NHANES III to see if they could adequately assess food insecurity similar to the Radimer et al. (1990) scale. Campbell (1991) indicated that the Radimer's scales were good because they allowed the researcher to assess individual vs. household hunger, and mother's hunger vs. her children's hunger. It was important to assess mother vs. child because it has been hypothesized that mothers face food insecurity before their children. The Radimer/Cornell food security scale indicated that insecure subjects had lower income, lower food expenditures, and used more coping tactics than food secure subjects (Campbell, 1991). Campbell (1991) noted that the hunger scale of CCHIP did not separate household vs. child hunger. Nonetheless, the CCHIP scale focused on assessing the tactics used to cope with food insecurity, such as skipping or cutting the size of meals and limiting the number of foods. Campbell

(1991) noted that there was little agreement between researchers if coping tactics should be considered as part of food insecurity's core constructs.

Core Food Security Module. In a review article, Frongillo (1999) examined the Food Security Supplement from the Current Population Survey (CPS) to estimate how often food insecurity occurs in the US. The Food Security Supplement measure was developed from the Radimer/Cornell instrument and CCHIP measure. Frongillo (1999) attributed the construct validity of the Radimer/Cornell and the CCHIP items because of the in-depth contact with subjects, who had experienced food insecurity and hunger. This validity of the Food Security Supplement has been consistently demonstrated by factor analysis, the proportion of affirmative responses for items, the extensive cognitive testing of measured items, and the consistency of patterns of affirmative responses across populations. The Food Security Supplement Measure was an early version of the 18-item Core Food Security Module (CFSM). Bickel et al (2000) indicated similar results.

Blumberg et al. (1999) indicated that the 1995 CPS survey with the 18-item CFSM, categorized 11.9% of the US households as food insecure. Of this 11.9%, 65.1% (7.8% of all households) did not show evidence of hunger, 28.0% (3.3% of all households) showed moderate hunger, and 6.9% (0.8% of all households) showed evidence of severe hunger. Blumberg et al. (1999) created a 6-item CFSM short form scale from the 18-item CFSM used in the CPS 1995. The 6-item CFSM was created to be used to assess food security when time and

money restricted the use of the 18-item CFSM. The 6-item CFSM form identified food insecurity within 2 percentage points of the 18-item CFSM (Blumburg et al., 1999). Blumberg et al. (1999) indicated that this form was sound for testing food security of general population households. The questions that referred specifically to households with children (from the original 18 item CFSM) were dropped to create the short form.

Derrickson et al. (2000) determined if the 18-item Core Food Security Module (CFSM) scale was a reliable and valid instrument to measure food insecurity in Asians and Pacific Islanders in Hawaii. A convenience sample was taken of (1) 144 food pantry recipients thought likely to be hungry, (2) a retest sample that included 61 of the initial 77 food pantry respondents who completed the 18-item CFSM scale a second time; and (3) a statewide sample of 1,469 respondents gathered through the Hawaii Health Survey (HHS). Respondents (Derrickson et al., 2000) were placed into one of the four household food security categories: food secure, food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger. Nine hundred and ninety-nine (54.6%) of the 1,664 subjects identified themselves as Asian or Pacific Islander. The 18-item CFSM scale classified 1,411 (84.8%) of the HHS respondents as food secure, 158 (9.5%) food insecure without hunger, 64 (3.8%) as food insecure with moderate hunger, and 31 (1.2%) as food insecure with severe hunger. The 18-item CFSM scale defined food security in Hawaiians as well as in the national sample. The 18-item CFSM did not adequately categorize

the Samoan sample (n=23). Thus, the 18-item CFSM scale appeared to be limited for use with Samoans without using additional items.

Prevalence of Food Insecurity in Oklahoma

Oklahoma was the sixth most prevalent food insecure state (11.9% of all households were food insecure) and the sixth most prevalent food insecure with hunger state (4.2% of all households were food insecure with hunger) based on the CPS Food Security Supplement data (1996-1998) (Nord et al., 1999). Oklahoma food insecurity prevalence is above the national average (9.7% of all households) for the prevalence of food insecurity. Oklahoma's food insecurity with hunger prevalence is above the national average (3.5% of all households) for the prevalence of food insecurity with hunger.

Characteristics of Food Insufficient and Insecure Households

Several studies have examined the characteristics of food insufficient households. A study performed by Kendall et al. (1995) indicated that food security status was associated with demographic characteristics.

Education

Education is considered one of the major determinates of food security status. Kendall et al. (1995) indicated that food insecurity status worsened as women's education level decreased. Women with a college education were the least likely to be food insecure, while women with less than a high school education were the most likely to be food insecure. Rose and Oliveira (1997A) noted that the heads of food insufficient households had a lower education level than heads of food sufficient households. Cristofar and Basiotis (1992) and Dinkins (1997) reported similar findings.

Income

Rose (1999) reported in a review that income is typically one of the major economic determinants of food insecurity and hunger. In this study, Rose (1999) reviewed the 1995 CPS data in relation to economic determinants in food

insecure and secure households. Rose (1999) indicated that 17% of households with income <50% of the poverty level experienced hunger in some form. It was also found that the rate of experiencing hunger in some form decreased as the households income increased towards >185% of the poverty level. The third National Health and Nutrition Examination Survey (NHANES III) 1988-1994, 1992 Survey of Income and Program Participation (SIPP), and the 1989-1991 Continuing Survey of Food Intake by Individuals (CSFII) demonstrated comparable decreases in food insufficiency rates with increasing income (Rose, 1999). Sixteen percent of CSFII households with incomes <50% of the poverty level were food insufficient while the rate decreased to <1% for those >185% of the poverty level. Fifty percent of food insufficient households had incomes above the poverty level as indicated by the CPS data. The CSFII and the SIPP reported comparable data on the percent of food insufficient households above the poverty level (41.3 % vs.53.3%, respectively) (Rose, 1999). Rose (1999) concluded that each of these surveys despite their different indicators, years, purpose, and sampling strategies point to a consistent relation between income and food security status. The lower the income the greater the risk of food insecurity.

However, Rose (1999) also stated that income-based measures should not be the only indicators of food security status. Cost of housing and food, temporary bouts of food insecurity, and health care costs should also be considered. Income based measures did not consider the needs of single parent homes or those containing individuals with disabilities. Thus, the poverty

indicator alone was considered an inaccurate measure of food insecurity due to the fact that some food insecure households were not in poverty.

In a study by Kendall et al. (1995), 50 out of 193 subjects were classified as food insecure and food insecurity status was negatively related to income. Households with incomes greater than $25,000 were significantly more likely to be secure, than households with incomes <$10,000 ($p<0.0001$). If a household had a hungry child they were more likely to have both male and female members unemployed. As food insecurity status increased, the household participation in the four major food assistance programs increased (Kendall et al. 1995). Andrews et al. (1999) evaluated the food insecure household data from the Food Security Supplement to the CPS for the years 1995-1999. Andrews et al. (1999) noted that households with an annual income ≤185% of the poverty level were six times more likely to experience food insecurity and eight times more likely to experience hunger than households above the poverty line. Similar findings regarding income and food security were found by Olson (1999), Tarasuk and Maclean (1990), and Dinkins (1997).

Other Characteristics of Households

Frongillo et al. (1997) found that a food insecure household was more likely to include: a single parent, extra people moved into the household, a food budget of <$100/wk for family of five or $75-80 per person per month, spent a low amount on food and no money on eating out, applied for food stamps or

received them, food stamps received sporadically, received free or reduced priced school lunch, low-income but chooses not to participate in school lunch program, income varied month to month, high utility bills, had major medical problems, and less than usual food stores because of lack of money. Other characteristics of food insecure households were job lost in the last year, family income <$10,000, used food pantries, borrowed money for food, and lack of medical insurance. Frongillo et al. (1997) also found the following characteristics were rarely found in food insecure households: using a buying club, gardening, hunting/fishing, obtaining free eggs/milk/meat, spending large amounts on food outside the home, having someone to ask for help, having the household paying the full price for school lunch, food stamps lasting the month, saying they do not need food stamps, saying they do not need a food pantry, adults were working, receiving child support, receiving workers' compensation or unemployment benefits, and having car payments.

Tarasuk and Maclean (1990) performed an ethnographic study and found that low-income Canadians incurred food complications. These complications included: money spent on food had to be weighed against money spent on other goods and services such as meeting energy needs; limited selection of food items; food was not seen as pleasurable or entertaining; fear of food shortages; rationing of food; personal food preferences not being met; and rarely dining out. Tarasuk and Maclean (1990) stated that there was a greater risk for unsatisfactory intake of nutrients in these households. This was due to the low-

income households' confined food budget and because of a limited food selection.

Andrews et al. (1999) evaluated the food insecure household data from the Food Security Supplements to the CPS for the years 1995-1999. The following characteristics were found to be present in food insecure households: headed by a single woman with children, black, or Hispanic. Cristofar and Basiotis (1992) indicated the following characteristics to be present in woman that reported food insufficiency: they were black or Asian; a member of a comparatively large household more likely to contain children 1-12 years old, teenage females, or males between 19-50 years old; perceived herself in poor health; a smoker; income reported was in the lower range of the low-income segment of the population; and a food stamp participant. However, increased food stamp allotment did not lower the likelihood of reporting "not enough to eat". Nonetheless, if the women reported insufficiency and lived in a household with children 1-5 years the following characteristics were indicated: living in a region of the country other than the East; did not attend college; member of a household with teenage females present; perceived herself to be in poorer health; and a food stamp participant. Andrews et al. (1999) noted that food insecure households were more likely to be located in central cities and non-metro areas compared to suburbs. More insecure households were located in the South and West compared to the Midwest and North.

Measuring Nutrient Intake

The nutrient intake for the current study was completed in the nutrient intake phase. A 24-hour food recall and three 1-day food records estimated nutrient intake. These measures were used instead of a Food Frequency Questionnaire (FFQ) due to the tendency of a FFQ to overestimate nutrient intake (Block et al., 1992).

Ways to Increase Accuracy of 24-Hour Food Recalls

When conducting a 24-hour food recall, the individual is asked to recall and report all food and beverages consumed during the previous 24-hours. Experienced interviewers who have knowledge about food and preparation practices, are important in administering a 24-hour food recall in order to retrieve food items not originally reported by the individual (Thompson and Byers, 1994).

The multiple pass method is a method where the subject first completes a 24-hour food recall with the nutrition professional only asking them to recall the foods consumed the day before (first pass). Then the nutrition professional reviews the subject's 24-hour food recall and reads it back to the subject for completeness (second pass). Then the nutrition professional asks the subject to recall any food items, condiments, or ingredients that might have been forgotten and lists them if any are indicated (third pass). The multiple pass method was created to help individuals remember foods that are commonly forgotten when

conducting a 24-hour food recall (Briefel et al., 1997). This allows the 24-hour recall to become more accurate. The following items are used to prompt the individual to remember: crackers, breads, rolls, tortillas, hot or cold cereals, added cheese, chips, candy, nuts, seeds, fruits eaten with meals or snacks, coffee, tea, soft-drinks, juices, beer, wine, cocktails, brandies, and an other alcoholic beverage (Briefel et al., 1997). Current literature suggests the following should be done to increase the accuracy of a food recall: use food models to determine portion sizes, ask open-ended questions, and train interviewers to use the same standardized tools for determining foods and portion sizes (Karvetti and Knuts, 1985).

The 24-hour food recall can provide an exaggerated estimate of nutrient intake, because on any given day some individuals will eat very little food, whereas others will eat an unusually large amount. Another possibility for inaccurate (over-reporting or underreporting) intake is respondent error in reporting due to either memory or interview situation (Thompson and Byers, 1994). However, the 24-hour food recall has been used extensively in nutrition education programs because it is easy to administer, economical, and the effectiveness of the recall is independent of the literacy of the respondent (Del Tredici et al., 1988). Multiple recalls are needed to more accurately measure the dietary intake of a participant (Karvetti and Knuts, 1985).

Ways to Increase Accuracy of Food Records

A food record is a list of all food and beverages, with exact amounts consumed over a period of days (Thompson and Byers, 1994). The amounts should be measured by respondents using scales; household measuring cups or spoons, food models, or pictures at the time food is consumed. Furthermore, the respondent must be responsible for providing important details, such as brand names, preparation methods, and serving sizes (Thompson and Byers, 1994).

Rebro et al. (1998) studied the effect on eating patterns by burden on subjects when they were asked to record food intake for four days. Data were collected on 175 women, 50-79 years of age, who were participating in the Women's Health Trial Feasibility Study in minority populations. Women recorded food intake over four alternate days for a one-week period, after receiving instructions from a nutritionist. Nutrition educators reviewed four 1-day food records for completeness. Records including a weekend were excluded because of variability in weekend meal patterns (i.e. family gatherings). Significantly fewer food components, food items, and snacks were reported on day four as compared to day one (Rebro et al., 1998). Respondents were found to reduce the number of foods and snacks consumed and decrease the complexity of their diet by substituting foods that were easier to record. The importance of avoiding lengthy periods of consecutive reporting days, including four days or more for diet records is important to minimize changes in eating patterns.

Mela and Aaron (1997) stated there was little information on the factors that predict the likelihood of subjects generating valid or invalid food intake records. The objective of this study was to gain insight into subjects' views of two different diet recording tasks: a FFQ and keeping a weighed food record. The sample included 240 subjects, mostly female, with a mean age of 41 years. Each subject was given a questionnaire only if he or she had never recorded his or her food intake before. Subjects stated making estimates in household measures was significantly more difficult than completing a food frequency questionnaire. Researchers felt this was because the participants were not confident in their own ability to make estimates of food amounts. Respondents indicated that recording the weighed food records was "embarrassing".

Several studies have shown that individuals have difficulty estimating portion sizes of foods and as a result underreport amounts eaten on food records and 24-hour food recalls (Thompson and Byers, 1994, Mela and Aaron, 1997, Block, 1982, Rebro et al., 1998). To increase the accuracy of self-reporting of food intake, researchers have examined the effect of training sessions on estimating portion sizes. When subjects were trained in portion size estimations, used actual food models and container sizes, researchers reported increased validity of portion size estimation (Briefel et al., 1997).

The form used to record food and beverages consumed must be designed carefully to assist the respondent in completely recording what was eaten (Thompson and Byers, 1994). An instruction booklet for the subjects used during the food recording period is essential. If the intent of the study is to generate a

population distribution of each individual nutrient's intake, then only two days of recalls were needed on a sample. However, three days of dietary information were needed to estimate the distribution of usual diet intake from food records (Thompson and Byers, 1994). A combined dietary recall record approach was used to estimate nutrient intake of individuals in which an initial interviewer administered a seven 24-hour food recall over a period of 7 days was used by the USDA in its 1977-78 Nationwide Food Consumption Surveys to estimate the nutritional adequacy of low-income households (Peterkin et al., 1982). The 24-hour food recalls were then evaluated for the nutritive value of the edible portions of foods used using published food composition handbooks and unpublished data.

Accuracy of Food Recalls and Food Records to Estimate Nutrient Intake

Several studies have found that the FFQ can over-underestimate nutrient intake (Bergman et al., 1990, Block et al., 1992, and Mela and Aaron, 1997). Block et al. (1992) compared two dietary questionnaires, the University of Michigan (UM) FFQ and the Block 92 FFQ against multiple dietary records collected during one year. The subjects consisted of 85 black and white persons, between 25-50 years of age. The participants completed a series of four sets of three 1-day diet records each three months apart, and 4 sets of 24-hour food recalls. After the recall, the interviewer instructed the respondent on proper recording of three 1-day food records. After completion, the respondents were asked to complete the University of Michigan FFQ and the Block 92 FFQ. The

correlation between energy and nutrient intake of the 24-hour food recalls and the mean of the four, three 1-day food records was between r=.70 and r=.80 ($p<.01$). This included calories, protein, fat, carbohydrate, saturated fatty acids, calcium, B vitamins, and iron. Correlation coefficients should be in the range of .40 to .80 and significant in order to be acceptable (Block et al., 1992).

Rebro et al. (1998) indicated that historically food records were considered the "gold standard" of dietary assessment and have been used to ascertain the validity of additional methods of assessment. Nonetheless, Rebro et al. (1998) indicated that Martin et al. (1996) and Black et al. (1991) have found that food records significantly underestimate energy intakes when using the objective method of estimating energy expenditure, doubly labeled water.

Johnson et al. (1998) studied the accuracy of estimated energy intakes via the multiple pass 24-hour food recall method in women aged 19-46 years using the doubly labeled water method. Thirty-five women were recruited from a WIC clinic. Over a 14-day time period, 4 multiple-pass 24-hour food recalls were conducted (2 in-person and 2 by telephone). Mean 4-day energy intake (2,196.7±606.6 kcal) was lower than total energy expenditure (2,644.1±503.0 kcal, $p<.001$). Johnson et al. (1998) indicated that the multiple pass 24-hour recall failed to correctly assess the women's total energy expenditure when comparing as a group. Johnson et al. (1998) concluded that the multiple-pass 24-recall failed to estimate a group measure for energy intake that was correct or unbiased for this sample of low-income women.

Stuff et al. (1983) developed a modified food frequency form (FFF) for use with 40 breast-feeding women and compared it to estimates from a 1-day record (1DR), a 3-day record (3DR), and a 7-day record (7DR). The group means for kcal, fat, calcium and iron intakes were estimated from the 1DR, 3DR, and 7DR. The 1DR estimated mean intakes were: calories (2057±609), fat (86.0±25.7), calcium (1354.0±446.0), and iron (14.7±6.3). The 3DR estimated mean intakes were: calories (2059±444.0), fat (86.5±19.6), calcium (984.0±421.0), and iron (13.6±4.1). The 7DR mean intakes were: calories (2028±357), fat (86.5±19.6), calcium (1004.0±413.0), and iron (13.0±3.0). The interclass correlations for measuring agreement between the mean intakes from the 1DR vs. 7DR were for kcal (0.45), fat (0.46), calcium (0.63), and iron (0.52) and all were significant ($p<0.005$). The interclass correlations between the 3DR vs. 7DR were for kcal (0.79), fat (0.74), calcium (0.89), and iron (0.82) and all were significant ($p<0.005$). It was concluded that an individuals' 3DR nutrient estimate can be used to determine the 7DR values. Stuff et al. (1983) chose the 7DR as the validating measure for the other measures (1DR and 3DR), since it was identified as the best compromise between obtaining accurate information with "minimal" imposition on the subjects' lifestyle. Stuff et al. (1983) stated that a reasonable approach for estimating nutrient intake data was the 3DR. Unfortunately the 3DR was a poor predictor for estimating nutrient intake for individuals as compared to the 7DR, but the 3DR was good for population estimates. Conversely the 3DR was a good predictor for the general quality of the diet.

General

A study by Emmons (1986) compared four weekly 24-hour food recalls from low-income families receiving food stamps. Seventy-six low-income families were interviewed. Of those 76 families, 70% were black and 30% were white. The ages of the subjects in the study ranged from 17 to 42 years, all families had one child under the age of three, and the subjects' families ranged in size from two to eight members. The black subjects experienced significant decreases in the number of servings from high protein foods, fruits, vegetables, and soft drinks and a significant increase in the servings of lentils from the beginning to the end of the month (Emmons, 1986). The white families' food intake was more constant over the month. Soft drinks and fruit-flavored drinks were consumed in large quantities throughout the month by whites. Protein, niacin, and riboflavin were well above the Recommended Dietary Allowances (RDAs) for all groups at all four weeks of the month. Vitamin B_6, vitamin D, zinc, calcium, and iron were well below the RDAs at all four weeks of the month, thus indicating that nutrition problems are continuous throughout the entire month.

