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THE EFFECT OF HOUSING AND FOOD EXPENDITURES
ON DIET QUALITY OF LOW-INCOME HOUSEHOLDS
IN SALT LAKE COUNTY

by

Rebecca Low

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Human Environments
(Consumer Science)

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1996

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ABSTRACT

The Effect of Housing and Food Expenditures on Diet Quality
of Low-Income Households in Salt Lake County

by

Rebecca Low, Master of Science

Utah State University, 1996

Major Professor: Dr. Jean M. Lown
Department: Human Environments

During a time of national and local debate over welfare reform, research is needed to determine the effectiveness of specific welfare programs and the impact on the lives of households participating in these programs. The objective of this study was to determine the effect housing and food expenditures have on the diet quality of low-income families. Participants for the study were drawn from government-subsidized housing rolls and housing assistance waiting lists. Diet quality was measured by 16 variables: percent RDA protein, fiber, vitamin A, vitamin C, iron, and calcium consumed; percent calories from protein, carbohydrates, fat, and alcohol; and the number of servings from each food group: bread and cereal, fruit, vegetable, meat and protein, dairy, and fats and sweets food groups. Pearson's correlation coefficient was used to analyze the relationship between the percent poverty level of the household and the percent of income spent on housing and

food with each diet quality variable. No statistically significant correlations were found. Mann-Whitney U tests and t tests and were used to determine if diet quality of participants who received housing assistance was different from participants who did not receive assistance. No statistical significance was found. Participant's ^{diets} who received food assistance and ^{diets} of participants who do not receive food assistance were also analyzed to determine any differences in diet quality. Again, no statistical significance was found between the two groups. The diets of the sample population were found to be fairly average in comparison to overall food consumption patterns of the United States. Consumption of fiber, fruits, vegetables, and dairy products was low. Increased consumer education programs are recommended to improve overall diet.

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Rebecca Low

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INTRODUCTION

Statement of the Problem

Low-income households spend larger percentages of income on food and housing than higher income groups, which in turn adversely affects the diet and health of individuals living within these households. Understanding the relationship between housing and food expenditures on diet will enable policies and programs to better serve this at-risk population.

Rationale

The poor have always been among the people of the world. Each generation faces the same questions: What should be done with the poor? How much help should they be given? Are they deserving of their situation? Are the current policies and programs that assist the poor doing the job intended? Wars have been waged, programs have been instituted, and policies have been changed as the economic tides roll in.

Increasing demands on food assistance programs (food pantries, soup kitchens, food stamps, WIC, commodities) generate questions concerning nutrition adequacy among poor individuals and families in the 1990s. Approximately 40 million Americans received food assistance during 1993. All food assistance programs expanded despite a drop in the unemployment rate (Matsumoto, 1994).

The effect of poverty is far reaching and can be long term. The total cost over a lifetime of living in poverty is difficult to measure and few studies have attempted to

place a dollar figure on these costs. Of concern in this study is the cost of adequate nutrition and "food security." Food security is defined as all people receiving acceptable and nutritionally adequate diets through nonemergency food sources at all times (Clancy & Bowering, 1992). Incomes are inadequate if they are insufficient for purchasing food, clothing, shelter, and other basic needs. Many assistance programs consider annual incomes up to 185% of poverty level as income eligible and qualify the family or individual for program participation. If only 125% of poverty is considered, approximately one of every three individuals will experience poverty during their lifetime. According to the Panel Study of Income Dynamics (Duncan, 1984), for most families poverty is a brief experience. For others, it is a persistent condition. Families who receive welfare for an average of eight or more years during their first time on welfare are considered persistently poor (Duncan, 1984).

Whether one considers cross-sectional or longitudinal data, poverty most often affects single women, female-headed households, and children (Duncan, 1984; Leahy, Buss, & Quane, 1995; Leidenfrost, 1993b). The Clancy and Bowering study (1992) demonstrates that low incomes and high housing costs are major factors contributing to food insecurity in the United States. When money is needed to pay rent, it is not available for food purchases. According to Clancy and Bowering (1992), 45% of poor households pay 70% of their income for housing. Sixty-six percent of poor households pay at least 50% of their income for housing compared to higher income households (\$20-25,000 annual income) who pay 19% of their income for housing. The money left

over after housing expenses must purchase food, clothing, transportation, child care, and other needs.