Food Stamp and WIC Effect on Nutrient Intake

Several studies have examined the effect of the food stamp and WIC programs on participant nutrient intake. In the Nationwide Food Consumption Survey, 4,408 households that were food stamp eligible were interviewed about the kinds and amounts of all foods used by the household during the previous seven days (Peterkin et al., 1982). Six hundred and twenty-seven individuals' food intakes, whose food cost was within 10% of their food stamp allotment level, were analyzed for nutritional adequacy. Protein, phosphorous and vitamin C were consumed at or above the RDA by 80% of the households. Less than 50% of these households reported diets that met the RDA for iron, calcium, magnesium, and vitamin B_6

Wilde et al. (2000) examined the CSFII (1994-1996) data to determine the effect of the food stamp and WIC programs on dietary quality of program participants. Subjects completed two nonconsecutive day 24-hour food recalls and were divided into groups according to age. Households selected for this study had incomes at or below 130% of the poverty line (Wilde et al., 2000). FSP participation significantly increased the intake of meats, added sugars, and total fats. WIC positively increased the intake of fruits and dairy, and decreased the intake of added sugars. Wilde et al. (2000) concluded that FSP and WIC participation affected areas of dietary consumption differently. The significantly smaller consumption of added sugars by WIC participants was reflective of the program's approved foods.

Bell et al. (1998) evaluated the nutritional status of persons using a local Emergency Food Relief (ERF) program in middle America. Data were collected from December 1994 through March 1995 from subjects waiting for emergency food at the Flint Hills Breadbasket in Manhattan, Kansas. Dietary intake (via 24-hour food recall) and anthropometric measurements (height, weight, triceps skinfolds, and mid-upper arm circumferences) were collected to assess nutritional status. Forty-six women and 23 men participated in this study (N=69). Racial composition of the subjects included whites (n=50) and some blacks and Hispanics. Forty subjects (58%) were participating in other food assistance programs such as WIC, Food Stamp Program, and the National School Lunch Program. Twelve subjects were underweight and 34 were obese. Of the 34 obese subjects 24 (52%) were women (Bell et al., 1998).

Female subjects failed to adequately consume mean intakes of iron (n=19, 41% of RDA), folate (n=20, 44% of RDA), and calcium (n=21, 46% of RDA) (Bell et al., 1998). The mean intake ± standard deviation of fiber was 12±14g. Subjects also failed to consume the recommended food guide pyramid servings for the following food groups: fruit (n=53), vegetables (n=55), meat (n=15), dairy products (n=49), and grains (n=40). Bell et al. (1998) suggested that the subjects in this study consumed a poorer diet than the general US population. Bell et al. (1998) concluded EFR participants were at greater risk for cancer and cardiovascular disease due to their intake of high-fat foods, low-fiber foods, and low intake of antioxidants.

Food Insufficiency's Effect on Nutrient Intake

Rose and Oliveira (1997A, 1997B) evaluated the estimated nutrient intake of women from food insufficient households. The sample included 6,143 women, aged 19-50 years from the Continuing Survey of Food Intakes by Individuals (CSFII) 1989-1991. Women were categorized into food insufficient or food sufficient households based on responses made to a 4-item question. There were 3,578 food sufficient and 227 food insufficient women. The subjects were divided into three household types: those with children under 18 years of age (n=2,335), those without children but with elderly individuals ≥ 60 years of age (n=2,082), and those with neither children nor elderly individuals (n=1,726). Subjects' nutrient intake was estimated by a 24-hour food recall and two, 1-day food records. The women in food insufficient households were more likely to consume less than 50% of their recommended energy intake as compared to women in food sufficient households. Food energy, iron, and vitamin B_6 intake were significantly lower for food insufficient women compared to food sufficient women ($p<.05$) (Rose and Oliveira, 1997A, 1997B).

Cristofar and Basiotis (1992) categorized subjects who responded to the CSFII question, "Which best describes the food eaten in your household?" into three FFS groups 1) Always enough (n=1,177), 2) Not always the type of food wanted (n=1,692), and 3) Sometimes/often not enough to eat (n=438 and 101). Group 1 estimated mean nutrient intake was 1,619 kcal, 65.5 g total fat, 1.2 mg vitamin B_6, 198.2 µg folacin, 10.6 mg iron, and 618 mg calcium. Group 2 estimated mean nutrient intake was 1,558 kcal, 63.1 g total fat, 1.2 mg vitamin

B_6, 193.8 μg folacin, 10.6 mg iron, and 605 mg calcium. Group 3 estimated mean nutrient intake was 1,438 kcal, 58.1 g total fat, 1.0 mg vitamin B_6, 168.9 μg folacin, 9.8 mg iron, and 541 mg calcium. The estimated nutrient intakes were significantly less for food insufficient groups compared to the other two groups ($p<.01$). Even when socioeconomic variables were controlled for, food insufficiency lowered nutrient intake of all nutrients.

Kendall et al. (1996) classified 193 women by food security status using the 10-item Radimer/Cornell measure. Security status was then compared to fruit and vegetable consumption and household food inventory. The food secure group (n=90) consumed significantly more fruit, salad, carrot, and potato servings per week than the household insecure group (n=50) and the individual insecure group (n=33) ($p<.001$). The food secure group had significantly more household stores of dairy, meat, grains, fruits, and vegetables than the household insecure group and the individual insecure group ($p<.001$).

Tarasuk and Beaton (1999) collected three, 24-hour food recalls from 193 women aged 19-45 years old who received emergency food relief. The 24-hour food recalls were collected during all four weeks of the month. Food security status was determined using the 6-item CFSM. Households with no hunger evident (n=62) consumed significantly more energy than food insecure households with moderate hunger (n=52) and food insecure with severe hunger (n=31) ($p<.05$). Women in households reporting hunger over the past 30 days had significantly lower estimated mean intake of energy, total fat, folate, calcium, and iron compared to women in households reporting no hunger over the past 30

days ($p \leq 0.05$). Tarasuk and Beaton (1999) concluded that food insecure households consumed less than food secure households.

Food Resource Augmentation and Allocation Behaviors

Food Resource Augmentation Behaviors (FRAB) are defined as the behaviors that allow a low-income person to acquire food in socially acceptable ways to prevent food insufficiency and insecurity. FRAB may also be referred to as coping behaviors (Hamilton et al., 1997).

Augmentation

Radimer et al. (1992) studied the coping tactics used by women when experiencing food anxiety. A convenience sample was taken of 189 women participating in food pantries, community centers, WIC, summer lunch program sites, and well-baby clinics. These sites were used because women who had experienced hunger were likely to be present.

The subjects used two coping tactics. The first tactic used was buying more inexpensive foods and making inexpensive meals. The second coping tactic was the restriction of food intake by women. These tactics allowed the household to avert food depletion and insufficient intake, and disrupted eating patterns for individuals in the households. However, these tactics upset normal

household eating behaviors and sometimes led to compromised food quality. Radimer et al. (1992) indicated that the use of such coping tactics could produce emotional manifestations and physical sensations.

Hamelin et al. (1999) indicated that 77 out of the 98 households in their study were food insecure. Fifty out of 98 households had to change their eating patterns by making meals that were less complete or balanced in their opinion when food insecurity was present. Twenty of the food insecure respondents indicated that disrupted household dynamics were present (parent-child relation and deviant behavior). The most common disrupted household dynamic occurred in their parent-child relations (e.g., irritability; anger; parents less available due to the increased time required to procure food; conversation gap with children because parents are not able to face their incapacity to feed them adequately). These respondents reported that they had experienced deviant behavior (e.g., hording food), "pernicious practices", (e.g., relying on others or relying on credit to eat, that created dependency), the "regular use of food pantries", and "obligated means" (e.g., borrowed money for food, selling personal belongings), parents depriving themselves to feed their children, going to usurers, poaching animals, or stealing.

In a review by Mullis et al. (1998), it was indicated that low-income families continually find themselves in circumstances where the ability to obtain food was low because of their inability to travel beyond their living situations. Those who lived in urban and suburban areas had access to food outlets, manufacturers' warehouses, day-old stores, and other alternative food suppliers. In general,

these stores participated in the FSP. If the store mandated that a membership be acquired, it discouraged the participation of low-income families. If the families cannot afford membership, they may not have had the capacity to manage the cost of the bulk merchandise, nor the storage facilities to securely keep the food from becoming unsafe to consume. The ability to store foods greatly influenced the kinds of foods purchased and consumed (Mullis et al., 1998). Similar cost-saving programs have been put into place by major supermarkets, for example a discount card (at no cost to the customer) or "buy in bulk" merchandising, but these supermarkets have vacated the inner cities (Mullis et al., 1998).

Rural low-income families would hunt and fish, and have a garden to increase their food supply (Mullis et al., 1998). These supplemental foods may later be canned, dehydrated, or frozen for later use. Nonetheless, these preparation and storage methods demand time and knowledge.

Mullis et al. (1998) revealed that low-income shoppers do not engage in conventional cost-saving behaviors such as list-making, using coupons, stocking up when items were on sale, and comparison shopping. Mullis et al. (1998) indicated that low-income households might not perform these activities because they do not have the immediate cash to participate in them. Dinkins (1997) reported similar findings about list-making, using coupons, stocking up when items were on sale, and comparison shopping.

Mullis et al. (1998) reported that low-income families chose to shop in markets where their traditional cultural foods were present and their cultural

festivals were observed instead of in stores where their total food costs may be lower. Allegiance to the market owner due to ethnicity may also be a factor in where low-income families choose to shop.

Understanding the Food Choices of Low Income Families was a focus group project with food stamp program participants to gain insight into the attitudes, perceptions, and beliefs about food choices and healthy eating (Bradbard et al., 1997). Black respondents indicated they did their shopping once a month at a major supermarket after receiving their FS. Once a month shopping behavior caused the respondents to feel that they were restricted in their capacity to purchase a low-cost diet. Respondents felt that supermarkets had higher prices at the time food stamps were received and that they were "locked into" a buying cycle because food stamps were received only once a month (Bradbard et al., 1997). Ethnic and cultural traditions and family member preferences were indicated to more likely affect the foods purchased by blacks and Hispanics, especially when it concerned buying meat. Bradbard et al. (1997) concluded that these low-income shoppers are savvy, but are burdened by time constraints, which may cause them to buy convenience foods.

Lutz et al. (1996) reviewed the results from the USDA's Nationwide Food Consumption Survey (1987-1988). Low-income households spent less total income on fresh fruits, fresh vegetables, dairy products, red meat, flours and cereals, and sugars and sweets than the general population. Low-income households spent more total income on eggs, which when combined with data on flours and cereals may indicate that they make more things "from scratch" than

the general population. Lutz et al. (1996) concluded that low-income households tend to purchase cheaper food items to save money when their finances are limited, but this causes them to endanger their diets nutritional quality.

Measuring Proportional Food Piling

Onnela (1998) used proportional piling as a method to assess food distribution in terms of overall consumption rather than specific food categories in 11 women in Ethiopia. Proportional piling was performed using local materials such as twigs or berries to indicate expenditure and income used to acquire perishable goods and the amounts of those goods that would be distributed to individual members of their households. It was indicated that fathers seemed to receive the largest amount of food (Onnela, 1998). However, no data or other results could be found from Onnela (1998) or other researchers using this method.

CHAPTER THREE

METHODOLOGY

The first purpose of this study was to determine if nutrient intake and food insufficiency differ for low-income women receiving food stamps compared to those not receiving food stamps in the nutrient intake phase. The second purpose of this study was to determine the food resource augmentation and allocation practices of low-income women receiving food assistance with differing degrees of food security in the Food Resource Augmentation Behaviors (FRAB) phase.

Overall Design of the Study

A descriptive research design was used for both phases of this study. During the first phase (nutrient intake phase) of the present study, three 1-day food records and one 24-hour food recall were administered within a period of one week. Nutrient intakes were compared between food stamp and non-food stamp recipients while nutrient intake of non-food stamp recipients was compared by time of the month (days 1-14 vs. days 15-31). Nutrients used in the comparisons included total calories, the percentage of calories from fat, grams of fat, folate, vitamin B_6, iron, and calcium. During the second phase (Food

Resource Augmentation Behaviors (FRAB)) of the study, the FRAB survey and the Family Food Distribution Activity (FFDA) were administered. These tools were used to compare food resource augmentation and allocation behaviors by food security status.

Selection of Subjects

Nutrient Intake Phase

One hundred and seventy-three women were invited to participate in the nutrient intake phase of the study. A convenience sample of one hundred and thirteen subjects completed the three 1-day food records and the 24-hour food recall. The sample consisted of women, ages 19-50, newly enrolled in Expanded Food and Nutrition Education Program (EFNEP) and Oklahoma Nutrition Education (ONE) programs from October 1998 through March 1999 in Tulsa, Oklahoma. Being enrolled in the EFNEP or ONE programs served as the inclusion criterion for the nutrient intake phase of the study. These women were invited to participate by the Nutrition Education Assistant (NEA). The current income criterion for the EFNEP and ONE program is a household that receives an income that is less than 130% of the poverty level (HHS Poverty Guidelines, 1999). Participants in the ONE program received food stamps or were food stamp eligible due to enrollment criteria in the ONE program. Exclusion criterion for the nutrient intake phase of the study was as follows. Men in the EFNEP and

ONE program were not invited to participate. Women who were pregnant or currently breast-feeding were excluded from participation. Women with developmental disabilities or who were unable to read were excluded. Subjects who were altering their normal diet due to medical conditions over the past three months were not invited to participate. Subjects in the first phase of this study signed a consent form before participating in this study (Appendix A). The Institutional Review Board at Oklahoma State University has approved all methodology (Appendix B).

Food Resource Augmentation Behaviors (FRAB) Phase

One hundred and twenty women were invited to participate in the FRAB phase of the present study. A convenience sample of 98 participants completed the FRAB survey. When the FRAB survey was administered to a group, the volunteers were asked to complete the FFDA. Thirty of the original 98 participants volunteered to complete the FFDA. Participants in the FRAB phase were participants in Women, Infants, and Children Nutrition Supplement Program (WIC); Food Stamps; Temporary Assistance for Needy Families (TANF); EFNEP and ONE programs; or Department of Human Services (DHS) food and economic programs such as cash benefits in Tulsa, Oklahoma. Women ages 19-66, were eligible for participation with income levels below 130% or 185% of the poverty level (HHS Poverty Guidelines, 1999, Wilde et al., 2000). Individuals with developmental disabilities or who were unable to read were excluded from

the FRAB phase. All subjects signed a consent form prior to participating in the study (Appendix C). The Institutional Review Board at Oklahoma State University approved all methodology (Appendix D).

Pilot Studies

Pilot Study for Nutrient Intake Phase

A pilot study of 32 subjects was conducted with EFNEP and ONE participants enrolled in the programs during the months of July and August 1998. The subjects were asked to complete three 1-day food records. Demographic information was obtained from the EFNEP enrollment form. Due to problems with accuracy and completeness of the three 1-day food records, more pre-instruction was needed for the subjects. Many of the participants failed to read the instruction booklet. Thus, when the food records were returned, the NEA asked questions of the participant to provide more detailed data. Questions asked included the preparation methods of foods, portion sizes of foods, missing foods, and the restaurant name, if applicable

Pilot Study for FRAB Phase

A pilot study of eight subjects was conducted with the NEAs and graduate students during December 2000. The subjects completed the FRAB survey and the FFDA. Subjects were asked to complete the survey and identify unclear and confusing questions on the survey that might be difficult for the present study's population to understand. Corrections were made to the survey based on the feedback for better readability and completeness of instructions.

Research Instruments

Nutrient Intake Phase

Spanish Translation. During the pilot study of the nutrient intake phase, a Spanish translation of the food diary and the consent form were developed using the method of back translation (Gans et al., 1999). A bilingual NEA first translated the Spanish version of the food diary booklet and consent form. Two researchers, a fellow graduate student, Marisla Contreras (a native of Venezuela) and an American student knowledgeable in the Spanish language rechecked the food diary and the consent form for translation consistencies. The bilingual NEA reviewed the food diary and the consent form again to make sure the subjects could understand the documents.

Enrollment Form. The enrollment form for the EFNEP or ONE programs was used in the nutrient intake phase of the present study (Appendix E). The form asked the participant the following demographic questions: age, sex, race, place of residence, total household income last month, number of other adults in the household (not counting the homemaker), number of children in the household (through age 19), receipt of WIC or CSFP benefits, food stamp participation, Food Distribution Program on Indian Reservation participation, commodities participation, Head Start participation, Child Nutrition participation, Temporary Assistance for Needy Families (TANF) participation, currently pregnant, currently breast feeding, currently taking nutritional supplements, amount of money spent on food last month. This information was used in this study to describe the sample. This form was not translated into Spanish because it is recorded in the presence of the paraprofessional.

Three 1-Day Food Records/Food Diary. The food diary served as the recording form for the three 1-day food records (Appendix F). The booklet contained directions about how to record the time of day that the food was consumed, how to describe the food, and record the amount of food consumed. Pictures of portion sizes were included in the booklet to assist when estimating food amounts. This booklet was translated into Spanish.

The 24-hour Food Recall. During the 24-hour food recall, the subject was asked about the foods and beverages consumed in the last 24-hours (Appendix G). The NEA conducted the 24-hour food recall with the subject at the time of enrollment into the EFNEP and ONE programs.

FRAB Phase

The FRAB Survey. The FRAB survey consisted of 36 questions that measured how low-income women acquire food and the behaviors they use to acquire that food. The questions were divided into seven sections. Questions 1-4 asked about income and the monetary assistance received by the participant. Question 5 measured food sufficiency. Questions 6-11 measured food security status. Question 12 asked about food resource augmentation and allocation behaviors performed by the participant. Question 13 asked about life events that had occurred to the participant or members of their household. Questions 14-23 asked about food purchasing activities performed. Questions 24-36 were demographic information (Appendix H).

Family Food Distribution Activity (FFDA)/Proportional Food Piling. The FFDA/proportional food piling was an activity used to determine how low-income women distributed food during meal planning activities for one day. As subjects completed the FRAB survey, they were asked to volunteer to complete the

FFDA. Thirty subjects completed the FFDA. Subjects were asked to list the members living in their household, age of the member, and the relation of the member to participant. Subjects were then asked to distribute 200 beans between all members of their household. Subjects were unaware of the number of beans. Subjects were asked to pretend that the beans were the amount of food they had to give to every member of their household for one day. Upon completion of the FFDA, the primary investigator counted the beans for each member of the household and recorded that number on to the FFDA form (Appendix I).

Food Sufficiency and Food Security Measures

Food Sufficiency Question 1

The first food sufficiency question was added to the FFQ in the nutrient intake phase of the present study (Bickel et al., 2000).

> Which of the following statements best describes the food eaten in your household (circle only one):
> a) enough of the kinds of food we want to eat
> b) enough but not always what we want to eat
> c) sometimes not enough to eat
> d) often not enough to eat

Subjects who responded a or b were classified as food sufficient. Subjects who responded c or d were classified as food insufficient (Rose and Oliveria, 1997, Briefel and Woteki, 1992).

Food Sufficiency Question 2

The food sufficiency question was included on the Community Nutrition Education Program (CNEP) survey and the FRAB survey. The CNEP survey was used in the EFNEP and ONE programs (Appendix J) to assess behavior changes (Keenan and Parmer, 1998). This question was used in the nutrient intake and FRAB phases of the study.

> How often do you run out of food before the end of the month? Check one of the following:
>
> a) Do Not Do
> b) Seldom
> c) Sometimes
> d) Most of the time
> e) Almost Always

Subjects that responded a or b were classified as food sufficient. Subjects that responded c, d, or e were classified as food insufficient (Keenan and Parmer, 1998). Keenan and Parmer (1998) conducted a telephone interview with Ruby Cox concerning the development of the CNEP survey It was indicated that the original survey was created using 1992 focus group research. The survey was pilot tested in 1993. The CNEP question used in the present study was from the third revision of the CNEP survey. However, practical problems were indicated with this question because survey subjects were verbally willing to admit to food insecurity issues, but they were unwilling to write it on the CNEP survey. Keenan indicated this to be true for program participants in New Jersey. It was indicated that no validity or reliability data was available on this CNEP question (Keenan and Parmer, 1998).

Core Food Security Module (CFSM) 6-Item Scale

The following set of questions measured food security in the FRAB phase of the present study (Bickel et al. 2000, Blumberg et al. 1999). The question numbers used here are the numbers used in the FRAB survey in the present study.

6) In the last 12 months, since (date 12 months ago), did you (or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food? Response: Yes or No.
[*If no, skip to 8*]
7) [*Ask only if #6 YES*] How often did this happen? Response: Almost every month, Some months but not every month, In only 1 or 2 months.
8) In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food? Response: Yes or No.
9) In the last 12 months, since (date 12 months ago), were your ever hungry but didn't eat because you couldn't afford enough food? Response: Yes or No.
10) "The food that [I/We] bought just didn't last, and [I/We] didn't have money to get more." often, sometimes, or never in the last 12 months. Response: Yes or No.
11) "[I/We] couldn't afford to eat balanced meals." Response: Was that often, sometimes, or never in the last 12 months.

An affirmative response for questions 6,8, and 9 was yes. An affirmative response for Question 7 was *almost every* and *some months*. An affirmative response for Questions 10 and 11 was *Often* and *sometimes*. Two or more affirmative responses indicated food insecurity; five or more affirmative responses indicated food insecurity with hunger (Blumberg et al., 1999).

Nutrient Intake Phase

Three 1-Day Food Records/Food Diary. Each paraprofessional (NEA) received the food diary booklet, was asked to review the booklet, and then practiced explaining the procedures to each other. Each NEA was asked to fill out the food record for the following day. The food diary was collected by the trainer and checked for completeness.

The 24-hour Food Recall. EFNEP and ONE paraprofessionals attended a one-hour training session conducted by a nutrition professional on how to conduct a 24-hour food recall. This training module was developed by the Oklahoma State University Cooperative Extension Service (Joyce and Williams, 1997).

Paraprofessionals practiced asking each other open-ended questions and obtaining information to accurately record a 24-hour food recall. Every paraprofessional practiced with a partner to complete a 24-hour food recall. A list of commonly forgotten foods was given to each paraprofessional to aid their memory (Briefel et al., 1997). This list of commonly forgotten foods included crackers, breads, rolls, tortillas, hot or cold cereals, added cheese, chips, candy, nuts, seeds, fruit eaten with meals or snacks, coffee, tea, soft drinks, juices, beer, wine, and any other drinks made with liquor. The 24-hour food recalls were

collected by the nutrition professional and reviewed for completeness. Completeness was defined as the proper identification of all types of food with preparation used, their brand name, condiments added, and with their accompanying portion sizes for the assessment of nutrient intakes (Cook, 2000).

Data Collection

Nutrient Intake Phase

Participants newly enrolled in the EFNEP or ONE programs were asked by the NEA to participate in the nutrient intake phase of this study. At this time, subjects completed an enrollment form (Appendix E) and signed a consent form (Appendix A) agreeing to participate in the study. The paraprofessional assisted the participant in completing the enrollment form. The 24-hour food recall was also completed at this time.

Then the NEA explained to the participant how to record their food intake for the next three days in the food diary booklet. The NEA used beanbag portion sizes of food and samples of drinking cups to explain small, medium, and large portions to aid the participant in recording food amounts. The NEA collected the food diary booklet from the subject at the next scheduled visit.

The NEA checked the food records to ensure that all foods and beverages were recorded with detailed portion sizes, food preparation techniques, and the ingredients in combination foods were listed. Each participant was given a

cookbook called "Simply Good Eating," from the Minnesota Extension Service (2000) as an incentive for completing the food measurement instruments.

FRAB Phase

In the FRAB phase of this study participants enrolled in WIC, Food Stamps, TANF, EFNEP, ONE program, or other DHS supplemental programs were asked to complete the FRAB survey. After completing the FRAB survey, participants were asked to volunteer to do the FFDA. Volunteers were randomly recruited until 30 participants completed the FFDA. The primary investigator assisted the participant with completing the FRAB survey and the FFDA if the participant had questions. Each participant was given a cookbook called "Simply Good Eating," from the Minnesota Extension Service (2000) as an incentive for completing the FRAB survey and the FFDA.

Analysis of Data

Nutrient Intake Phase

In the nutrient intake phase of this study Food Processor (V 7.2, ESHA, Salem, OR) was used to generate nutrients of interest from the three 1-day food records and the 24-hour food recall. Nutrients of interest included total calories, the percentage of calories from fat, grams of fat, folate, vitamin B_6, iron, and calcium.

Respondents who committed serious reporting errors on the three 1-day food were excluded from the data set. Serious reporting errors included a caloric intake in excess of 4,500 calories per day (Suitor et al., 1989), and unusually high amounts of calcium (≥2 standard deviations above the RDA).

FRAB Phase

From the FRAB phase, summing the responses to the 14-items in the life events question generated a life events score. Each yes response counted as one point; there was a possible minimum score of 0 and a maximum score of 14. The higher the score, the greater the number of disruptive life events had occurred in the past 12 months. Emergency foods purchased were determined by performing frequency counts on food items listed in response to Question 23. Qualitative analysis of the FFDA described the percent of the 200 beans that

were allotted to each family member. The FFDA was used to determine allocation practices of participants.

Statistical Analysis

Purpose

The first purpose of the present study was to determine the nutrient intake and food insufficiency status of low-income women receiving food stamps compared to those not receiving food stamps. The second purpose of the present study was to determine the Food Resource Augmentation Behaviors (FRAB) of food secure and food insecure low-income women.

Objectives and Hypothesis

Objective 1: To determine if the nutrient intake of low-income women differs due to food stamps participation.

Ho 1.1: Nutrient intake of low-income women will not differ by food stamp participation.

Objective 2: To determine if the nutrient intake of non-food stamp participants varies during the month (day 1-14 vs. 15-31).

Ho 2.1: Nutrient intake of non-food stamp participants will not vary during the month.

Objective 3: To determine if the perception of food insufficiency differs in low-income women due to food stamp participation.

Ho 3.1: The perception of food insufficiency will not differ in low-income women by food stamp participation.

Objective 4: To determine the association between different methods to measure food insufficiency/insecurity.

Ho 4.1: There will be no association between the two measures of food insufficiency.

Objective 5: To determine the food resource augmentation behaviors used by low-income women differs due to food security status.

Ho 5.1: There will be no significant difference in the types of emergency foods purchased by food security status.

Ho 5.2: There will be no difference in the number and kind of life events by food security status.

Ho 5.3: There will be no difference in behaviors conducted to save money by low-income women by food security status.

Ho 5.4: There will be no difference in food acquisition behaviors or sources of food by food security status.

Objective 6: To determine the food allocation distribution amounts to household members by low-income women.

Nutrient Intake Phase

Differences in estimated nutrient intakes of low-income women by food stamp participation were analyzed using independent two-tailed *t*-tests. Paired *t*-tests were used to determine the differences in nutrients of interest of low-income women who do not receive food stamps by time of month. Chi-square analyses were used to determine the differences in food insufficiency status of low-income women by food stamp participation. Chi-square analyses were used to determine the agreement of food sufficient classification of participants using the food insufficiency question on the FFQ (CSFII question) by the category of food insufficiency based on the insufficiency question from the CNEP survey.

FRAB Phase

Chi-square analyses were used to determine the agreement of food sufficient and food secure classification of participants using the CFSM 6-item scale on the FRAB survey by the category of food insufficiency based on the insufficiency question from the CNEP survey. Chi-square analyses were used to determine the differences in categorical data for the Food Resource Augmentation Behaviors (FRAB) used by low-income women and life events by food security status. Differences in continuous data for sources of food by food security status were analyzed using independent two-tailed *t*-tests. Frequency counts were performed on the types of emergency foods purchased and Chi-

square analyses were used to determine the difference in the types of emergency foods purchased by food security status. A qualitative analysis was performed to summarize the amount of food women allocated to themselves and household members.

CHAPTER FOUR

RESULTS

Introduction

The first purpose of the present study was to determine the nutrient intake and food sufficiency status of low-income women receiving food stamps. The second purpose of the present study was to determine the Food Resource Augmentation Behaviors (FRAB) of food secure and food insecure low-income women. The objectives of the present study were: 1) to determine if the nutrient intake of low-income women differs due to food stamp participation; 2) to determine if the nutrient intake of non-food stamp participants varies during the month; 3) to determine if the perception of food insufficiency differs in low-income women due to food stamp participation; 4) to determine the association between different methods to measure food sufficiency and security; 5) to determine if the food resource augmentation behaviors of low-income women differs due to food security status; and 6) to determine the food allocation distribution amounts to household members by low-income women.

Nutrient Intake Phase of the Study

Description of Participants

The participants of the present study were newly enrolled volunteer participants in the EFNEP and ONE programs in Tulsa County. One hundred and thirteen women of 173 women actually completed, the three 1-day food records and the 24-hour food recall. Forty-three participants refused to participate. A total of 17 participants were deleted from the nutrient intake data base due to one of the following reasons: estimated calcium value greater than three standard deviations or estimated caloric intake greater than 4,500 calories (Suitor et al., 1989).

Ages of the participants ranged from 19-50 years with a mean age of 31 ± 9 years (Table 1). The majority of participants were white or black. Participants resided mostly in a central city over 50,000. Mean household income was $528.76 ± $430.76 per month and the amount of money spent on food per month was $236.20 ± $112.11. The majority of participants were receiving food stamps and less than half were participating in Women, Infants, and Children Supplemental Nutrition Program (WIC) or Temporary Assistance for Needy Families (TANF). Over 50% of the participants reported 1 or 2 children living in the household and were part of a single parent household.

Food sufficiency status was determined by responses made to two sets of questions (Table 2). Seventy-four percent of the respondents were categorized

as food sufficient and 26% were categorized as food insufficient using the CSFII question, "Which of the following best describes the food eaten in your household?". Fifty-two percent were categorized as food sufficient and 48% were categorized food insufficient using the CNEP question, "How often do you run out of food before the end of the month?".

The three 1-day food records were merged with the 24-hour food recall to produce a total of four days of food records. The estimated mean nutrient intakes were total calories 1,686 kcal, calories from fat 614 kcal, fat 68 g, folate 261 μg, vitamin B_6 1.3 mg, iron 12 mg, and calcium 596 mg. Approximately a quarter of the participants had an estimated mean folate intake at or above the Estimated Average Requirement (EAR) of 320 μg. Over 60% of the participants had an estimated vitamin B_6 intake equal to or greater than the EAR of 1.1 mg. Over 80% of the participants had an estimated iron intake equal to or greater than the EAR of 8.1 mg. Approximately 11% of the participants had an estimated calcium intake equal to or greater than the Adequate Intake (AI) of 1000 mg. None of the participants estimated nutrient intake was above the Tolerable Upper Intake Level (UL) for these nutrients (Dietary Reference Intakes: Applications in Dietary Assessment, 2001).

Differences in Demographic Information, Estimated Nutrient Intake, and Food Sufficiency Status by Food Stamp Participation

The demographic characteristics of participants in the present study were compared by food stamp participation (Table 4). About forty percent of participants and non-participants in the food stamp program were white. Forty-two percent participated in the food stamp program of black participants compared to 21% who did not participate. Eighteen percent participated in the food stamp program of all other ethnic groups compared to 39% who did not. Blacks were significantly more likely to participate in the food stamp program compared to whites and all others ($p<.05$). As household income increased there was a smaller percent of food stamp participants and as income increased there was a greater percent of non-food stamp participants ($p<.05$). About Fifty-four percent of participants that participated in TANF also received food stamps compared to the 9% that did not receive food stamps ($p<.05$). Chi-square analyses were not conducted for several variables due to small cell numbers.

Seventy-seven of the respondents participated in the food stamp program and their estimated nutrient intake was compared to non-participants. Participants not participating in the food stamp program compared to food stamp participants consumed a significantly greater mean amount of calcium and folate (Table 5) ($p<0.05$). Approximately 25% of food stamp participants consumed estimated intake amounts that were equal to or above the EAR for folate compared to 33% of non-food stamp participants. Approximately 59% of food stamp participants consumed estimated intake amounts that were equal to or

above the EAR for vitamin B_6 compared to 73% of non-food stamp participants. Approximately 81% of food stamp participants consumed estimated intake amounts that were equal to or above the EAR for iron compared to 91% of non-food stamp participants. Significantly fewer of the food stamp participants (7% of participants) consumed estimated intake amounts that were equal to or above the AI for calcium compared to non-food stamp participants (21% of participants) ($p<.05$).

Estimated nutrient intake of 33 participants that were not receiving food stamps were analyzed by the time of the month they completed the four 1-day food records (Table 6). Participants that completed the food records during the last half of the month consumed a significantly greater estimated nutrient intake of total calories, percentage of calories from fat, and fat grams ($p<0.05$).

Two methods were used to categorize participants by food sufficiency status and differences due to food stamp participation was compared (Table 7). No differences were found for food sufficiency status based on food stamp participation.

Monthly Income and Money Spent on Food of Non-Food Stamp Participants by Time of Month Benefits Received

There was no difference in the total household income and money spent on food due to the time of month benefits were received of food stamp participants (Table 8)

Association Between Two Methods of Measuring Food Sufficiency

Chi-square analysis was used to measure agreement between the two methods of determining food sufficiency status (Table 9). The two methods did not categorize the participants the same, as there was a significant difference ($p<.05$). The agreement level was also poor at 60%. This means that the two methods are categorizing people differently.

FRAB Phase of the Study

Association Between Two Methods of Measuring Food Sufficiency and Security

Chi-square analysis was used to measure agreement between the two methods to determine food sufficiency and food security status (Table 10). The two methods did not categorize the participants the same, as there was a significant difference ($p<.05$). The agreement level was poor at 72%. This means that the two methods are categorizing people differently.

Description of Participants

One hundred and twenty women were invited to participate in the FRAB phase of the present study by recruiting at WIC and DHS sites. Fourteen women refused to participate. Two participants failed to return the FRAB survey. A total of 104 women actually completed the FRAB survey. Six participants were eliminated from the data set because they were less than 19 years of age. The final data set included 98 participants. Thirty of the original 104 women volunteered to complete the Family Food Distribution Activity (FFDA).

Ages of participants ranged from 19-66 years with a mean age of 30±10 years (Table 11). The majority of participants were white. Approximately a third resided in either central cities over 50,000 and in towns and cities 10,000-50,000. Over 55% of the participants participated in WIC and approximately a third received food stamps. The majority of the participants indicated having 1 or 2 children living in the household and almost half were from two adult households. A quarter of the participants were the only adult in the household. More than half of the participants had at least a high school education.

Over 55% of the participants were classified as food insufficient using the CNEP question and 52% were classified as food insecure using the 6-item Core Food Security Module (CFSM). The number of children by food secure and insecure households was not calculated. Participants had a mean life events score of 2.2, which means they experienced 2.2 life events in the last 12 months.

Emergency Foods Purchased

Ninety-eight of the participants listed the foods they would purchase if they only had $10.00 left to spend. The 10 foods listed most often were bread, milk (all types), meat (no specification), lunchmeat, vegetables, potatoes, pasta, eggs, beef, and cheese (Table 12). Foods listed in the other category were chips, cooking grease, snack for baby, pop, sugar, and butter.

Emergency food items were compared by food security status using Chi-square analyses for 98 participants. Significantly more food secure participants stated they would purchase vegetables as an emergency food than food insecure participants ($p=.002$) (Table 13). Chi-square analyses could not be conducted for juice, peanut butter, oatmeal, canned goods, flour, pork and ham, soup, salad, and crackers due to small cell numbers.

Monthly Income and Money Spent on Food Compared by Food Stamp Participation

The mean household income was significantly less per month for participants that were receiving food stamps compared to those not receiving food stamps ($p<0.05$) (Table 14). The mean amount of money spent on food per month was not significantly different for participants that were receiving food stamps compared to those not receiving food stamps.

Time of Month Wages or Assistance Program Benefits Received

Seventy-one percent of the participants received their wages bi-weekly or weekly (Table 15). The majority of the participants that received their wages once a month received them during the first half of the month. The receiving of food stamps was evenly split over both times of the month and TANF was only received during the first half of the month.

Comparison of Demographic Characteristics of Participants and Life Events by Food Security Status

The demographic characteristics were compared by food security status (Table 16). Significantly more food secure participants participated in WIC and were married than food insecure participants ($p<0.05$). Significantly more food insecure participants received food stamps than food secure participants ($p<0.05$). Chi-square analyses could not be conducted for Food Distribution Program on Indian Reservation (FDPIR), commodities, other food assistance programs, Head Start, EFNEP, TANF, and pregnancy due to small cell numbers. Food insecure participants had a significantly higher life events score than food secure participants ($p<0.05$).

Each life event was compared by food security status (Table 17). Food insecure participants were significantly more likely to have lost a job and experienced depression/anxiety than food secure participants ($p<0.05$). Chi-

square analyses were not conducted for marriage, divorce, death of a spouse, death of a parent, death of a child, or a life threatening illness diagnosed due to small cell numbers.

<u>Food Resource Augmentation Behaviors (FRAB) and Eating Out Practices Compared by Food Security Status</u>

FRAB were compared for differences in food security status using Chi-square analyses for all subject (Table 18). Significantly more of the food insecure participants performed the following FRAB: put off paying bills to have enough money to buy food; got or borrowed money from friends or relatives; got emergency food from church, food pantry, or food bank; sent or took children to friends or relatives for a meal; got or borrowed food from friends or relatives; bought generic or store food brands; made meals that were more inexpensive by increasing amount of cheaper foods and decreasing the amount of expensive foods; bought fewer convenience foods; bought less fruit; bought less vegetables; bought less milk; and bought less bread than food secure participants ($p<0.05$). Chi-square analyses could not be conducted for ate meals at a soup kitchen due to small cell numbers.

FRAB and other eating out practices were compared for differences in food security status (Table 19). No statistical significance was found for where food was usually bought (type of grocery store) and if the participants had eaten or been given food from a grocery store or restaurant that could no longer be

sold in the store or restaurant but the subject could still eat it. Chi-square analyses could not be conducted for hunting, fishing, and gardening due to small cell numbers. Food secure participants ate at a sit down restaurant significantly more times per month than food insecure participants ($p<0.05$).

Food Allocation Distributions to Household Members of Food Secure and Insecure Households

Table 20 summarizes the food allocation distributions of 17 food secure households by completing the Family Food Distribution Activity (FFDA). In general children in food secure households received a greater percentage of beans distributed to them than adults in food secure households in every household type. However, as the number of adults increased and number of children increased the individual child's percentage of beans decreased. Both the one adult household with one child and the one adult household with two children distributed a greater percentage of beans to their children rather than themselves. Two adult households with one child and with four children distributed a lower percentage of beans to themselves and a higher percentage to the second adult. The two adult households with five children did not distribute beans to either adult.