When times are prosperous and resources plentiful, consumers pay less attention to efficient spending and they are more generous in giving to others less fortunate. But when resources tighten, spending awareness increases. Expenditures are scrutinized and prioritized. Budget items deemed unnecessary are deleted, while other expenditures of lower priority receive less funding than previously enjoyed. In the 1990s, taxpayers faced with economic changes and threats to job security scrutinized personal spending patterns. Taxpayers demanded greater accountability for expenditures of public funds. They have insisted on regular reviews and evaluations to assess how efficient tax-funded programs are operating and they demand greater attention to sound evaluation procedures.

To effectively evaluate government funding of programs supporting poor households, understanding the conditions which affect food security and the policies which are instituted are of utmost importance. Nancy Leidenfrost, former national director of the USDA Extension Service Expanded Food and Nutrition Education Program (EFNEP), summarized poverty and federal spending to assist families below the poverty level with the following (1993a):

The presence of poverty has raised questions about the nation's willingness to resolve it or the government's part in creating it. In an age of debt crises, will America choose to bear the cost that is associated with resolving poverty? If we do not, what are the consequences for those who are in poverty and for the

growing numbers that are likely to enter, and all the remaining members of our society? (p. 3)

Taxpayers, nutrition educators, policy makers, administrators of welfare assistance programs, and advocates for low-income households must be aware of the conditions surrounding poverty and the effects on the health and welfare of households living in poverty. They must work cooperatively with each other if the causes of hunger, malnutrition, and their associated health care costs are to be reduced in the future.

Hypothesis

This study attempted to determine the effect of housing and food expenditures on the diet quality of low-income families. Specific hypotheses tested were:

1. There is no correlation between the percent poverty level, percent of income spent on housing, and percent of income spent on food on the diet quality of low-income households as measured by: percent RDA protein, percent RDA fiber, percent RDA vitamin A, percent RDA vitamin C, percent RDA iron, and percent RDA calcium; percent calories from protein, percent calories from carbohydrates, percent calories from fat, and percent calories from alcohol; servings from bread/cereal, fruit, vegetable, meat/protein, dairy, and fats and sweets food groups.
2. There is no difference in low-income households that receive assistance with housing expenses and low-income households that do not receive assistance with housing expenses on diet quality as measured by: percent RDA protein, percent RDA

fiber, percent RDA vitamin A, percent RDA vitamin C, percent RDA iron, and percent RDA calcium; percent calories from protein, percent calories from carbohydrates, percent calories from fat, and percent calories from alcohol; servings from bread and cereal, fruit, vegetable, meat and protein, dairy, and fats and sweets.

Campbell and Desjardins (1989) developed a conceptual framework to study food resource management of low-income households, which is the basis for this research. In their model, health and nutrition status of households (the ultimate goal of food security) is dependent upon several other household management strategies. Their model can be seen as follows.

The System or Wider Environment

Household Resource Management (assets/liabilities)

1. Income
2. Time
3. Social support network
4. Housing
5. Health

Family Provisioning Strategies

1. Child care
2. Transportation
3. Clothes
4. Laundry and Diapers
5. Food
 - i. Food Acquisition: The Store, Restaurant or Other
 - ii. Supply Management: The Kitchen Cupboard
 - iii. Preparation and Allocation: The Table
 - iv. Consumption: The Plate
 - v. Health and Nutrition Status

According to Campbell and Desjardins' framework (1989), the bottom line of food security is the health and nutrition status of the individual. Health and nutrition is a

part of a series of management strategies that first begin with the household assets and liabilities. This study dealt only with income and housing expenditures.

After liabilities have been met using available assets, how the household allocates resources into each of five categories will determine how much money is available for food. Food resources are further managed by the skills and decisions of the household, which range from food acquisition to consumption. All levels of strategies play a vital role in the health and welfare of the household. This study focused upon food acquisition costs and their relationship to the health and nutrition of the household as measured by the diet quality of the participant's 24-hour food record.

LITERATURE REVIEW

Poverty

The effect of poverty is far reaching and can be long term. The total cost of years spent on poverty, whether for one year or eight (or more years), is difficult to measure and few studies have attempted to place a dollar figure on these costs. Of importance to this study is the effect of housing costs on adequate nutrition and "food security." According to Clancy and Bowering (1992), food security is defined as all people obtaining a culturally acceptable, nutritionally adequate diet, through non-emergency food sources at all times. Clancy and Bowering (1992), demonstrated that low incomes, high housing costs, and other factors (e.g., cost of child care, and inadequate unemployment and health care benefits) are the reasons for food insecurity in the U.S. An understanding of these conditions and policies instituted to relieve the pressure on low income families are of utmost importance.