Table 21 summarizes the food allocation distributions of 13 food insecure households. In general, adults in food insecure households received a greater percentage of beans distributed to them than children in their household for all

household types. However, as the number of household members increased the individual child's average percentage of beans decreased. In two adult households, the second adult member of the household received a greater percentage of beans. This was not the case for households with one child. In the household with three adults and one child, the first and third adult received a similar percentage of beans with the second adult receiving slightly more, but the child still received the greatest percentage of beans. In the household with three adults and two children, the second adult received the lowest percentage of beans distributed and the greatest percentage distributed to the children followed by the first adult and then the third adult.

Summary of Findings

Estimated nutrient intakes for nutrients of interest were determined using four 1-day food records. Participants not participating in the food stamp program consumed significantly higher estimated mean intakes of calcium and folate. When the food records were compared for differences by time of month for non-food stamp participants, it was found that the estimated energy, energy from fat, and fat intake were consumed at a significantly higher level in the second half of the month.

No differences were found in estimated nutrient intakes for nutrients of interest in food stamp participants by food sufficiency status. Overall agreements for the two methods used to assess food sufficiency and security status were

poor, but statistically significant in both phases of the study. This indicates that the two methods were classifying participants differently.

Food secure participants said they would buy vegetables significantly more often as an emergency food than food insecure participants. Food insecure participants experienced at least two life events in the last 12 months and significantly more depression/anxiety and job loss than food secure participants. Food insecure participants performed significantly more FRAB in order to save money compared to food secure participants. Food secure participants ate significantly more times per month at a sit down restaurant compared to food insecure participants.

A qualitative analysis of the FFDA indicated that children in food secure households received a greater percentage of beans distributed to them, but as the number of adults increased and the number of children increased the individual child's percentage of beans decreased. However, in food insecure households adults received a greater percentage of beans distributed to them and the second adult listed generally received a greater percentage of beans. As the number of household members increased the individual child's average percentage of beans decreased.

Table 1. Demographic characteristics of low-income women in the nutrient intake phase of the study. (N=113)

Demographic characteristics	n	%
Age		
19-25	35	31.8
26-35	38	34.5
36-50	37	33.3
Ethnic group		
White (non-Hispanic)	44	39.6
Black (non-Hispanic)	40	36.0
Am Indian/Alaskan Native	7	6.3
Hispanic	18	16.2
Asian/Pacific Islander	2	1.8
Place of Residence		
Central cities over 50,000	85	82.5
Suburbs over 50,000	3	2.9
Towns and Cities 10,000-50,000	4	3.9
Towns under 10,000 and rural	11	10.7
Household income last month[1]		
$0-290	34	31.8
$292-790	41	37.8
$800-1500	32	25.3
Food assistance programs		
Women, Infants, and Children (WIC)	51	45.5[1]
Food stamps	78	69.6
Food Distribution Program on Indian Reservation (FDPIR)	2	1.8
Commodities	1	0.9
Child Nutrition	15	13.4
Other food assistance programs	37	33.1
Education and assistance programs		
Head start	0	0.0[1]
Temporary Assistance for Needy Families (TANF)	45	40.2
Number of children through age 19		
0	2	1.9
1	32	29.6
2	45	41.7
3	16	14.8
4	9	8.3
5	3	2.8
6	1	0.9

Table 1. Continued.

Demographic characteristics	n	%
Number of other adults in household		
0	55	52.4
1	42	40.0
2	6	5.7
3	2	1.9
Pregnant	2	1.9
Breast-Feeding	1	1.0
Money spent on food last month		
$0-180	29	31.2
$200-280	31	33.6
$300-600	33	35.9
Taking nutritional supplements	5	6.1

[1]Percentages will not total to 100% because respondents participate in multiple programs.

Table 2. Food sufficiency status of low-income women based on response to food sufficiency questions in the nutrient intake phase of the study. (N=106-112)

Food sufficiency category	n	%
CSFII question, "Which of the following best describes the food eaten in your household?"		
Food sufficient	78	73.6
Food insufficient	28	26.4
CNEP question, "How often do you run out of food before the end of the month?"		
Food sufficient	58	51.8
Food insufficient	54	48.2

Table 3. Estimated mean nutrient intake of low-income women in the nutrient intake phase of the study. (N=110)

Nutrient	Mean	SD[1]
Energy (Kcal)	1686	508
Energy from fat (Kcal)	614	199
Fat (g)	68	22
Folate (µg)	261	112
Vitamin B_6 (mg)	1.3	0.5
Iron (mg)	12	5
Calcium (mg)	596	268
Participants estimated intake equal to or above EAR[2]	n	%
Folate (µg)	30	27.3
Vitamin B_6 (mg)	68	63.0
Iron (mg)	91	84.3
Participants estimated intake equal to or greater than AI[3]		
Calcium (mg)	12	10.9

[1]Standard Deviation.
[2]Estimated Average Requirement.
[3]Adequate Intake.

Table 4. Demographic characteristics of low-income women by food stamp participation in the nutrient intake phase of the study. (N=113)

Demographic characteristics	Food stamp participation			
	Yes		No	
	n	%	n	%
Age				
19-25	22	28.2	13	40.6
26-35	28	35.9	10	31.3
36-50	28	35.9	9	28.1
p	.438			
Ethnic group				
White (non-Hispanic)	31	39.7	13	39.4
Black (non-Hispanic)	33	42.3	7	21.2
All others[2]	14	17.9	13	39.4
p	.027			
Place of Residence[1]				
Central cities over 50,000	60	85.7	25	75.8
Suburbs over 50,000	1	1.4	2	6.1
Towns and Cities 10,000-50,000	3	4.3	1	3.0
Towns under 10,000 and rural	6	8.6	5	15.2
Household income last month				
$0-290	31	42.5	3	8.8
$292-790	32	43.8	9	26.5
$800-1500	10	13.7	22	64.7
p	.000			
Food assistance programs				
Women, Infants, and Children (WIC)	38	48.7	13	38.2
p	.306			
Food Distribution Program on Indian Reservation (FDPIR)[1]	0	0.0	2	5.9
Commodities[1]	0	0.0	1	2.9
Child Nutrition	10	12.8	5	14.7
p	.788			
Temporary Assistance for Needy Families (TANF)	42	53.8	3	8.8
p	.000			
Number of children per household through age 19[1]				
0	0	0.0	2	6.1
1	22	29.3	10	30.3
2	29	39.0	16	48.5
3	12	16.0	4	12.1
4	8	11.0	1	3.0
5	3	4.0	0	0.0
6	1	1.3	0	0.0

Table 4. Continued.

Demographic characteristics	Food stamp participation			
	Yes		No	
	n	%	n	%
Number of other adults in household[1]				
0	48	68.0	7	21.0
1	19	27.0	23	68.0
2	3	4.2	3	9.0
3	1	1.4	1	3.0
Pregnant[1]	0	0.0	2	6.5
Breast-Feeding[1]	0	0.0	1	3.3
Money spent on food last month				
$0-180	19	30.2	10	33.3
$200-280	20	31.7	11	36.7
$300-600	24	38.1	9	30.0
p	.745			
Taking nutritional supplements[1]	3	5.4	2	7.7

[1]Chi-square analysis was not conducted due to small cell numbers.
[2]Am Indian/Alaskan Native/ Hispanic/Asian/Pacific Islander.

Table 5. Estimated mean nutrient intake of low-income women by food stamp participation in the nutrient intake phase of the study. (N=110)

Nutrient	Food stamp participation			
	Yes (n=77)		No (n=33)	
	Mean	SD[1]	Mean	SD[1]
Energy (Kcal)	1662	430[a]	1739	658[a]
Energy from fat (Kcal)	613	183[a]	613	234[a]
Fat (g)	68	20[a]	68	25[a]
Folate (μg)	243	105[a]	302	117[b]
Vitamin B_6 (mg)	1.3	0.5[a]	1.4	0.5[a]
Iron (mg)	12	5[a]	12	5[a]
Calcium (mg)	553	235[a]	696	312[b]
Participants estimated intake equal to or greater than EAR[2]	n	%	n	%
Folate (μg)	19	24.7	11	33.3
p	.350			
Vitamin B_6 (mg)	44	58.7	24	72.7
p	.163			
Iron (mg)	61	81.3	30	90.9
p	.208			
Participants estimated intake equal to or greater than AI[3]				
Calcium (mg)	5	6.5	7	21.2
p	.023			

[1]Standard Deviation.
[2]Estimated Average Requirement.
[3]Adequate Intake.
[a]Means in a row with different superscripts are significantly different by food stamp participation using independent two-tailed *t*-test ($p<0.05$).

Table 6. Estimated mean nutrient intake of non-food stamp participants by time of the month in the nutrient intake phase of the study. (N=33)

Nutrient	Time of month			
	Days 1-14 (n=14)		Days 15-31 (n=19)	
	Mean	SD[1]	Mean	SD[1]
Energy (Kcal)	1461	444[a]	1943	724[b]
Energy from fat (Kcal)	501	177[a]	696	240[b]
Fat (g)	55	19[a]	77	26[b]
Folate (μg)	259	74[a]	334	134[a]
Vitamin B_6 (mg)	1.3	0.4[a]	1.5	0.5[a]
Iron (mg)	10	3[a]	14	6[a]
Calcium (mg)	650	235[a]	730	361[a]

[1]Standard Deviation.
[a]Means in a row with different superscripts are significantly different by time of month using independent two-tailed t-test ($p<0.05$).

Table 7. Food sufficiency status of low-income women based on response to food sufficiency questions and food stamp participation in the nutrient intake phase of the study. (N=106-112)

Food Sufficiency Status	Food stamp participation			
	Yes		No	
	n	%	n	%
CSFII question, "Which of the following best describes the food eaten in your household?"				
Food sufficient	53	71.6	25	78.1
Food insufficient	21	28.4	7	21.9
p	.486			
CNEP question, "How often do you run out of food before the end of the month?"				
Food sufficient	42	53.8	16	47.1
Food insufficient	36	46.2	18	52.9
p	.509			

Table 8. Monthly income and money spent on food of low-income women participating in food stamp program by time of month benefits are received in the nutrient intake phase of the study. (N=34).

Money	Time of month			
	Days 1-14 (n=14)		Days 15-31 (n=16-20)	
	Mean	SD[1]	Mean	SD[1]
Total household income last month ($)	764.86	492.62[2]	970.00	429.65
Money spent on food last month ($)	213.07	105.31	223.13	130.28

[1]Standard Deviation.
[2]Means in a row are not significantly different by group using independent two-tailed *t*-test ($p<0.05$).

Table 9. Association between two methods of measuring food sufficiency in the nutrient intake phase of the study. (N=106)

	CSFII question, "Which of the following best describes the food eaten in your household?"			
	Food sufficient		Food insufficient	
	n	%	n	%
CNEP question, "How often do you run out of food before the end of the month?"				
Food sufficient	44	56.4	34	43.6
Food insufficient	8	28.6	20	71.4
p	.011			
Agreement level	60%			

Table 10. Association between two methods of measuring food sufficiency and security in the FRAB phase of the study. (N=89)

	CFSM 6-item scale			
	Food secure		Food insecure	
	n	%	n	%
CNEP question, "How often do you run out of food before the end of the month?"				
Food sufficient	28	66.7	11	23.4
Food insufficient	14	33.3	36	76.5
p	.000			
Agreement level	72%			

Table 11. Demographic characteristics of low-income women in the FRAB phase of the study. (N=98)

Demographic characteristics	n	%
Age		
19-24	32	34.0
25-31	33	35.1
32-66	29	31.3
Ethnic group		
White (non-Hispanic)	48	50.5
Black (non-Hispanic)	28	29.5
Am Indian/Alaskan Native	12	12.6
Hispanic	5	5.3
Asian/Pacific Islander	1	1.1
Place of residence		
Central cities over 50,000	33	36.3
Suburbs over 50,000	8	8.8
Towns and cities 10,000-50,000	38	41.8
Towns under 10,000 and rural	12	13.2
Food assistance programs		
Women, Infants, and Children (WIC) (n=87)	56	64.4
Food stamp (n=88)	32	36.4
Food Distribution Program on Indian Reservation (FDPIR) (n=85)	1	1.2
Commodities (n=85)	4	4.7
Other food assistance	4	4.5
Education and assistance programs		
Head start (n=86)	4	4.7
Expanded Food and Nutrition Education Program (EFNEP) (n=84)	1	1.2
Temporary Assistance for Needy Families (TANF)	9	10.3
Number of households with 0 to 10 children (n=98 households)		
0	14	14.3
1	28	28.6
2	33	33.7
3	15	15.3
4	5	5.1
5	2	2.0
10	1	1.0

Table 11. Continued.

Demographic characteristics	n	%
Number of other adults in household (n=83)		
0	25	30.1
1	46	55.4
2	9	10.8
3	1	1.2
4	2	2.4
Education level (n=96)		
K-11	22	22.9
12th grade, no diploma	8	8.3
High school grad/equiv	35	36.5
One or more years of college, but no degree	15	15.6
Vo-tech or associate degree	12	12.5
Bachelor's degree	1	1.0
Some graduate school	3	3.1
Marital status (n=98)		
Married or living as married	32	43.8
Separated, divorced, or widowed	25	36.6
Never married	26	40.0
Pregnant	7	7.3
Breast feeding	0	0.0
Food sufficiency status based on CNEP question, "How often do you run out of food before the end of the month?" (n=96)		
Food sufficient	40	41.7
Food insufficient	56	58.4
Food security status of respondents based on CFSM 6-item scale (n=91)		
Food secure	44	48.4
Food insecure	47	51.6
Number of children in food secure or insecure households based on CFSM 6-item scale (n=174)		
Food secure	73	42.0
Food insecure	101	58.0
	Mean	SD[1]
Age (n=94)	29.9	9.6
Life events score (n=89)	2.2	1.7

[1]Standard Deviation.

Table 12. Number of respondents that listed foods they would buy if only had $10.00 left. (N=98)

Food item	n	%
Bread	59	64.1
Milk (all types)	45	48.9
Meat (no specification)	43	46.7
Lunch meat	31	33.7
Vegetables	21	22.8
Potatoes	20	21.7
Pasta	19	20.7
Eggs	19	20.7
Beef	19	20.7
Cheese	18	19.6
Dried beans	15	16.3
Rice	13	14.1
Fruit	11	12.0
Chicken	11	12.0
Cereal	10	10.9
Juice	9	9.8
Peanut butter	6	6.5
Oatmeal	5	5.4
Canned goods	4	4.3
Flour	3	3.3
Canned Fish	2	2.2
Pork and ham	2	2.2
Soup	2	2.2
Baby food	1	1.1
Salad	1	1.1
Crackers	1	1.1
Other[1]	7	7.6

[1]Other foods listed were: Chips (n=2), cooking grease (n=1), snack for baby (n=1), pop (n=1), sugar (n=1), and butter (n=1).

Table 13. Number of respondents that listed foods they would buy if only had $10.00 left by food security status. (N=98)

Food item	Food secure (n=44)		Food insecure (n=47)	
	n	%	n	%
Bread	28	66.7	28	62.2
p	.665			
Milk (all types)	23	54.8	21	46.7
p	.450			
Meat (no specification)	21	50.0	21	46.7
p	.756			
Lunch meat	15	35.7	14	31.1
p	.649			
Vegetables	15	35.7	4	8.9
p	.002			
Potatoes	11	26.2	9	20.0
p	.493			
Pasta	12	28.6	7	15.6
p	.142			
Eggs	9	21.4	9	20.0
p	.869			
Beef	11	26.2	7	15.6
p	.221			
Cheese	11	26.2	7	15.6
p	.221			
Dried beans	4	9.5	10	22.2
p	.107			
Rice	5	11.9	7	15.6
p	.622			
Fruit	6	14.3	4	8.9
p	.430			
Chicken	7	16.7	4	8.9
p	.275			
Cereal	5	11.9	5	11.1
p	.908			
Juice[1]	5	11.9	4	8.9
Peanut butter[1]	1	2.4	5	11.1
Oatmeal[1]	4	9.5	1	2.2
Canned goods[1]	3	7.1	1	2.2
Flour[1]	0	0.0	3	6.7
Canned Fish[1]	2	4.8	0	0.0
Pork and ham[1]	0	0.0	2	4.4
Soup[1]	2	4.8	0	0.0
Salad[1]	1	2.4	0	0.0
Crackers[1]	1	2.4	0	0.0

[1]Chi-square analysis was not conducted due to small cell numbers.

Table 14. Monthly income and money spent on food of low-income women by food stamp participation in the FRAB phase of the study. (N=34).

Money	Food stamp participation			
	Yes (n=28-29)		No (n=44)	
	Mean	SD[1]	Mean	SD[1]
Total household income last month ($)	341.48	443.95[a]	1,238.41	810.80[b]
Money spent on food last month ($)	222.96	149.62[a]	205.34	124.48[a]

[1]Standard Deviation.
[a]Means in a row with different superscripts are significantly different by group using independent two-tailed *t*-test ($p<0.05$).

Table 15. Time of month wages or assistance program benefits were received of low-income women in the FRAB phase of the study. (N=98).

Wages or assistance program	n	%
Time wages received (n=93)		
Weekly	29	31.2
Bi-weekly	38	40.9
Once a month	25	28.0
Wages received once a month (n=26)		
Days 1-14	21	80.8
Days 15-31	5	19.2
Food Stamps (n=36)		
Days 1-14	18	50.0
Days 15-31	18	50.0
TANF (n=8)		
Days 1-14	8	100.0

Table 16. Demographic characteristics of low-income women by food security status in the FRAB phase of the study. (N=98)

Demographic characteristics	Food secure		Food insecure	
	n	%	n	%
Age				
19-24	15	36.6	15	31.9
25-31	14	34.1	16	34.0
32-66	12	29.3	16	34.0
p	.862			
Ethnic group				
White (non-Hispanic)	22	52.4	26	55.3
Black (non-Hispanic)	13	31.0	14	29.8
All others[2]	7	16.7	7	14.9
p	.956			
Place of residence				
Central cities over 50,000	17	42.5	16	34.8
Suburbs over 50,000	4	10.0	4	8.7
Towns and cities 10,000-50,000	12	30.0	21	45.7
Towns under 10,000 and rural	7	17.5	5	10.9
p	.492			
Food assistance programs				
Women, Infants, and Children (WIC) (n=82)	30	75.0	21	50.0
p	.020			
Food stamp (n=83)	9	22.5	21	48.8
p	.013			
Food Distribution Program on Indian Reservation (FDPIR)[1] (n=81)	0	0.0	1	2.4
Commodities[1] (n=81)	2	5.0	2	4.9
Other food assistance[1]	1	2.6	3	6.7
Education and assistance programs				
Head start[1] (n=82)	0	0.0	4	9.5
Expanded Food and Nutrition Education Program (EFNEP)[1] (n=80)	1	2.6	0	0.0
Temporary Assistance for Needy Families (TANF)[1] (n=83)	2	5.0	6	14.0
Ages of children through age 19 present in households[3]				
<12 months	16	21.0	15	14.9
1-5 years	31	42.4	36	35.6
6-12 years	22	30.1	35	34.7
13-18 years	4	5.5	15	14.9

Table 16. Continued.

Demographic characteristics	Food secure		Food insecure	
	n	%	n	%
Number of other adults in household (n=83)				
No other adults in the household	10	25.6	15	36.6
Other adults in the household	29	74.4	26	63.4
p	.291			
Education level (n=96)				
K-12th grade, no diploma	10	23.3	17	36.2
Some college/vo-tech, trade school, or associate degree/bachelor's degree	19	44.2	16	34.0
Some graduate school	14	32.6	14	29.8
p	.387			
Marital status (n=98)				
Married	24	55.8	14	29.8
Not married	19	44.2	33	70.2
p	.013			
Pregnant[1]	2	5.0	5	10.6
	Food secure (n=41-44)		Food insecure (n=47)	
	Mean	SD[4]	Mean	SD[4]
Age (n=94)	29.4	9.4[a]	30.4	9.8[a]
Life events score (n=89)	1.8	1.5[a]	2.9	1.7[b]
Total number of children (n=91)	1.7	1.1[a]	2.1	1.6[a]

[1]Chi-square analysis was not conducted due to small cell numbers.
[2] Am Indian/Alaskan Native/Hispanic/Asian/Pacific Islander
[3]Chi-square analysis was not conducted due to database constraints
[4]Standard Deviation.
[a]Means in a row with different superscripts are significantly different using independent two-tailed *t*-test ($p<0.05$).