In Levine and Ingram's discussion of income and measurement of poverty (as cited in Clancy & Bowering, 1992), poverty guidelines were created by multiplying the Economy Food Plan, developed by the United States Department of Agriculture in the 1950s, by three. At the time of its creation, it was determined that families spent one third of their income on food. The actual numbers used in these calculations are updated regularly. This standard is still used today despite the fact the percentage of after-tax income spent on food has decreased and the percent of income spent on housing has

increased. Poverty guidelines provide an index to determine income eligibility for assistance programs (Poverty Index) and to provide a means whereby the poor could be counted (Poverty Thresholds). It could not provide an accurate measure of the consequences of being poor. It could not measure the family financial position when a family received income just above the cut-off level for poverty nor compare a family earning just a few dollars less but whose income fell just below the income cut-off. Because housing, child care, and other costs have risen, there is considerable debate as to whether poverty guidelines provide an accurate picture of poverty in the United States. According to Schwenk (1991), the amount of income spent on food decreases with increasing income. For example, a household income of over \$50,000 spends about 12.5% of the total income on food. A household with an annual income of less than \$5,000 spends 18% of the total on food. When the poverty guidelines were created in the 1950s by multiplying the USDA Economy Food Plan by three, food expenditures accounted for just less than one third of the total household income. Regardless of whether the current method of calculating poverty is accurate or not, it has been consistent and thus an economic measuring stick of income changes over the past 40 years.

The extent of the population experiencing poverty may appear to vary depending upon whether cross-sectional or longitudinal data are used. The short-term picture seems easier to deal with in the minds of the more fortunate, for then the problem of poor people appears to be a smaller problem. Using the current poverty guidelines, one of every

seven Americans lived below the poverty threshold in 1992, but, according to the Panel Study of Income Dynamics (PSID), one in four individuals is likely to experience poverty during any decade (Duncan, 1984). Many welfare programs consider income eligibility up to 185% of poverty guidelines. If the current poverty guidelines are only considered to the 125% level, almost one in every three individuals will experience poverty within a decade (Duncan, 1984).

Between 1980 and 1990, Utah's population grew by 18% while the poverty grew by 30% (State Community Services Office, 1993). According to the Population Research Laboratory (1990), 11.4% of the Utah population, or approximately 196,000 individuals currently live below poverty. Using 125% poverty as a guideline, almost 569,000 will experience poverty. In Salt Lake County, almost 72,000 individuals currently live in poverty with an additional 168,000, or a total of 240,000, individuals who are likely to experience poverty before the year 2000.

For most Americans, poverty is a brief experience. For others, approximately 17% of the poor (about 2% of the entire population), poverty is a persistent condition. According to the PSID, persistent poverty is defined as receiving welfare for eight or more years in their first time on welfare (Duncan, 1984).

Whether one views cross-sectional or longitudinal data, poverty most often affects single women, female-headed households (54% of all poor families are homes without a father), and children (one in every four children under age 6 and one in every five under age 18 years live in poverty) (Duncan, 1984; Leahy et al., 1995; Leidenfrost, 1993a).

Persistent poverty is not likely to decrease in the near future. Single-mother families are a growing proportion of all families with children under the age of 18 years. According to Rawlings (as cited in Lino, 1994), 13% of families with at least one child under age 18 in 1970 increased to 30% by 1992. It is estimated that half of all children will reside in a single-parent family at some time before they reach age 16, for an average period of 6 years (Lino, 1994).

In single parent, female-headed households, the reason the mother is single (divorced, widowed, or never married) will greatly influence the economic status of the family (Lino, 1994). Never-married, single mothers maintaining a household increased from 8% of all households to 38% between 1970 and 1992 while households of single mothers who were divorced or separated declined from 69% to 56% during the same years. Never-married, single mother households have an average annual before-tax income less than all other groups (Lino, 1994). For example, the average before-tax family income, between 1989 and 1991, for married couple households was \$43,130 (or \$17,120 per adult equivalent); widowed households was \$22,790 (or \$12,880 per adult equivalent); divorced or separated households was \$18,580 (or \$11,060 per adult equivalent); and never-married households was \$9,820 (or \$5,810 per adult equivalent). Thirty-nine percent of before-tax income received by never-married, single mother households comes from public assistance and food stamps. Married couple households income from public assistance and food stamps is 0.4%; widowed households 1.8%; and divorced or separated households 7.2% (Lino, 1994).

Attitudes of Americans toward welfare programs and program participants differ according to what element is being studied. For example, "in 1990, the Population Reference Bureau and the Center on Budget and Policy Priorities analyzed Gallup polling on where Americans think the poverty line should be set" (Clancy & Bowering, 1992, p. 15s). They reported the average income figure was \$3,000 higher than the official poverty line. In a review of literature, Groskind (1994) described the American "creed" as individualism, achievement, political (but not economic) equality, anti-government and anti-authority, self-reliance, and economic individualism. This creed creates an unfavorable view of public assistance. Conflicting views on welfare hinge on racial and political attitudes. According to Groskind (1994), Americans largely prefer "market justice" to "political justice" allowing unlimited wealth and poverty without much political interference. Parrott and Greenstein (1995) summarized these political attitudes on welfare (including Aid to Families with Dependent Children, food stamps, and subsidized housing), stating all should be eliminated.

Many views of welfare are based on social myths, which include: (a) most general assistance recipients are able to work; (b) most general assistance recipients are Black males; (c) most recipients remain on general assistance for extended periods of time; and (d) a full-time minimum wage job will raise a person above poverty. Other beliefs include: "welfare creates dependency"; "welfare recipients are lazy"; and "poor people can be motivated to work only if they are denied government assistance" (Halter, 1994, p. 706). For example, Joseph R. Holland, Republican State Representative of

Rockland County, New York, was quoted by Sack in The New York Times (Halter, 1994, p.706), "The party still views general assistance as a major contributor to the problem of welfare dependency. If they're physically able and are unused to working or don't work, we want them to struggle." One Ohio legislator was quoted in the Ohio State Legal Services Association Weekly (Halter, p. 706), stating that the general assistance needs changing because "it is not being used for the purposes intended since 50 percent of the dollars have been spent on 19- to 24-year-olds, who are mainly in college and use [general assistance] for beer money."

Contrary to these opinions are the facts about poverty. To summarize Fifty Facts About Poverty (Leindenfrost, 1993b), the majority of poor persons are white (66.5%); children are almost twice as likely to be poor than any other group in America; in 1991 the poverty rate among children in female-headed families was five times the rate among married-couple families, the number of all poor children is the highest since 1965, most are white, most have a parent who works, and most live outside large cities; poor families are more likely to have nutritionally inadequate diets than non-poor families; only 43.6% of the poor receive cash assistance such as Aid to Families with Dependent Children (AFDC); a federal study in 1988 estimated there were only enough low-skill jobs to employ one out of six AFDC participants who may be expected to work; and, one in five poor families with a child under age 18 cannot escape poverty even when the head of the household works full time.

There are many different views on poverty. The poor have always been among

the people of the world and each generation faces the same questions: Why are the poor poor? What should be done with the poor? How much help should they be given? Are they deserving of their situation? and, Are the current policies and programs that assist the poor doing the job intended? Understanding poverty and its effect on individuals and families is of utmost importance to policy makers, program administrators, the general public, and all society.

Diet and Health

According to a review of literature by Frazao (1994), diet is the underlying reason for the top three causes of death in the United States. Four of the top 10 causes are associated with diet: coronary heart disease, some types of cancer, stroke, and type II diabetes. These conditions account for nearly two thirds of all deaths each year. It is estimated that 35% of all cases of cancer could be prevented just by changing the diet. In 1991, 500,000 Americans died of cancer. The costs associated with these deaths reached \$104 billion. Thirty-five percent of \$104 billion could result in \$36.4 billion savings, not to mention the improved quality and quantity of life. Coronary heart disease costs Americans an estimated \$52 billion in direct health care costs and lost productivity. Obesity accounts for half of all type II diabetes. Being careful not to double count causes of death with overlapping risk (such as alcohol or illegal drugs), Frazao (1994) estimated that 300,000 (14%) of the 2.1 million deaths in 1990 could be attributed to poor diets and/or inadequate physical activity.