Table 17. Life events experienced by low-income women by food security status in the FRAB phase of the study. (N=98)

Life events	Food secure		Food insecure	
	n	%	n	%
Marriage[1] (n=87)				
Yes	6	14.0	2	4.5
No	37	86.0	42	95.5
Divorce[1] (n=87)				
Yes	0	0.0	5	11.4
No	43	100.0	39	88.5
Death of a spouse[1] (n=88)				
Yes	1	2.3	4	8.9
No	42	97.7	41	91.1
Death of a parent[1] (n=87)				
Yes	2	4.7	2	4.5
No	41	95.3	42	95.5
Death of a child[1] (n=87)				
Yes	1	2.3	0	0.0
No	42	97.7	44	100.0
Birth of a child (n=88)				
Yes	19	44.2	20	44.4
No	24	55.8	25	55.6
p	.981			
Loss of job (n=88)				
Yes	10	23.3	25	55.6
No	33	76.7	20	44.4
p	.002			
New job (n=89)				
Yes	9	20.9	13	28.3
No	34	76.7	33	71.7
p	.423			
Depression/anxiety (n=89)				
Yes	10	23.3	27	58.7
No	33	76.7	19	41.3
p	.001			
You were diagnosed with a life threatening illness[1] (n=86)				
Yes	1	2.3	4	9.3
No	42	97.7	39	90.7

Table 17. Continued.

Life events	Food secure		Food insecure	
	n	%	n	%
You were diagnosed with a chronic illness (for example high blood pressure or diabetes) (n=87)				
Yes	3	7.0	7	15.9
No	40	93.0	37	84.1
p	.192			
Family member(s) diagnosed with a life threatening illness (n=88)				
Yes	6	14.0	7	15.6
No	37	86.0	38	84.1
p	.832			
Family member(s) diagnosed with a chronic illness (for example high blood pressure or diabetes) (n=87)				
Yes	6	14.3	12	26.7
No	36	85.7	33	73.3
p	.154			
Loss of food assistance benefits, such as food stamps or WIC vouchers (n=87)				
Yes	4	9.5	9	20.0
No	38	90.5	36	80.0
p	.171			

[1]Chi-square analysis was not conducted due to small cell numbers.

Table 18. Food resource augmentation behaviors of low-income women by food security status in the FRAB phase of the study. (N=98)

Food resource augmentation behaviors	Food secure		Food insecure	
	n	%	n	%
Put off paying bills to have enough money to buy food (n=89)				
Yes	10	23.8	38	80.9
No	32	76.2	9	19.1
p	.000			
Got or borrowed money from friends or relatives (n=90)				
Yes	20	46.5	37	78.7
No	23	53.5	10	21.3
p	.002			
Ate meals at a soup kitchen[1] (n=85)				
Yes	1	2.4	3	7.0
No	41	97.6	40	93.0
Got emergency food from church, food pantry, or food bank (n=98)				
Yes	3	7.0	23	50.0
No	40	93.0	23	50.0
p	.000			
Sent or took children to friends or relatives for a meal (n=86)				
Yes	3	7.3	17	37.8
No	38	92.7	28	62.2
p	.001			
Got or borrowed food from friends or relatives (n=86)				
Yes	5	11.9	23	52.3
No	37	88.1	21	47.7
p	.000			
Shared food with others (n=83)				
Yes	12	30.0	19	44.2
No	28	70.0	24	55.8
p	.182			
Bought generic or store food brands (n=90)				
Yes	30	69.8	41	87.2
No	13	30.2	6	12.8
p	.043			

Table 18. Continued.

Food resource augmentation behaviors	Food secure		Food insecure	
	n	%	n	%
Made meals that were more inexpensive by increasing the amount of cheaper foods and decrease the amount of expensive foods (n=89)				
Yes	23	54.8	40	85.1
No	19	45.2	7	14.9
p	.002			
Bought fewer convenience foods (n=89)				
Yes	22	52.4	37	78.9
No	20	47.6	10	21.3
p	.009			
Bought less fruit (n=87)				
Yes	8	19.5	30	65.2
No	33	80.5	16	34.8
p	.000			
Bought less vegetables (n=87)				
Yes	2	4.9	21	45.7
No	39	95.1	25	54.3
p	.000			
Bought less milk (n=85)				
Yes	2	4.9	15	34.1
No	39	95.1	29	65.9
p	.001			
Bought less bread (n=85)				
Yes	3	7.5	14	31.1
No	37	92.5	31	68.9
p	.007			

[1]Chi-square analysis was not conducted due to small cell numbers.

Table 19. Food resource augmentation behaviors and eating out practices of low-income women as determined by food security status in the FRAB phase of the study. (N=98)

Food resource augmentation behaviors	Food secure		Food insecure	
	n	%	n	%
Where do you usually buy your food?				
Medium sized grocery store	18	47.4	25	67.6
Large multipurpose.	20	52.6	12	32.4
p	.077			
Hunting[1] (n=82)				
Yes	4	9.8	1	2.4
No	37	90.2	40	97.6
Fishing[1] (n=81)				
Yes	7	16.7	1	2.6
No	35	83.3	38	97.4
Gardening[1] (n=82)				
Yes	4	9.8	4	9.8
No	37	90.2	37	90.2
Have you eaten or been given food from a grocery store that could no longer be sold in the store but you could still eat it? (n=90)				
Yes	2	4.7	8	17.0
No	41	95.3	39	83.0
p	.062			
Have you eaten or been given food from a restaurant that was no longer able to sell the food in the restaurant but you could still eat it?[1](n=90)				
Yes	0	0.0	3	6.4
No	43	100.0	44	93.6
Restaurant types	Food secure (n=39-41)		Food insecure (n=40-45)	
	Mean[2]	SD[3]	Mean[2]	SD[3]
Number of times per month you typically eat at a fast food/deli restaurant.	3.9	4.3[a]	2.5	2.5[a]
Number of times per month you typically eat at a sit down restaurant.	1.6	1.6[a]	0.9	1.2[b]

Table 19. Continued.

Restaurant types	Food secure (n=39-41)		Food insecure (n=40-45)	
	Mean[2]	SD[3]	Mean[2]	SD[3]
Number of times per month you typically eat at a buffet/all you can eat restaurant.	1.0	1.4[a]	0.6	.07[a]

[1]Chi-square analysis was not conducted due to small cell numbers.
[2]Mean times per month.
[3]Standard Deviation.
[a]Means in a row with different superscripts are significantly different using independent two-tailed *t*-test ($p<0.05$).

Table 20. Food allocation distributions to household members by low-income women in food secure households in the FRAB phase of the study. (17 Households, N=60)

Number of Households	Description of Household	Self	Second Adult	1 to 3 Children	4 to 5 Children
1	One adult, no children	100.0%[1] n[a]=2			
1	One adult, one child r[b]= 27.5%-72.5%	27.5% n[a]=1		72.5% n[d]=1 r[c]=3 yrs.	
1	One adult, two children r[b]= 29.5%-37.5%	29.5% n[a]=1		35.2% n[e]=2 r[b]= 33.0%-37.5% r[c]=21 mos. -3.5 yrs.	

Table 20. Continued.

Number of Households	Description of Household	Self	Second Adult	1 to 3 Children	4 to 5 Children
4	Two adults, one child	21.5% n^a=4 r^b= 6.0%-87.0%	33.8% n^a=4 r^b= 7.0%-51.5%	44.8% n^a=4 r^b= 20.0%-87.0% r^c=7 mos.-1 yr.	
7	Two adults, two children	30.0% n^a=7 r^b= 20.0%-42.5%	23.7% n^a=7 r^b= 12.0%-33.0%	23.1% n^a=14 r^b= 11.5%-38.0% r^c=3mos.-17yrs.	
1	Two adults, four children	18.0% n^a=1 r^b= 10.0%-25.5%	25.5% n^a=1		14.1% n^a=4 r^b= 10.0%-21.5% r^c=6 mos.-11 yrs.
1	Two adults, five children	0.0% n^a=1 r^b= 0.0%-23.0%	0.0% n^a=1		20.0% n^a=5 r^b= 14.5%-23.0% r^c=2 yrs.-12 yrs.

[1]Mean of % beans distributed.
[a]Number of subjects in cell.
[b]Range of percent beans allocated
[c]Age range of children.

Table 21. Food allocation distributions to household members by low-income women in food insecure households in the FRAB phase of the study. (13 Households, N= 52)

Number of Households	Description of Household	Self	Second Adult	Third adult	1 to 3 Children	4 to 5 Children
2	One adult, one child	70.0%[1] n^a=2 r^b= 65.5%-74.5%			30.0% n^a=2 r^b= 25.5%-34.5% r^c=3 yrs. -4yrs.	
2	Two adults, one child	60.7% n^a=2 r^b= 23.5%-46.5%	34.7% n^a=2 r^b= 31.5%-38.0%		30.2% n^a=2 r^b= 15.5%-45.0% r^c=5 mos. -6 mos.	
3	Two adults, two children	24.5% n^a=3 r^b= 20.5%-30.5%	35.3% n^a=3 r^b= 24.5%-48.5%		20.0% n^a=6 r^b= 14.0%-30.0% r^c=1yr. -7 yrs.	
3	Two adults, three children	19.5% n^a=3 r^b= 11.5%-35.0%	24.6% n^a=3 r^b= 19.5%-27.5%		18.6% n^a=9 r^b= 5.0%-27.5% r^c=7 mos. -18 yrs.	

Table. 21 Continued.

Number of Households	Description of Household	Self	Second Adult	Third adult	1 to 3 Children	4 to 5 Children
1	Two adults, four children	17.5% n^a=1 r^b= 6.0%-27.5%	27.5% n^a=1			13.7% n^a=4 r^b= 6.0%-22.0% r^c=9 mos. -8 yrs.
1	Three adults, one child	18.5% n^a=1 r^b= 18.0%-41.5%	22.0% n^a=1	18.0% n^a=1	41.5% n^a=1 r^c=4 mos.	
1	Three adults, two children	47.0% n^a=1 r^b= 16.5%-51.0%	16.0% n^a=1	37.0% n^a=1	50.05% n^a=2 r^b= 50.0%-51.0% r^c= 21 mos. -26 mos.	

[1]Mean of % beans distributed.
[a]Number of subjects in cell.
[b]Range of percent beans allocated.
[c]Age range of children.

Table 22. Food allocation distributions in food secure households by deviation from normal distributions in the FRAB phase of the study. (17 households, N=60)

Number of Households	Expected Distribution %	Description of Household	Self	Second Adult	1 to 3 Children	4 to 5 Children
1	100.0	One adult, no children	0.0%[1]			
1	50.0	One adult, one child	-22.5%		22.5%	
1	33.3	One adult, two children	-3.8%		1.9%	
4	33.3	Two adults, One child	-11.8%	0.5%	11.5%	
7	25.0	Two adults, two children	5.0%	-1.3%	-1.9%	
1	16.7	Two adults, four children	-1.4%	8.9%		-2.5%
1	14.3	Two adults, five children	-14.3%	-14.2		5.7%

[1]Difference of actual distribution from expected distribution

Table 23. Food allocation distributions in food insecure households by deviation from normal distributions in the FRAB phase of the study. (13 households, N=52)

Number of Households	Expected Distribution %	Description of Household	Self	Second Adult	Third Adult	1 to 3 Children	4 to 5 Children
2	50.0	One adult, one child	20.0%[1]			-20.0%	
2	33.3	Two adults, one child	27.4%	1.4%		-3.1%	
3	25.0	Two adults, two children	-0.5%	10.3%		-5.0%	
3	20.0	Two adults, three children	0.5%	4.6%		-1.4%	
1	16.0	Two adults, four children	0.9%	10.9%			-2.9%.
1	25.0	Three adults, one child	7.0%	-3.0%	-7.0%	-16.5%	
1	20.0	Three adults, two children	27.0%	-4.0%	17.0%	30.1%	

[1]Difference of mean distribution from expected distribution.

Table 24. Null hypotheses reject or fail to reject summary.

Null hypotheses There will be no between variables below (1.1-5.4)	Fail to Reject HO	Reject HO
1.1[1]	[2]E, EF, F,VB_6, Fe	Fol, Ca
2.1	Fol, VB_6, Fe, Ca	E, EF, F
3.1[3]	[4]CSFII, CNEP	
4.1		CSFII ,CNEP, CSFM
5.1	[5]OV	Vegetables
5.2	[6]OV	#, D/A, JL
5.3	[7]OV	PF, GM, EFC, SC, GF, BG, MI, FC, LF, LV, LM, LB
5.4	[8]OV	SDR

[1] 1 1-2.1,5.4HO was determined from independent two-tailed t-test ($p<0.05$) on Tables 5, 6, and 19.

[2] E=Energy (Kcal), EF=Energy from fat (Kcal), F=Fat (g), Fol=Folate (µg), VB_6=Vitamin B6 (mg), Fe=Iron (mg), Ca=Calcium (mg).

[3] 3.1-5.4HO was determined from Chi-square analysis ($p<0.05$) on Tables 7, 9, 10, 13, 17, 18, and 19

[4] Food sufficiency and security status based on responses the CSFII question, CNEP question, or CFSM 6-item scale.

[5] OV=All other emergency food item variables on Table 13

[6] OV=All other life event variables, #=Total number of life events, D/A=Depression/Anxiety, JL=Job Loss on Table 17.

[7] OV=All other FRAB variables, PF=Put off paying bills to have enough money to buy food, GM=got or borrowed money from friends or relatives, EFC=got emergency food from church, food pantry, or food bank, SC=sent or took children to friends or relatives for a meal, GF=got or borrowed food from friends or relatives, BG=bought generic or store food brands, MI= made meals that were more inexpensive by increasing amount of cheaper foods and decreasing the amount of expensive foods, FC=bought fewer convenience foods, LF=bought less fruit, LV=bought less vegetables, LM=bought less milk, LB=bought less bread on Table 18

[8] OV=All other food acquisition behaviors or sources of food variables, SDR=number of times per month subject at a sit down restaurant on Table 19.

CHAPTER FIVE

DISCUSSION

Nutrient Intake Phase of the Study

Nutrient Comparisons by Food Stamp Participation

The purpose of the present study was to determine the nutrient intake and food sufficiency status of low-income women receiving food stamps. The four 1-day food records were used to compare the estimated nutrient intake differences between food stamp and non-food stamp participants. In the present study, only estimated calcium and folate intakes were significantly different due to food stamp participation (Table 5). Significantly fewer of the food stamp participants (7% of subjects) consumed estimated intake amounts that were equal to or above the AI for calcium compared to non-food stamp participants (21% of subjects) ($p<.05$). There were no significant differences in estimated nutrient intakes that were equal to or greater than the EAR for folate, vitamin B_6, and iron compared by food stamp participation. It is interesting that 91% of non-food stamp participants consumed estimated nutrient intake amounts that were equal to or greater than the EAR for iron. This may have been due to WIC participation, because WIC approved foods must be iron fortified. This may have been due to the fact that a greater percentage of food stamp participants have a

lower income than non-food stamp participants. The low-intake of calcium by food stamp participants may have been because they choose not to spend money or food stamps on items high in calcium such as dairy products. Whereas, participants receiving WIC vouchers can purchase approved dairy products. However, it must be noted that the EAR values used in the present study cannot be compared to the RDA values used in previous and older studies. This is because the EAR is a lower value than the RDA. The current RDA recommends the intakes of iron 18 mg/day, folate 400 μg/day, calcium 1000 mg/day, and vitamin B_6 1.3 mg/day. Peterkin et al. (1982) found that 627 food stamp households with food costs near their potential food stamp allotment level (90-109% of the allotment) consumed diets that met the 1974 RDA for iron (62% of households), calcium (43% of households), and vitamin B_6 (37% of households). However, it was also indicated that 417 out of 627 food stamp households did not consume 65% of 1974 RDA for calcium, iron, and vitamin B_6. Emmons (1986) indicated similar findings for 238 subjects participating in the food stamp program. Perkin et al. (1988) indicated that white food stamp subjects consumed mean intakes below the 1980 RDA for calcium (62% of the 1980 RDA) and iron (42% of the 1980 RDA). It was also indicated that black food stamp subjects consumed mean intakes below the 1980 RDA for calcium (59% of the 1980 RDA) and iron (42% of the 1980 RDA). The white and black food stamp participants consumed mean caloric intakes below the 2,000-kcal RDA (1,304 kcal and 1,176 kcal, respectively). Rose et al. (1998) found that food stamp participation increased the intake of iron in preschoolers by 1.2 mg/day to

a level that was 95.5% of the RDA. Estimated nutrient intakes for preschoolers participating in the food stamp program were found to be at 91% of the RDA for energy, 111% of the RDA for vitamin B_6, 328% of the RDA for folate, 35% of the RDA of percentage of energy from fat. Pérez-Escamilla et al. (2000) indicated that preschoolers participating in the food stamp program compared to non-participants consumed significantly higher mean intakes of vitamin B_6 (1.68 mg vs. 1.45 mg, respectively), folate (260.84 μg vs. 219.77 μg, respectively), and iron (16.96 mg vs. 14.40 mg, respectively)($p<0.05$). These significant differences indicated that food stamp participation increased nutrient intake in preschoolers.

Nutrient Comparisons by Time of Month

The estimated nutrient intake of non-food stamp participants was compared by the time of month. In the present study, estimated energy, energy from fat, and fat were consumed in significantly higher amounts in the second half of the month (Table 6). Two behaviors may explain this phenomena 1) less expensive higher fat foods were purchased, such as sausage, poor cuts of meat, and convenience foods, and 2) higher fat food preparation methods, such as frying and adding fat to nutrient dense foods were used; which increased fat and energy intake. These two behaviors may have been performed in an effort to stretch foods at a time of month when monetary resources were low. Starkey et al. (1999) indicated that week-to-week differences in energy intake were substantial for low-income food bank users. Calcium intake was significantly less

during the first and third weeks compared to the second and fourth weeks. However, this was not true for the present study because estimated nutrient intake for all nutrients of interest tended to be lower in the first half of the month compared to the last half of the month.

Food Sufficiency Status Comparisons by Food Stamp Participation

Two methods were used to categorize subjects by food sufficiency status and compared by food stamp participation (Table 7). No differences were found for food sufficiency status based on food stamp participation. Lee and Frongillo (2001) examined four groups of subjects: elderly food secure non-food stamp participants (FSNP), food insecure non-food stamp participants (FINP), food insecure food stamp participants (FIP), and food insecure non-food stamp participants (FINP). It was found that food insecure persons participated in food assistance programs more often than food secure persons. Participants in the food stamp program had comparable poorer nutrient intakes, nutritional risk, self-reported health status, hospitalization rates and mortality rates, and smaller skinfold thickness than non-participants. Elderly subjects were not assessed in the present study.