In an effort to focus a review of research conducted on malnutrition and its relationship to poverty in the United States, the Center on Hunger, Poverty and Nutrition Policy (1993) at Tufts University prepared a report titled "The Link Between Nutrition and Cognitive Development in Children." In this report, scientific evidence links nutrition intake to behavior and cognitive development in children from conception onward. Poor nutrition and impaired cognitive development are linked to environmental factors associated with poverty such as retarded physical growth and brain development, iron deficiency anemia, poor learning retention and memory, low standardized test scores, and permanent brain damage. Children living in poverty suffer twice, first from immediate hunger pains related to a poor diet and second from lost opportunities. Society also loses when nutritionally deprived children might otherwise make contributions to society as a whole by productivity as adults in later life, and contributions they may make to their families and succeeding generations.

Allocation of scarce resources is of great importance to lower income households. The lower the income, the greater the risk of poor nutrition and associated health care costs. Most at risk are single-mother households that earn less money and spend a greater percentage of their after-tax income on food and housing than any other group (Lino, 1994).

Nutritionally adequate diets for children and adults hinge on availability and access to a wide variety of appealing foods to meet dietary recommendations (Putnam, 1994). While supermarkets have increased their selection of foods, low-income families

do not always have access to these foods. For example, between 1982 and 1989, 62,000 new products were introduced to shoppers (Schwenk, 1991). In 1970, a medium-sized supermarket had an average of 64 produce items, while today there are 300 items. But, according to USDA food intake surveys in 1989-90 (Putnam, 1994), more than a fourth of the population did not eat fruit or drink fruit juice during three consecutive days of record keeping. A larger proportion of low-income people (33%) ate no fruit nor drank juice compared to 23% of higher income families (Putnam, 1994).

Food consumption is influenced by several factors, including awareness and concern about diet and health, changes in income, governmental food programs, and demographics (Schwenk, 1991). Of concern to this study is the effect of restricted food spending, income restrictions, and budget allocation of scarce resources on diet quality. Low-income, single-mother households self-declared their diet to be poor in a study conducted by Lino and Guthrie (1994). When asked if they had enough of the kinds of foods they wanted to eat, 58% of single-mother households reported they did, compared to 78% of married couple households. In response to the question, Did they sometimes or often not have enough to eat?, 7% of single-mother households responded affirmatively compared to only 2% of married couple households. Overall only 32% of single mothers reported their diet as excellent or very good (31% said fair to poor) compared to 40% of married couple households (17% said fair to poor). Lino and Guthrie (1994) found that although the calorie intake was similar for single and married couple households, single-mother households were significantly less likely to consume fruits, vegetables, and milk.

The diets of single-mother households were poorer than married couple households.

In "Dietary Guidelines for Americans," The U.S. Department of Agriculture and The U.S. Department of Health and Human Services (1990) recommend choosing a diet with plenty of vegetables, fruit and grain products. Most dietary carbohydrates should be from complex carbohydrates, with some from naturally occurring simple carbohydrates such as those found in fruit, vegetables, and milk. Refined sugar should be consumed in moderation.

With greater awareness of the relationship between diet and health, Americans are consuming less fat than a few years ago (Putnam, 1994). More consumers are using the information on food labels to make food selections, especially for first-time purchases. Most consumers are aware they should reduce the amount of fat in their diet. Fifty-eight percent have made major changes in their diets for health reasons during the past 3 years, yet few are aware of the importance of fiber. An increase in dietary fiber above the current intake of 12 grams per day to 25-35 grams is also recommended (Putnam, 1994).

To follow general recommendations to eat less fat and eat more fiber, people need to better understand what the major food sources of these components are and how their present diet measures up. Only 14% reported eating more fiber over the past three years which shows little change since 1985. In addition, only 5% of shoppers know they should consume 6 to 11 servings of bread and cereal daily (Putnam, 1994). Despite these facts, consumers are making changes in their diets and they are more aware of needed changes. How much money is available and allocated for all expenditures and how

available food dollars are spent affect the diet, which in turn affects health and health care costs.

Single-mother households have poorer diets than married couple households and are more at risk of poor diet because a greater percentage of their income must go towards food expenditures (between 19% and 27%). Married couple households average only 16% of their after-tax income on food expenditures. Never-married, single mother households have the greatest percentage of income (27%) spent on food. They also have the highest percentage of total income going toward housing costs (Lino, 1994; Lino & Guthrie, 1994).