Association Between Two Methods of Measuring Food Sufficiency Status

When comparing the CNEP method to the CSFII method of measuring food insufficiency status the agreement level was only 60% (Table 9). The fact that there was a significant difference means the two methods are not categorizing subjects the same. This indicated the low validity of the CNEP method. The CSFII method has been highly validated (Briefel and Woteki, 1992, Rose and Oliveira 1997A, 1997B). Frongillo et al. (1997) indicated that the NHANES III (same question as CSFII) food insufficiency item's low sensitivity caused it to estimate a low prevalence of household food insufficiency. Keenan and Parmer (1998) conducted a telephone interview with Ruby Cox concerning the development of the CNEP survey and it was indicated that no validity or reliability data was collected on this CNEP question to measure food sufficiency.

Food Resource Augmentation Behaviors Phase of the Study

Association Between Two Methods of Measuring Food Sufficiency and Food Security Status

When comparing the CNEP food sufficiency method to the CFSM 6-item food security scale the agreement was only 72% (Table 10). The fact that there was a significant difference means the two methods are not classifying subjects the same. This indicated the low validity of the CNEP method. The CFSM 6-

item food security scale has been validated (Blumberg et al., 1999). Blumberg et al. (1999) indicated that the 6-item CFSM scale was sound for testing food security of general population households. Again there is no validity or reliability data for the CNEP question (Keenan and Parmer, 1998).

Emergency Food Purchase Comparisons by Food Security Status

The second purpose of the study was to determine the Food Resource Augmentation Behaviors (FRAB) of food secure and food insecure low-income women. Significantly more food secure subjects listed vegetables as an emergency food item compared to food insecure subjects (Table 13). The frequent listing of these items by food secure subjects may be explained by the fact that being food secure allows the individual to be comfortable enough to buy low-calorie items such as vegetables without risk of feeling hungry. Kendall et al. (1996) found that food secure subjects consumed significantly more servings of fruit, fruit juice, salad, carrot, and potato per week than the food insecure subjects. Food secure subjects had significantly more household stores of dairy, meat, grains, fruits, vegetables, and overall food groups compared to food insecure subjects. The present study meat, lunchmeat, vegetables, potatoes, and beef were listed most often in the top 10 emergency food items to be purchased by food secure and insecure subjects.

Life Event Comparisons by Food Security Status

Food insecure subjects experienced 2.9 life events in the last 12 months compared to the 1.8 life events of food secure subjects ($p<.05$) (Table 16). Food insecure subjects experienced significantly more depression/anxiety and job loss in the last 12 months than food secure subjects (Table 17). Depression/anxiety may have been more apparent in food insecure subjects due to job loss and the added stress of augmenting and allocating food for their families. This added stress might lead to disrupted household dynamics. Hamelin et al. (1999) indicated that food insecure subjects had a more disrupted household. Examples of disruptive events included parent-child relations, irritability, anger, parents less available to be with children due to the increased time required to procure food in a food insecure household, and conversation gap between children and parents because parents are not able to face their incapacity to feed them adequately.

FRAB Practiced to Save Money Comparisons by Food Security Status

Food insecure subjects were more likely to practice many of the food resource augmentation behaviors compared to the food secure participants (Table 18). These behaviors were probably performed in order to have more money for food, to make food go farther, or in the most severe cases to have food at all. The nature of these differences in FRAB performed by participants may have been determined by food security status. The findings of the present

study agree with the work by Radimer et al. (1992). Radimer et al. (1992) found that food insecure subjects bought inexpensive foods and made inexpensive meals. Radimer et al. (1992) also found that the use of such coping tactics could produce emotional manifestations such as depression, irritability, anger, and helplessness. A high level of depression/anxiety was found in the present study. Lutz et al. (1996) indicated that low-income households tend to purchase cheaper food items to save money when their finances are limited, but this causes them to endanger their diets nutritional quality. In the present study, food insecure subjects were significantly more likely than food secure subjects to have bought generic or store food brands and made meals that were less expensive by increasing the amount of cheaper foods and decreasing the amount of expensive foods.

Hamelin et al. (1999) noted that food insecure households had to change their eating patterns by making meals that were less complete or balanced in their opinion when food insecurity was present. Hamelin et al. (1999) respondents reported that they had experienced deviant behavior (e.g. hording food), "pernicious practices" (e.g., relying on others or relying on credit to eat, that created dependency), regularly used food pantries, and "obligated means" (e.g., borrowed money for food, selling personal belongings), parents depriving themselves to feed their children, going to usurers, poaching animals, and stealing. In the present study, food insecure subjects were significantly more likely to have put off paying bills to have enough money to buy food; got or borrowed money from friends or relatives; got emergency food from church, food

pantry, or food bank; sent or took children to friends or relatives for a meal; and or borrowed food from friends or relatives than food secure subjects.

However, Bradbard et al. (1997) noted that low-income shoppers are savvy, but are burdened by time constraints, which may cause them to buy convenience foods. However, in the present study food insecure subjects reported buying significantly fewer convenience foods compared to food secure subjects.

Food Acquisition Behaviors or Sources of Food Comparisons by Food Security Status

Other eating out practices were compared by food security status (Table 19). Food secure subjects ate significantly more times per month at a sit down restaurant compared to food insecure subjects. This may be due to food secure subjects having more money to allocate towards eating out in general. No significant differences were found between food secure and insecure subjects for where food was usually bought (type of grocery store) or when subjects ate in a fast food or buffet restaurant. This may have been caused by the participants difficultly in answering these questions. It may also have been caused by the participants' inability to change stores shopped at due to transportation and financial constrains. Participants may not have eaten at fast food or buffet type restaurants because they were to expensive to eat at or because they were not close to their homes.

Mullis et al. (1998) found that rural low-income families would hunt and fish, and have a garden to increase their food supply. These questions were asked in the present study, but Chi-square analyses were unable to be performed due to small cell numbers. However, the trend was the opposite in the present study. Food secure families tended to hunt and fish more compared to food insecure families. In general food insecure and secure families did not garden to increase their food supply.

Food Allocation Distributions to Household Members

A qualitative analysis was performed to summarize the food allocation distributions (FFDA) of beans representing food to household members by 30 low-income women. Typically children in food secure households received a greater percentage of beans distributed to them than adults in food secure households in every household type (Table 20). However, as the number of adults increased and number of children increased the individual child's percentage of beans decreased. In general, adults in food insecure households received a greater percentage of beans distributed to them than children in their household for all household types (Table 21). However, as the number of household members increased, the individual child's average percentage of beans decreased. Typically in two adult households, the second adult member of the household received a greater percentage of beans. Onnela (1998) indicated that fathers seemed to receive the largest amount of food. Results in

the present study reflected this in insecure households but not in the food secure households.

CHAPTER SIX

CONCLUSIONS

Hypothesis 1.1: Nutrient intake of low-income women will not differ due to food stamp participation. The null hypothesis was rejected for estimated folate and calcium intake.

Hypothesis 2.1: Nutrient intake of non-food stamp participants will not vary during the month. The null hypothesis was rejected for energy, energy from fat, and fat grams. These estimated nutrient intakes were consumed in lower amounts in the first half compared to the second half of the month in non-food stamp participants.

Hypothesis 3.1: The perception of food insufficiency will not differ in low-income women due to food stamp participation. The null hypothesis failed to be rejected.

Hypothesis 4.1: There will be no association between the two measures of food insufficiency. The null hypothesis was rejected. The associations between the two methods used in the nutrient intake and FRAB phases of the study were statistically significant and the agreement level was poor. This means the two methods are not categorizing the subjects in the same manner.

Hypothesis 5.1: There will be no significant difference in the types of emergency foods purchased due to food security status. The null hypothesis was rejected for vegetables. As shown in Table 13, significantly more food

secure subjects said they would purchase vegetables as an emergency food item than food insecure subjects. Emergency foods items that were listed in high frequency were bread, milk, meat (no specification), lunchmeat, vegetables, and potatoes.

Hypothesis 5.2: There will be no difference in the number and kind of life events due to food security status. The null hypothesis was rejected for total number of life events, experiencing depression/anxiety, and job loss.

Hypothesis 5.3: There will be no difference in behaviors conducted to save money by low-income women due to food security status. The null hypothesis was rejected for many behaviors. As shown in Table 18, food insecure subjects were significantly more like to have done the following behaviors in order to save money: put off paying bills to have enough money for food; got or borrowed money from friends or relatives; got emergency food from church, food pantry, or food bank; sent or took children to friends or relatives for a meal; got or borrowed food from friends or relatives; bought generic or store food brands; made meals that were more inexpensive by increasing amount of cheaper foods and decreasing the amount of expensive foods; bought fewer convenience foods; bought less fruit, bought less vegetables; bought less milk; and bought less bread compared to food secure subjects.

Hypothesis 5.4: There will be no difference in food acquisition behaviors or sources of food due to food security status. The null hypothesis was rejected for sit down restaurant.

The sixth objective of the present study was to identify the food allocation distribution amounts characteristic of food secure and food insecure households. The Family Food Distribution Activity (FFDA) indicated that children received a greater percentage of beans, but as the number of adults increased the individual child's percentage of beans decreased for both household types.

Implications

In this study we were able to identify differences in estimated nutrient intake in food stamp and non-food stamp participants. These results show the importance of recognizing that nutrient intakes differ by food stamp participation, and time of month for non-participants. This has implications for describing low-income women participating in the EFNEP and ONE programs in Tulsa County. Nutrition educators in the EFNEP and ONE programs need to be aware of the dietary patterns of low-income women participating in the food stamp program and those not participating and should use this information when assessing dietary outcomes and nutritional risk in these two groups before and after participation in community nutrition programs. Nutrition educators in public health need to recognize the differences in nutrient intakes by food stamp participation, food sufficiency status, and time of month dietary information is collected which will affect responses on dietary assessment instruments, and apply this knowledge to dietary changes. Women participating in the food stamp program tended to have lower intakes of calcium and folate implying that they

may need additional counseling on which foods are high in these nutrients. Food sufficiency status did not affect nutrient intake. However, it is important to note that the intakes were still low and that low-income women need nutrition education to increase nutrient intakes. Women not participating in the food stamp program tended to have higher intakes of estimated energy, energy from fat, and fat intake in the second half of the month implying that they may need education on moderation and event distribution of these nutrients through out the month.

The CNEP method for measuring food sufficiency does not classify participants the same as two validated methods, the CSFII method and the 6-item CFSM. The low validity of the CNEP method indicated that nutrition educators in the EFNEP and ONE programs may want to use another method for assessing food sufficiency status in their participants.

The results of the FRAB survey indicated significant differences by food security status in the FRAB used to save money, emergency foods purchased, and life events experienced by low-income women. The differences in FRAB used to save money and the emergency foods purchased implies that food security status affects the types of foods chosen by low-income women to feed their households. These results also imply that the number and kind of life events experienced by low-income women affect food security status. Nutrition educators should attach items concerning FRAB, emergency food purchases, and life events to their measure of food security status to assess this information. This information will give nutrition educators a better understanding of the client's

individual needs. It may be beneficial for nutrition educators to provide cooking classes to educate clients on recipes that are inexpensive to make and healthy. Nutrition educators may need to make their clients aware of employment, education, and counseling services offered through government, state, local, and church programs.

The results of the FFDA, showed that beans were distributed to the individual child considerably lessened as the number of household members increased and varies by food security status. These results imply that children's nutrient intake is strongly dependent upon the number of household members. Nutrition educators in public health need to recognize this when information assessing household, women's, and children's nutrient and food security status. Nutrition educators may need to educate women on the growth and development needs of their children. Nutrition educators may need to educate women the nutrient intake they need to maintain a health lifestyle.

Recommendations

Further research is necessary to more accurately determine how economic, demographic, social issues, psychological issues, FRAB, life events, and program participation affects food intake when combined with food sufficiency and security status. When conducting activities such as the FFDA (proportional food piling) it would be helpful to record comments made by the participants for additional qualitative data. It may also be helpful to use validated

measures such as the CSFII method and the CFSM 6-item food security scale to use as an outcome indicator for assessing program effectiveness.

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APPENDICES

APPENDIX A

CONSENT FORM FOR NUTRIENT INTAKE PHASE ENGLISH AND SPANISH

Consent Form
Validation of a Food Frequency Questionnaire

Oklahoma State University would like your help in a study, which would help us make recommendations for improving people's health. To do this we will need you to measure exactly how much food you eat for a period of 24 hours (one full day). We will ask you to do this three days in a row. We will use this information to develop a food behavior questionnaire that will help us determine what EFNEP participants need. We hope that we will be able to better serve you by collecting this information from you.

If you participate in the study, we will ask you to:

1. Fill out a form that asks you how often you eat certain foods.
2. Learn how to record the food that you eat. This will take about 20 minutes.
3. Record everything that you eat and drink from the time you wake up until the time you go to sleep for three days.
4. Allow a nutrition educator to visit your home so that she can help you with any problems that you might have when recording your foods.
5. The information collected in this study is confidential.

You will receive a cookbook at the end of the course

I understand that I may stop taking part in the study at any time and that there is no penalty for refusal to participate in this study.
I agree to take part in the study as described above: I sign it freely and voluntarily. A copy has been given to me.

(signed)_____ _____
Participant Date and Time

(signed)_____ _____
Witness Date and Time

If you have any questions you may contact Melanie Cook at telephone number (918) 746-3719, or you may contact Kathy Keim, 425 Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, telephone number (405) 744-5040. You may also contact Gay Clarkson at University Research Services, 203 Whitehurst, Oklahoma State University, Stillwater, OK 74078; Telephone: (405) 744-5700

Forma de Consentimiento

Cuestionario de Frecuencia de Comida

La Universidad del Estado de Oklahoma le brindará ayuda e información para mejorar su salud. Por lo tanto necesitamos que describas exactamente lo que comiste durante 24 horas(un dia completo). Necesitamos que hagas esto tres veces consecutivas, desarrollar un cuestionario sobre la comida. Esto nos servira para medir cambios. De este modo nosotros podremos servirte mejor, recibiendo la informaciòn completa de tus hàbitos alimenticios.

Si participas en este estudio, necesitamos que hagas lo siguiente.

1. Llena la forma de cada cuando comes y cada cuando tomas liquido.
2. Aprenderas como anotar la comida que injeriste. Esto dura como unos 20 minutos.
3. Anotar todo lo que comes y bebes desde que te levantas, por un periodo de 24 horas. Vas hacer esto tres veces.
4. Un maestra de nutriciòn visitará tu casa para ayudarte con cualquier problema que puedas tener anotando tus comidas .
5. Toda la informaciòn que usted nos brindará, será confidencial, aseguremos esto por medio de un código al solo usted tendra acceso, durante el estudio usaremos solamente su codigo

Recibiras un libro de recetas al terminar este curso.

Yo entiendo que mi parucipaciòn es voluntaria y que puedo dejarlo en cualquier momento.
No hay penalidad por dejar de participar en este curso.
Yo voluntariamente participé en este estudio descrito arriba: Yo firmo voluntariamente y obtenedré una copia de este certificado de curso.

(Firma)_____ _____

Participante Fecha y Hora

(Firma)_____ _____

Testigo Fecha y Hora

Si tienes alguna pregunta puedes llamar a Melanie Cook, el numero de telefono es (918) 746-3719. También a Kathy Keim, 425 HES, Department of Nutritional Sciences, Oklahoma State University,Stillwater OK 74078, telefono(405) 744-5040 Tambien puedes llamar Gay Clarkson a la University Reserch Services, 203 Whitehurst, Oklahoma State University, Stillwater,OK 74078, Telefono. (405) 744-5700

APPENDIX B

IRB APPROVAL FORM FOR NUTRIENT INTAKE PHASE

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

DATE: 05-11-98 **IRB# HE-98-096**

Proposal Title: THE VALIDATION OF FOOD FREQUENCY QUESTIONNAIRE FOR USE BY EFNEP AND ONE WOMEN 19 TO 50 YEARS OF AGE

Principal Investigator(s): Kathryn S. Keim, Glenna Williams, Michelle Dimond, Melanie Cook

Reviewed and Processed as: Modification

Approval Status Recommended by Reviewer(s): Continuation

Signature: Carol Olson

Date: 03-17-99

Carol Olson, Director of University Research Compliance
cc: Glenna Williams

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

APPENDIX C

CONSENT FORM FOR
FRAB PHASE

Consent Form

Oklahoma State University would like your help in a study, which would help us make recommendations for improving people's health. We would like you to fill out the following survey. We will use this information to determine what WIC and EFNEP/Fresh Start participants need in regards to food purchasing education. We hope that we will be able to better serve you by collecting this information from you.

If you participate in the study, we will ask you to:

1. Fill out this survey.
2. You may be asked to do a Family Food Distribution Activity.

The information collected in this study is confidential, and your name will not appear on the survey. The consent form will be separated from the survey. I will receive a cookbook after completing the survey.

I understand that I may stop taking part in the study at any time and that there is no penalty for refusal to participate in this study.
I agree to take part in the study as described above: I sign it freely and voluntarily. A copy has been given to me.

(Signed)_____ _____
Participant Date and Time

(Signed)_____ _____
Witness Date and Time

If you have any questions you may contact **Michelle Dimond** at telephone number **(405)-372-3712**, or you may contact **Kathy Keim**, 425 Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, telephone number **(405)-744-5040**. You may also contact **Sharon Vacher** at University Research Service, 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078; Telephone: **(405)-744-5700**.

APPENDIX D

IRB APPROVAL FORM FOR
FRAB PHASE

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/5/01

Date: Monday, November 06, 2000 IRB Application No HE0122

Proposal Title NUTRIENT INTAKE OF LOW-INCOME WOMEN IN OKLAHOMA RECEIVING FOOD STAMPS COMPARED TO THOSE NOT RECEIVING FOOD STAMPS

Principal Investigator(s):

Michelle Dimond
426 HES
Stillwater, OK 74078

Kathryn Kalm
421 HES
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Signature Carol Olson

Carol Olson, Director of University Research Compliance

Monday, November 06, 2000
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board

APPENDIX E

ENROLLMENT FORM FOR EFNEP AND ONE PROGRAMS

A ID# _____

Expanded Food and Nutrition Education Program
Adult Enrollment Form (Family Record)

Fill out for each family at ENTRY and again at EXIT. Keep in family file after it's reviewed by Agent and sent to Secretary for computer entry.

1. NEA's Name _____ ___ ENTRY ___ EXIT

4. Family ID: _____ a) Name _____
b) Street _____ c) City _____ Zip
d) Phone _____

5. Enrolled in EFNEP before? (circle Y for Yes, N for No) Y N
6. If Yes, did you receive a Certificate of Completion? Y N

7. Age _____
8. Pregnant: Y N
9. Sex: F M
10. Breast-Feeding: Y N

11. Race: Check the category you identify with

1-00 ___ White (non-Hispanic)
2-00 ___ Black (non-Hispanic)
3-00 ___ Am Indian/Alaskan Native
4-00 ___ Hispanic
5-00 ___ Asian or Pacific Islander

12. Place of Residence: circle

1 Farm
2 Towns under 10,000 & rural non-farm
3 Towns & Cities 10,000 to 50,000
4 Suburbs of Cities over 50,000
5 Central Cities over 50,000

13. Total Household Income Last Month: $_____

15. Number of Other Adults in Household (don't count Homemaker) _____

14. Household Members: Children by Age

List First Name of Children(through Age 19)	Age (Years)
1)	
2)	
3)	
4)	
5)	
6)	
7)	

16. Instruction (Lesson) Type
1 Group
2 Individual
3 Both
4 Other

17. Total Number of Lessons:

18. Entry Date

19. Assistance programs that the Family Participates in at ENTRY: (circle)

WIC/CSFP	Y N	Commodities	Y N
Food Stamps	Y N	Head Start	Y N
FDPIR (Food Distribution Prog. on Indian Res.)	Y N	Child Nutrition AFDC	Y N
Other _____ (Specify)	Y N		

[redacted]

20. Exit Date _____

21. Exit Reason: (circle)
1 Educational Objective Met
2 Returned to School
3 Took Job
4 Family Concerns
5 Staff Vacancy
6 Moved
7 Lost Interest
8 Other

22. Did your family receive assistance as the result of a referral or suggestion from EFNEP personnel? Y N

If yes, check all that apply:
___ WIC/CSFP
___ Food Stamps
___ FDPIR (Food Distribution Prog. on Indian Res.)
___ Commodities
___ Head Start
___ Child Nutrition
___ AFDC
___ Other _____ (Specify)

Comments

APPENDIX F

THREE 1-DAY FOOD RECORDS/FOOD DIARY BOOKLET
ENGLISH AND SPANISH

FOOD DIARY

Dear EFNEP participant,

Thank you for participating in this very important study. Everything that goes into your body is important to your health. For this reason, we would like for you to write down everything that you eat and drink for 24 hours (one whole day) and do this three days in a row. We hope this study will help us make recommendations for improving your health based on what you eat. If you have any questions at any time, feel free to ask. Do not change your eating habits during the time that you keep this diary. This is very important since we must know exactly what you eat.

Thank you!

Directions for Using the Food Diary

1. Write down everything that you put into your mouth for one day and do this three days in a row. This includes foods, candies, drinks, and anything that you swallow. Everything that goes into your body is important.

2. List the food as soon as it is eaten on the pages given to you. Also list the time of day and amount that you ate. Please indicate whether a.m. or p.m.

3. Describe every item that you record. For example:
   a. Write "fried chicken wing" if it is fried, not just chicken
   b. Write milk, whole milk, 2% milk, or skim milk. Do not just write milk.
   c. Write white bread, wheat bread, do not just write bread.
   d. Record the name brands when you know it. For example "Kellogg's Frosted Flakes", "Campbell's chicken soup", or "Ramen noodles".
   e. Include everything that you add to your food or drinks (jellies, sugar, salad dressings, mustard, ketchup, mayonnaise, butter, sauces, etc.)

For example

Time of day	Food Item and Method of Preparation	Amount Eaten
6.30 p.m.	Canned green beans with	½ cup
	margarine	2 tsp
6.30 p.m.	French fries (Burger King) with	1 small order
	ketchup	2 TB
6.30 p.m.	Iced tea with	16 oz
	sugar	2 tsp
6.30 p.m.	Fried chicken thigh	1 whole

4. Estimate what you ate in household measures (tablespoons, cups, slices, etc.) Your nutrition educator will show some examples. List the amount that you ate in the column marked amount eaten.

5. Please write in pencil and write as neatly as possible. Use as many pages as you need to record what you ate.

6. If anything is not clear to you, be sure to ask the nutrition educator any questions that you have before you leave today.

7. Bring your food diary with you to your next scheduled lesson.

Use the following measurements when recording these items:

Drinks (cups or fluid ounces)

Time of day	Food Item and Method of Preparation	Amount Eaten
7:30 p.m.	Pepsi	20 fl oz
9:00 p.m.	Unsweet tea	1 ½ cups
10:00 p.m.	Kool aid	16 fl oz

Fruits (pieces, portions of pieces, or cups)

Time of day	Food Item and Method of Preparation	Amount Eaten
7:30 a.m.	Peaches canned in heavy syrup	½ cup
12:00 p.m.	Banana (whole)	1
3:30 p.m.	Red apple	1 whole

Vegetables (cups)

Time of day	Food Item and Method of Preparation	Amount Eaten
12 00 p.m.	Green peas	½ cup
2:00 p.m.	Canned kernel corn	1 cup
6:30 p.m.	Mashed potatoes	1 cup
9:00 p.m	French fries	10

Grains (slices, cups)

Time of day	Food Item and Method of Preparation	Amount Eaten
7:30 a.m.	White bread	1 slice
6:30 p.m.	Cooked spaghetti	2 cups
6.30 p.m	White dinner roll	1 medium

Meats (ounces or cups)

Time of day	Food Item and Method of Preparation	Amount Eaten
6:30 p.m.	Hamburger meat	3 oz
6:30 p.m.	Fried eggs	2
6:30 p.m.	Fried chicken legs	2
6:30 p.m	Refried beans	1 ½ cups

Milk Items (cups or ounces)

Time of day	Food Item and Method of Preparation	Amount Eaten
7:30 a.m.	Whole milk	1 cup
7:15 p.m.	Dannon strawberry yogurt	6 oz
9:30 p.m.	Braums chocolate ice-cream	1 cup

Combination foods

Time of day	Food Item and Method of Preparation	Amount Eaten
6:30 p.m.	Cheese and pepperoni pizza (10 inch)	2 slices
6.30 p.m.	Hamburger helper	1 cup
6:30 p.m.	Chili dog	1 footlong
6 30 p.m.	Beef stew with carrots and potatoes	2 cups
6:30 p.m.	Sopapilla	1

Sweets/Others

Time of day	Food Item and Method of Preparation	Amount Eaten
6:30 p.m.	Keebler chocolate chip cookies	2 whole
6:30 p.m.	Homemade oatmeal cookies	4 whole
6 30 p.m	Snicker candy bar	1 king-size
8:30 p.m.	Donuts (plain cake type)	2
9:30 p.m.	Potato chips	20
9:45 p.m	Strawberry hard candy	2 pieces

You may need some help in trying to decide how much you ate. Use this guide to help you.

Grains:
1. An average size bagel is the size of a hockey puck.
2. A medium size pancake is the size of a CD.
3. 1 cup of rice or pasta would be about the size of a walkman.
4. 1/2 cup of rice or pasta would fill a cupcake wrapper.
5. 1 cup of dried breakfast cereal would be a large handful.

Fruits:
1. A fruit that is considered to be medium sized is the size of a tennis ball.
2. 1 cup of chopped fruit is about the size of a baseball.
3. 1/2 cup of fruit looks like a pile of 15 marbles.

Vegetables:
1. 1 cup of lettuce is 4 large leaves.
2. 1 cup of chopped vegetables is the size of a fist.
3. 1/2 cup of chopped vegetables is the size of a light bulb.

Meat:
1. 3 ounces of cooked meat is the size of a deck of cards or a cassette tape.
2. 1 ounce of meat is the size of a matchbook or 1 domino.

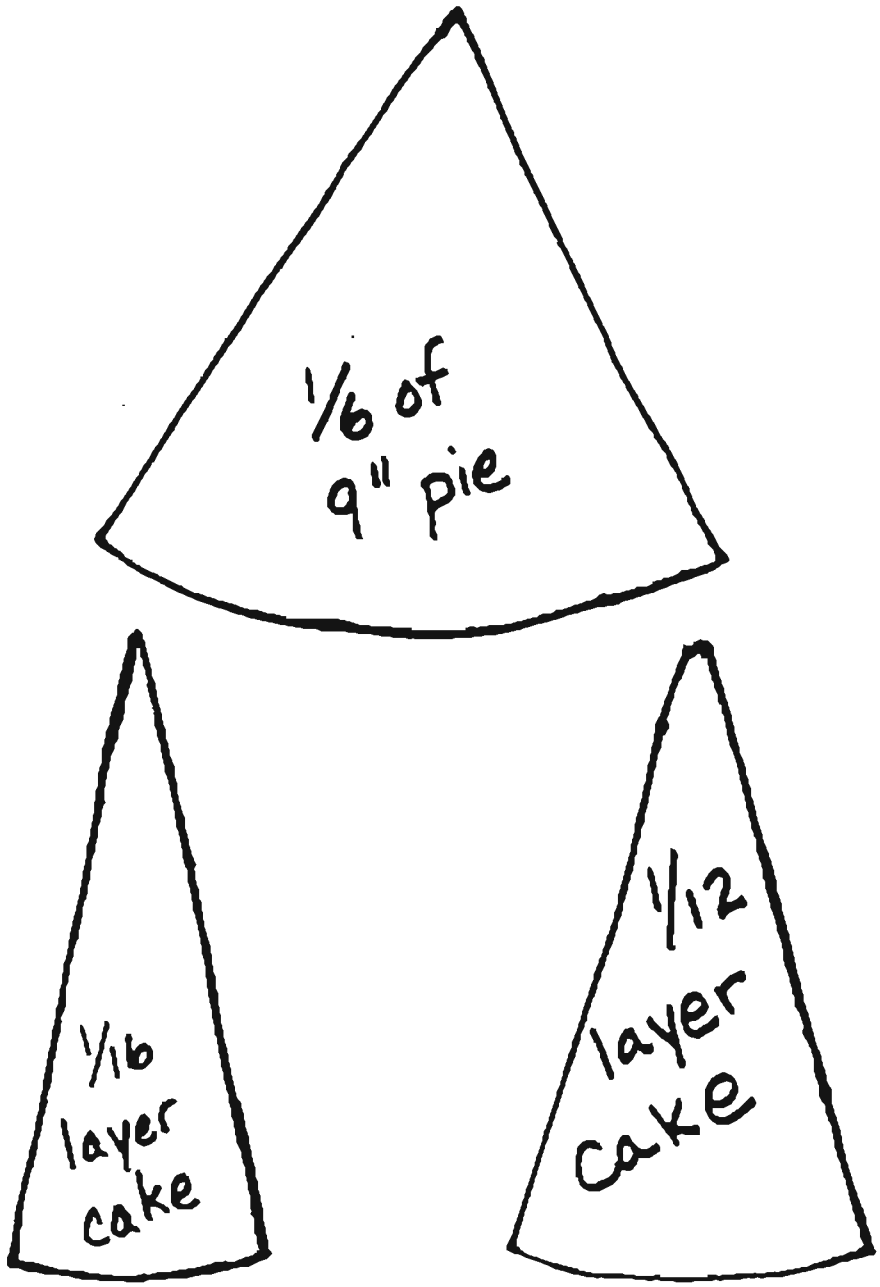
Milk Items:
1. 1 1/2 ounces of cheese looks like 3 dominoes or a 9-volt battery.
2. 1 ounce of cheese is the size of 4 dice

Fats, oils, sweets/others:
1. 1/2 cup of ice cream is the size of a tennis ball.
2. 2 tablespoons of butter, salad dressing, peanut butter, or mayonnaise is the size of 1 dice.
3. 1 ounce of small snack foods like hard candy or nuts is a handful.
4. 1 ounce of larger snack foods like pretzels, cornchips, or potato chips is a large handful.

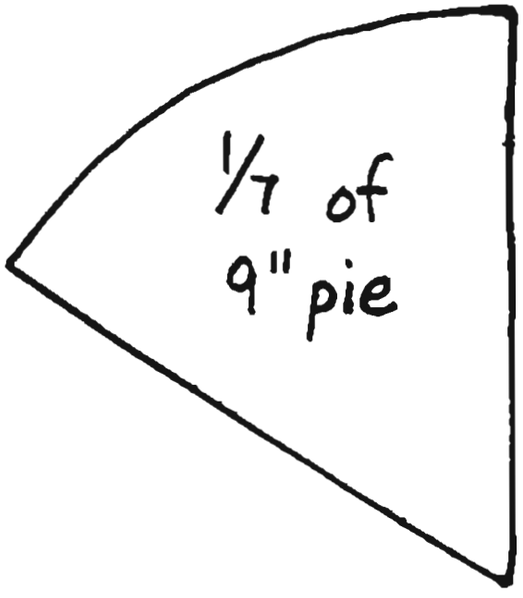
For your information:
1. 1 cup is the size of softball.
2. 1 tablespoon is 3 teaspoons.

Use the following pages to help you figure out how much you ate

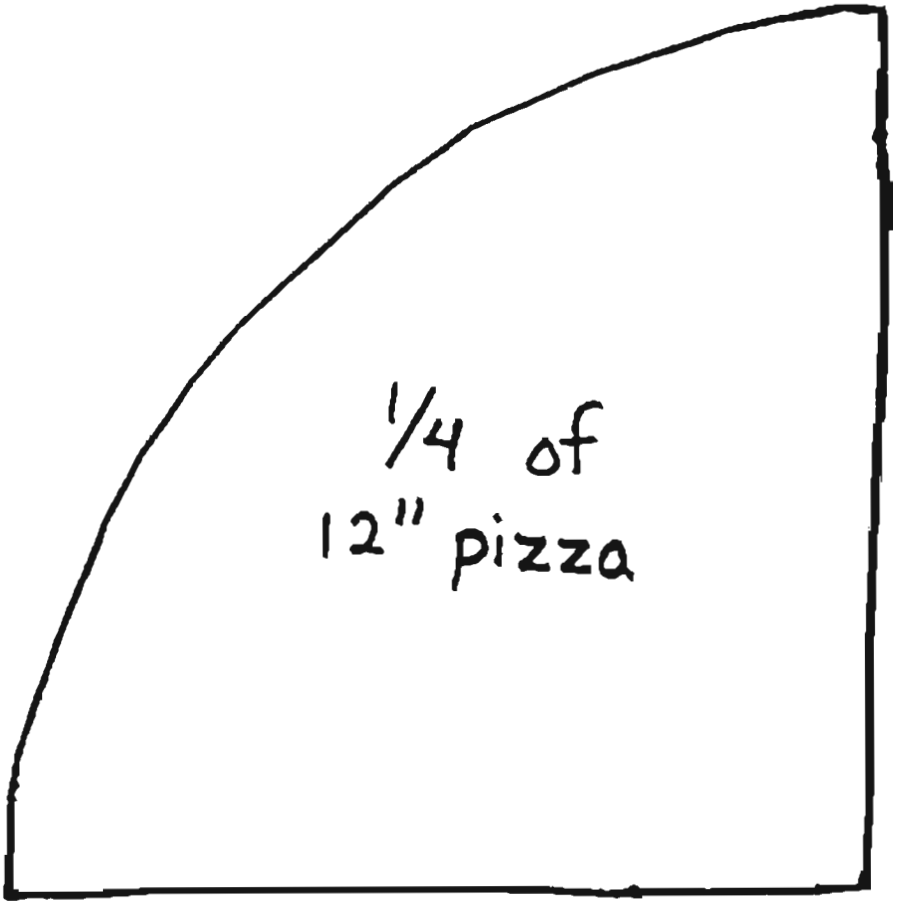
Use this page to help you determine how much pie or cake you ate.



Use this guide for cookies and pie



Use this guide for pizza.



If you ate ⅓ this amount you would record 1/8 of a 12" pizza.

Name_____

Identification #_____ Date_____

Time of day	Food Item and Method of Preparation	Amount Eaten

Name_____

Identification #_____ Date_____

Time of day	Food Item and Method of Preparation	Amount Eaten

Name_____

Identification #_____ Date_____

Time of day	Food Item and Method of Preparation	Amount Eaten

Diario de Comida

Queridos Participantes

Muchas gracias por participar en este estudio tan importante.
Todo lo que entra a tu cuerpo es muy importante para tu salud.
Por esta razón nos gustaría que escribieras todo lo que comes
y bebes durante 3 días seguidos (todo lo que comes duraute las 24 horas de cada dia). Ojalá que este estudio nos ayude hacer recomendaciones para mejorar tu salud basado en lo que comes. Si tienes alguna pregunta a cualquier hora, por favor pregunta sín cuidado. Por favor no
cambies tus hábitos de comer durante los días en que vas a escribir lo que comes. Esto es muy importante porque necesitamos saber exactamente que comes.

Gracias !

Como debes usar el Diario de Comida

1.) Escribe todo lo que comes por 3 dias. Incluyendo comidas, dulces, bebidas y cualquier cosa que te comes. Todo lo que entra a tu cuerpo es importante.
2.) Escribe una lista de los alimentos al momento en que comiste sobre los paginas que te dejaron
También escribe la hora y la cantidad que comiste. Por favor indique si es la a.m. o p.m.

3.) Explica cada comida que escribas. Por ejemplo:

a.) Si escribes "pollo", explica si es frito, asado, al horno, etc. y cual parte del pollo: ala, pierna, etc.

b.) Si escribes "leche", explica si es pura, 2 %, sin grasa, etc. No escribas solo leche.

c.) Si escribes "pan", explica si es blanco, de trigo, de maíz, dulce, etc No escribas solo pan.

d) Escribe la marca del producto o comida. Por ejemplo cereal Confleis: kellogg's, sopa de pollo: Cambells, o Ramen Noodles.

e.) Incluye todo lo que le pones a la comida. Por ejemplo: mermeladas, azúcar, catsup, mostaza, mayonesa, mantequilla y salsas.

Hora	Comidas y moda de Preparar	Cantidad
6.30 p.m.	Nopalitos con chile colorado cocido con aceite	1 taza
6 30 p.m.	Arroz con salsa de tomate y verduras mixtas	½ taza
6 30 p.m.	Te con hielo	12 oz
6 30 p m	Azúcar	2 cucharaditas

4) Estima que comes con medida (cuchara, taza o rebanada.) Tu maestra de nutrición te enseñara algunos ejemplos. Pon en una lista marcando la cantidad que comes.
5.) Por Favor escribe con lápiz y claramente. No te preocupes por la cantidad de papeleria que uses para escribir todo lo que comiste.
6.) Si tienes alguna pregunta o algo que no entiendas, por favor pregunta a tu maestra antes de que se vaya.
7.) No se te olvide traer tu diario en tu próxima cita.

Usa las siguientes medidas cuando estas escribiendo las comidas:

Bebidas (tazas o onzas)

Hora	Comida y Moda de Preparar	Cantidad
7:30 p.m.	Pepsi	20 oz.
9:00 p.m.	Te con hielo (sin azúcar)	8 oz
10:00 p.m.	Kool aid	16 o

Frutas (pieza, porciones, o tazas)

Hora	Comida y la Modo de Preparar	Cantidad
7:30 a.m.	Duraznos (enlatada con miel)	½ taza
12:00 p.m	Plátano	1
3:30 p.m.	Manzana (roja)	1 mediana

Vegetales (tazas)

Hora	Comida y Modo de Preparar	Cantidad
12:00 p.m.	Chicharos (enlatados)	½ taza
2:00 p.m.	Maiz (enlatados)	1 taza
9:00 p.m.	Puré de papa	1 taza

Granos (Rebanada, tazas)

Hora	Comida y Modo de Preparar	Cantidad
7.30 a.m.	Pan blanco	1 rebanado
6.30 p.m.	Espaguetis cocidos	2 tazas
6:30 p.m.	Biscuete blanco (pan pequeño)	1 mediano

Carnes (onzas o tazas)

Hora	Comida y Modo de Preparar	Cantidad
6:30 p m	Hamburguesa	3 oz
6:30 p.m.	Huevos fritos	2
6:30 p.m.	Piernas de pollo fritas	2
6 30 p.m.	Frijoles refritos	2 tazas

Productos de Leche (tazas o onzas)

Hora	Comida y Modo de Preparar	Cantidad
7.30 a.m.	leche entera	1 taza
7:15 p.m.	Yogurt de fresa (Danmen)	6 oz
9 30 p.m.	Nieve chocolate (Braums)	1 taza

Comidas Combinadas

Hora	Comida y Modo de Preparar	Cantidad
6:30 p.m	Pizza con queso y chiles	2 piezas
6:30 p.m.	Carne molida con tomate, cebolla y chile	1 taza
6:30 p.m	Burrito de res con tomate cebolla y chile	1
6.30 p.m	Caldo de res con papa, repollo y tomate y cebolla	1 taza
6:30 p.m.	Sopapilla	1

Dulces/Mas

Hora	Comida y Modo de Preparar	Cantidad
6:30 p.m	Galletas de mantequilla (Keebler)	3
6:30 p.m	Galletas de avena	2
6:30 p m	Chocolates (Snickers)	1 barra grande
8.30 p.m	Donas	2
9 45 p m.	Papitas fritas (Chips)	20

Si necesitas ayuda para decidir cuanto comiste; usa la guia para que te ayudes.