Housing

Prior to 1981, Housing and Urban Development's (HUD) standard for affordable housing was that housing expenditures should not consume more than 25% of annual income. Today the standard is 30% of income (Shinn & Gillespie, 1994). In reality, housing accounts for the largest share of total after-tax expenses of all household groups in the United States with the average ranging from 25% to 34% of total expenditures. Families headed by never-married, single mothers pay the highest percent while married couple households pay the least (Lino, 1994). But, as is always the case, an average does not provide the whole picture. For example, the poor spend a much greater percentage of after-tax income on housing than do higher income households. In 1989, 56% of poor families spent at least half their income on housing (Shinn & Gillespie, 1994). In 1984,

Utah families receiving Aid to Families with Dependent Children (AFDC) spent 80% of their income to pay housing costs (rent and utility bills). By 1992, that percentage increased to almost 90% (State Community Services Office, 1993).

According to a review of literature by Shinn and Gillespie (1994), the number of affordable units available to low-income households declined from approximately 5.8 million in 1970 to 2.8 million in 1991. At the same time, the number of households needing affordable housing increased from 5.3 million to 8 million. Government-subsidized units have increased slowly from 0.6 million units in 1970 to 1.6 million units in 1989, while nonsubsidized units decreased from 5.2 million units to 1.2 million units nationwide. Shinn and Gillespie (1994) attributed the increasing gap between supply and demand to: (a) rents from poor tenants are insufficient to pay maintenance and operating costs so owners allowed units to deteriorate and abandoned them; (b) owners upgraded low rent units into higher priced units, converted them to condominiums, or temporarily took the unit off the market; and (c) the increasing poverty population and the loss of affordable housing units has placed increased demands on rents (Shinn & Gillespie, 1994).

The actual picture of housing costs and demand on housing units may be obscured by the number of families and individuals who are doubling up and sharing housing. Between 1980 and 1987, the number of unrelated families living together increased by 57%. Overcrowding, according to HUD standards, is having more than one person per

room in the house. Overcrowding is the highest it has been since World War II (Shinn & Gillespie, 1994).

Summary

High (and rising) housing costs added to the second largest expenditure for low-income families (food) are creating difficult circumstances for low-income families. When housing and food expenses are met, there is little income left in a poor family's budget to pay for child care, transportation, clothing, medical, and other necessary expenses. This research investigated the effect of housing and food expenditures on the diet quality of low-income households. It was hypothesized that as housing costs increased, the amount of money spent on food would decrease, which would in turn affect the diet and health of the household. The results of this study may be used by policy makers and program leaders to evaluate the effectiveness of government assistance programs and to support welfare program changes and reform.

METHODOLOGY

Definitions

Public Housing

Public housing is defined as publicly owned multi-unit housing complexes rented to low income households. For this study, the public housing units were limited to those owned by and or managed by the Salt Lake County Housing Authority. Households paid rent equal to 30% of their net income.

Section 8 Housing

Section 8 housing is defined as housing units privately owned and rented to low income tenants. Only Section 8 housing owners and managers who had agreements with Salt Lake County Housing Authority were used for this study. Low-income households renting Section 8 housing pay 30% of their income for housing expenses, including utilities. The Housing Authority pays the remainder of the fair market value rent to the landlord.

Waiting List

Waiting list participants were defined as households seeking housing assistance. Individuals who had contacted the Salt Lake County Housing Authority and had been placed on a waiting list for housing were considered. The wait for subsidized housing can be as long as 2 years. As housing becomes available, participants were contacted to

come into the office for a qualifying interview. After qualifications for housing assistance were met, prospective housing participants attended an orientation meeting. Persons attending the orientation meeting were contacted and enrolled in the study.

Economic Well Being

The continuing debate that poverty guidelines are not a true reflection of poverty is based upon the argument that assistance received from government sources is a source of income. For purposes of this study, two indicators of economic well being were used: total income and percent of poverty level.

Income. Income was defined as the total of any source of monetary or in-kind assistance. Categories of income included net wages, child support, Aid to Families with Dependent Children (AFDC), food stamps, Women Infants and Children (WIC), church support, alimony, social security, disability, relatives, friends, worker's compensation, veterans benefits, and other. Total income, excluding the cash value of housing subsidizes, was used to calculate the percentage of income spent on housing and food.

Percent of Poverty Level. For this study, percent of poverty level is the percent of poverty the household income would be without government assistance commonly referred to as "welfare." The percent of poverty level was calculated by dividing the total household yearly net income (minus food stamps, WIC, and AFDC) by HHS Poverty Guidelines (1995) per family unit size. The HHS Poverty Guidelines are one version of

Table 1

1995 Poverty Guidelines

Size of family unit	100% Poverty income level
1	\$7,470
2	10,030
3	12,590
4	15,150
5	17,710
6	20,270
7	22,830
8	25,390
For each additional person, add	2560

the United States federal measure of poverty. Table 1 shows the size of the family unit and the poverty level for the 48 contiguous States.