Granos:
1. Un hot cake seria del tamaño de un CD disco compacto
2. Una taza de arroz o sopa o pasta, seria del tamaño de un radio pequeña.
3. 1/2 taza de arroz o sopa seria del tamaño de los quequis.
4. Una taza de cereal seco seria igual que una mano llena.

Fruta:
1. Una fruta mediana del tamaño de una pelota de tenis.
2. 1 taza de fruta cortada seria del tamaño de una pelota de beisbol.
3. 1/2 taza de verduras seria del tamaño de un foco.

Carne:
1. 3 oz. de carne cocida seria del tamaño de un casette o un juego de barajas.
2. 1 oz. de carne seria del tamaño de una caja de cerillos o una pieza de domino.

Productos de Leche:
1. 1 1/2 oz. de queso seria del tamaño de 3 piezas de domino o un pila de 9 voltios.
2. 1 oz. de queso seria del tamaño de 4 dados.

Grasa, Aceite, Dulces:
1. 1/2 taza de nieve seria del tamaño de una pelota de tenis.
2. 2 cucharaditas de mantequilla o crema de cacahuate ó mayonesa seria del tamaño de un dado.
3. 1 oz. de dulce duro o nueces es como una mano llena.
4 1 oz. de papitas seria como una mano grande llena.

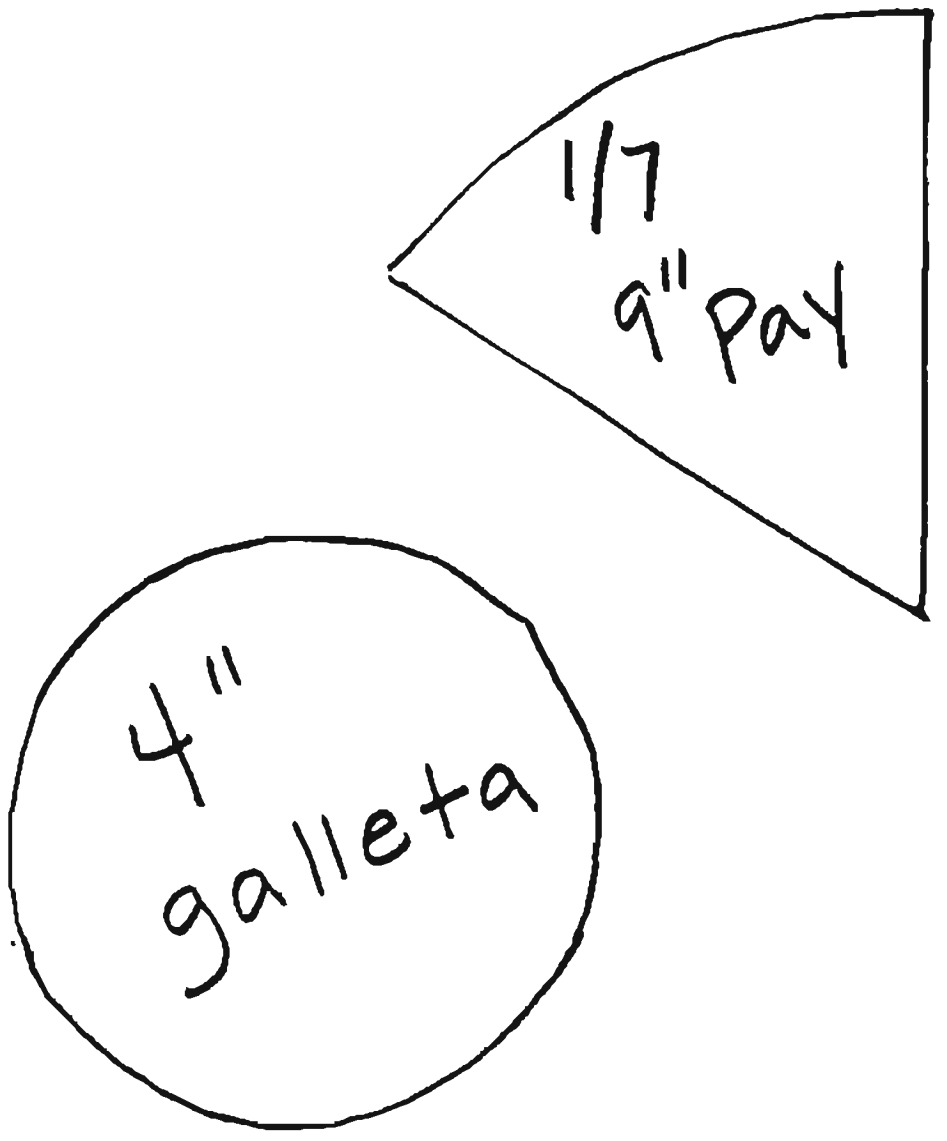
Verduras:
1 1 taza de lechuga es igual que 4 hojas grandes.
2. 1 taza de verduras picadas es del tamaño de un puño.
3 1/2 taza de verduras seria del tamaño de un foco.

Información:
1. 1 taza es la tamaño de un pelota de sofbol
2. 1 cucharada grande es 3 cucharaditas pequeñas.

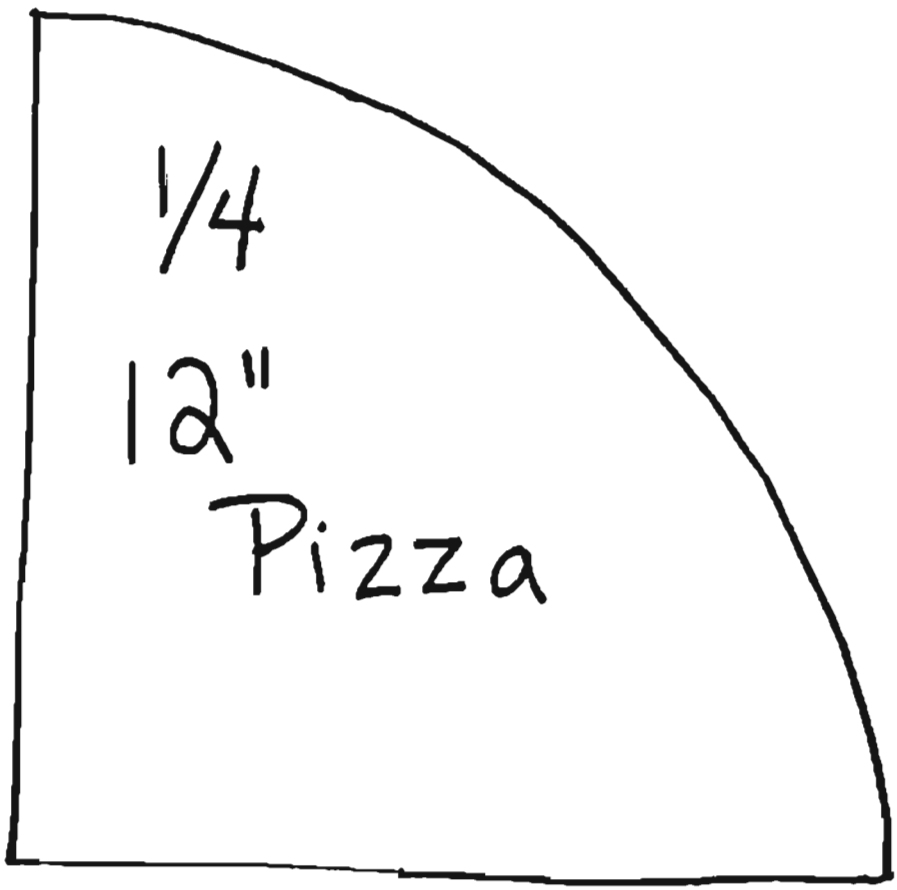
Usa las siguientes páginas para determinar la cantidad que comiste.

Usa esta pagina para determinar cuanto pastel o pay te has comido.

Usa esta guía para galletas o pay.



Usa esta guia para pizza/tortilla.



Si comiste la mitad de esta medida escribe 1/8 de uua pizza de 12 inches.

Nombre_____

de Identificación_____ Fecha_____

Hora	Comida y Modo de Preparar	Cantidad

Nombre_____

de Identificación_____ Fecha_____

Hora	Comida y Modo de Preparar	Cantidad

Nombre_____

de Identificación_____ Fecha_____

Hora	Comida y Modo de Preparar	Cantidad

APPENDIX G

THE 24-HOUR FOOD RECALL INSTRUMENT

HOMEMAKER'S 24-HOUR FOOD RECALL (Form A)

1. ID #:	2. Date Taken:
3. HM Name:	4. NEA Name:
5. Pregnant ☐ Yes ☐ No 6. Nursing ☐ Yes ☐ No	7. Takes Nutritional Supplements ☐ Yes ☐ No If "Yes" List Type:
8. Money Spent on Food Last Month: $ _____	

MEAL TYPE		MEAL TYPE		SERVING ABBREVIATIONS		9. Check Which Food Record
Morning	= 1	Afternoon	= 4	TBSP = tablespoon	c = cup	☐ ENTRY ☐ EXIT
MidMorning	= 2	Evening	= 5	tsp = teaspoon	lb = pound	☐ Other: Number _____
Noon	= 3	Late Evening	= 6	oz = ounce	sl = slice	

10. What did homemaker eat and drink in the last 24 hours?
(To be filled out by NEA or Homemaker)

11. To Be Coded By NEA:

FOOD ITEMS AND DESCRIPTION (List all foods and beverages. List separately main ingredients in mixed dishes.)	AMOUNT EATEN (ex: 1/2 c)	MEAL TYPE	FOOD ID NUMBER	AMOUNT CODE (ex: .50)

12. Number of Lessons Taught Since Last Record

Individual _____ Group _____ Other _____

APPENDIX H

THE FRAB SURVEY

Food Buying Survey

Participant survey number: _____
Date: _____

Please complete the following survey.
Circle, fill in the blank, or check the answers that apply to you.

1. How often do you receive wages? (circle one number)
   1 Weekly (go to Question 3)
   2 Bi-weekly (go to Question 3)
   3 Once a month (go to Question 2)

2. At what time of the month are you paid? (circle one number)
   1 At the first of the month (day 1-14).
   2 At the last of the month (day 15-31).

3. If you receive food stamps at what time of the month do you receive credit to your Electronic Benefit Transfer (EBT) card? (circle one number)
   1 At the first of the month (day 1-14)
   2 At the end of the month (day 15-31)
   3 Do not receive food stamps

4. If you receive Temporary Assistance for Needy Families (TANF) at what time of the month do you receive credit to your Electronic Benefit Transfer (EBT) card? (circle one number)
   1 At the first of the month (day 1-14)
   2 At the end of the month (day 15-31)
   3 Do not receive TANF

5. How often do you run out of food before the end of the month? (circle one number)
   1 Do not do
   2 Seldom do
   3 Sometimes do
   4 Most of the time do
   5 Almost always do

6. In the last 12 months, since (date 12 months ago), did you (or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food? (check one answer)
   Yes (go to Question 7)
   No (go to Question 8)

7. How often did this happen? (circle one number)
   1 Almost every month
   2 Some months but not every month
   3 In only 1 or 2 months

8. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food? (check one answer)
   Yes No

9. In the last 12 months, since (date 12 months ago), were your ever hungry but didn't eat because you couldn't afford enough food? (check one answer)
   Yes No

10. The food that [I/We] bought just didn't last, and [I/We] didn't have money to get more. Was that true for you? (circle one number)
   1 Often in the last 12 months
   2 Sometimes in the last 12 months
   3 Never in the last 12 months

11. [I/We] couldn't afford to eat balanced meals. Was that true for you? (circle one number)
   1 Often in the last 12 months
   2 Sometimes in the last 12 months
   4 Never in the last 12 months

12. In the last 12 months, have you done any of the following in order to save money? (check yes or no for each one)

Yes No

a. Put off paying bills to have enough money to buy food.
b. Got or borrowed money from friends or relatives.
c. Ate meals at a soup kitchen.
d. Got emergency food from church, food pantry or food bank.
e. Sent or took children to friends or relatives for a meal.
f. Got or borrowed food from friends or relatives.
g. Shared food with others.
h. Bought generic or store food brands.
i. Made meals that were more inexpensive by increasing the amount of cheaper foods and decreasing the amount of expensive foods.
j. Bought fewer convenience foods.
k. Bought less fruit.
m. Bought less vegetables.
n. Bought less milk.
o. Bought less bread.
p. Other (Please Explain)_____

13. In the last 12 months, have any of the following events happened to you? (check yes or no for each one)

Yes No

a. Marriage
b. Divorce
c. Death of a spouse
d. Death of a parent(s)
e. Death of a child
f. Birth(s) of a child(ren)
g. Loss of a job
h. New job
i. Depression/anxiety
j. You were diagnosed with a life threatening illness
k. You were diagnosed with a chronic illness (for example high blood pressure or diabetes)
l. Family member(s) diagnosed with life threatening illness
m. Family member(s) diagnosed with a chronic illness (for example high blood pressure or diabetes)
n. Loss of food assistance benefits, such as food stamps or WIC vouchers.

14. Where do you usually buy your food? (circle one number)
    1 Medium sized grocery store (for example Albertson's)
    2 Whole sale or discount store (for example SAMS)
    3 Convenience store (for example QT or 7Eleven)
    4 Large multipurpose discount stores (for example Wal-Mart)
    5 Cooperative
    6 Commissary
    7 Other (Please Explain)_____

15. In the last 12 months have you changed where you have bought your food? (check one answer)
    Yes (go to Question 16)
    No (go to Question 17)

16. Where were you buying your food previously? (circle one number)
    1 Medium sized grocery store (for example Albertson's)
    2 Whole sale or discount store (for example SAMS)
    3 Convenience store (for example QT or 7Eleven)
    4 Large multipurpose discount store (for example Wal-Mart)
    5 Cooperative
    6 Commissary
    7 Other (Please Explain)_____

17. The following are sources of food for my household. (Check yes or no for each one)

Yes	No	
		a. Hunting
		b. Fishing
		c. Gardening
		d. Other (Please Explain)_____

The next two questions are about gleaning. Gleaning means to collect or gather food. Gleaning is legal. An example of gleaning is to gather (the leavings) from a field after the crop has been reaped.

18. Have you eaten or been given food from a grocery store that could no longer be sold in the store but you could still eat it? (check one answer)
    Yes No

19. Have you eaten or been given food from a restaurant that was no longer able to sell the food in the restaurant but you could still eat it? (check one answer)

    Yes No

20. _____Number of times per month you typically eat food from a fast food/deli restaurant.

21. _____Number of times per month you typically eat at a sit down restaurant.

22. _____Number of times per month you typically eat at a buffet/all you can eat restaurant.

23. If you had $10.00 for food until your next pay check what food would you buy?

_____
_____
_____
_____

24. My age in years_____

25. Are you currently pregnant: (check one answer) Yes No

26. My race/ethnic origin is: (circle one number)

    1 White (non-Hispanic)
    2 Black (non-Hispanic)
    3 Am Indian/Alaskan Native
    4 Hispanic/Latino
    5 Asian or Pacific Islander
    6 Prefer not to disclose

27. The area I live is best described as: (circle one number)

    1 Farm
    2 Towns under 10,000 & rural non-farm
    3 Towns & Cities to 50,000
    4 Suburbs of Cities over 50,000
    5 Central Cities over 50,000

28. Total household income earned last month (Fill in the total income for each person employed age 16 or older not including income from TANF, Food Stamps, Child Support, or Housing Assistance): $_____

29. Last month, what was the total dollar value of your food stamps:

    $_____

30. Money spent on food last month: $_____

31. Number of other adults in household (don't count self)_____

32. Other household members: Please list the age of all of children under 19.

    _____ _____ _____ _____ _____

    _____ _____ _____ _____ _____

33. Assistance programs that the Family Participates in at this time: (check yes or no for each)

	Yes	No
WIC/CSFP		
Commodities		
Food Stamps		
Head Start		
FDPIR (Food Distribution		
Child Nutrition		
Prog. on Indian Res.)		
TANF		
EFNEP/Fresh Start Program		
Other (Please Explain)_____		

34. What is the last grade that you completed in school? (circle one number)

1 K-11_____(Specify last grade completed)
2 12th grade, No Diploma
3 High School Graduate-high school Diploma or the equivalent (for example: GED)
4 One or more years of college, but no degree.
5 Vo-tech., trade school, or associate degree (for example: AA, AS)
6 Bachelor's degree (for example: BA, AB, BS)
7 Some graduate school
8 Graduate degree

35. What is your current marital status? (check yes or no for each one)

Yes No

a Married
b Separated
c Divorced
d Widowed
e Never Married
f Other (describe)_____

36. Are you currently breastfeeding? (check one answer)

Yes No

APPENDIX I

THE FAMILY FOOD DISTRIBUTION ACTIVITY FORM

Subject

#_____

FAMILY FOOD DISTRIBUTION ACTIVITY
RECORD FORM

MEMBER OF FAMILY HOUSEHOLD	NUMBER OF BEANS ALLOTED TO MEMBER

APPENDIX J

THE CNEP SURVEY

NEA's NAME: _____

CNEP SURVEY

Participant's Name:	ID#
Date	Check if interview (NEA completed form) Entry [1] Intermediate [2] Exit [3]

This is a survey about ways to plan and fix foods for your family. As you read each question, think about the recent past. This is not a test. There are not any wrong answers. If you do not have children, just answer the questions for yourself.

For these questions, think about how you usually do things. Please put a check in the box that best answers each question.	Do Not Do	Seldom	Some-times	Most of the time	Almost Always
(1) How often do you plan meals ahead of time?					
(2) How often do you compare prices before you buy food?					
(3) How often do you run out of food before the end of the month?					
(4) How often do you shop with a grocery list?					
(5) This question is about meat and dairy foods. How often do you let these foods sit out for more than two hours?					
(6) How often do you thaw frozen foods at room temperature?					
(7) When deciding what to feed your family, how often do you think about healthy food choices?					
(8) How often have you prepared foods without adding salt?					
(9) How often do you use the "Nutrition Facts" on the food label to make food choices?					
(10) How often do your children eat something in the morning within 2 hours of waking up?					

2/6/98

APPENDIX K

RADIMER/CORNELL HUNGER ITEMS

Appendix K

Food depletion items:

3. The food that I bought just didn't last and I didn't have money to buy more.
4. I ran out of the foods that I needed to put together a meal and I didn't have money to get more.

Food anxiety items:

5. Do you worry whether your food will run out before you get money to buy more?
8. I worry about where the next day's food is going to come from. children's hunger items

Diet inadequacy items:

22. I cannot give my child(ren) a balanced meal because I can't afford that.
23. I cannot afford to feed my child(ren) the way I think I should.

Intake insufficiency items:

26. My child(ren) are not eating enough because I just can afford enough food.
27. I know my child(ren) are hungry sometimes, but I just can't afford more food and women's hunger items.

Diet inadequacy items:

9. I can't afford to eat the way I should.
11. Can you afford to eat properly?

Intake insufficiency items:

14. How often are you hungry but you don't eat because you can't afford enough food?
15. Do you eat less than you think you should because you don't have enough money for food?

VITA

Michelle Renée Dimond

Candidate for the Degree of

Master of Science

Thesis: ESTIMATED NUTRIENT INTAKE, FOOD SECURITY STATUS, AND FOOD RESOURCE AUGUMENTATION BEHAVIORS OF LOW-INCOME WOMEN IN OKLAHOMA.

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