A household of two individuals living on an income of \$10,030 would be living at 100% poverty level. For this study, a household of two individuals living on a net yearly income of \$9,643 would be living at 96% of poverty level. The higher the income of the household, the higher the poverty level.

Total Housing Expenses and Percent Spent

For the purpose of this study, housing expense was defined as monthly rent

(tenant's portion of responsibility), electricity, gas for cooking and water heating, water, basic telephone (long distance calls were excluded), and renter's insurance. It is recognized that some participants paid monthly utility costs as consumed while others are on an equal payment plan administered by the utility company. The equal payment plan averages the total cost of the utility for a year's time and divides it into equal monthly payments. For purposes of this study, the actual amount paid monthly by the tenant for utilities would limit the amount of money available for other living expenses, including food. Thus, no distinction was made between equal payment plans and regular utility payment plans.

Housing expenses were figured for the month prior to the first contact. The participant was asked to recall expenses for each category. Utility bills, check receipts, calendars, budget books, and other record-keeping devices were consulted to ensure accuracy. The total housing expenditure was divided by the total income of the household to determine the percent of income spent on housing.

Total Food Expenses and Percent Spent

Food expenses were recorded during the week in which the first and last diet recalls were recorded. Food expenses were defined as food and non-alcoholic beverages purchased at grocery stores, convenience stores, and speciality stores; dining at restaurants; and school meals. Due to the difficulty of placing a dollar value on food obtained without a monetary exchange, only food that was purchased with cash, food

stamps, or vouchers was considered. The dollar value of the food was divided by the total income to determine the percent of income spent on food.

Food received from other sources such as government commodity programs, gardens, churches, pantries and food banks, or friends and neighbors was counted by events. Each time the household received food was counted as one event, regardless of the amount received.

Participant

The participant was defined as the person primarily responsible for meal preparation and grocery shopping for the household. Ages of participants ranged from 19 to 85 years with the mean age of 39 years. Twelve participants were male and 72 female.

Household

A household was defined as the total of all individuals living under the same roof who were financially interdependent.

Sample

The sample for this study was obtained from the Salt Lake County Housing Authority resident population and waiting lists. To avoid language difficulties, participation was restricted to English-speaking residents. Of the original sample of 187 households, 84 households, or 45%, completed participation. Twenty-eight participants

were from Public housing, 32 participants from Section 8 housing, and 24 participants from the waiting list for housing.

Households were deemed ineligible if they did not speak English, moved prior to or during the collection time period, were mentally or physically unable to complete the survey during the data collection time period of 7 to 10 days, or they were not living at the same private residence for at least 30 days.

Random selection of households was used for participation within the first two groups: public housing and Section 8 housing. Tenant rolls from Salt Lake County Housing Authority were used. Public housing and Section 8 housing participants were drawn independently. Waiting list participants were obtained in order of waiting list and qualification for housing assistance. As potential households were contacted and deemed ineligible, the next randomly drawn household would take the place of the ineligible household. Ineligibility resulted when households moved, refused to participate, or attempts to contact the household resulted in failure after three attempts. Attempts to contact households were made at different times of the day and week to accommodate work schedules and vacations.

All data were collected by the researcher, who was trained in methods of taking diet recalls practiced by the Women Infants and Children program (WIC) and the Expanded Food and Nutrition Education Program (EFNEP). The researcher was also trained in procedures used to maintain consistency in data collection on survey

questions. Diet data were entered into the computer by the researcher to maintain consistency in translation of foods eaten with the diet analysis data base.

Measures and Procedures

Consistency in data collections was maintained by the researcher administering the questionnaire and recording diet recalls for each participant. Diet recall data were entered into the computer for analysis by the researcher.

Instrument Design

Diet analyses. Data collected from each household included three 24-hour diet recalls from the person primarily responsible for grocery shopping and meal preparation. One diet recall was taken for either a Saturday or Sunday, the other two for week days. The diet recalls were analyzed using Mosby Diet Simple (1993) which is from the Nutritionist IV professional program for dietary analysis. The diet recalls for each participant were averaged together and the quality of the diet was measured by 16 dependent variables: percentage of RDA consumed for protein, fiber, vitamin A, vitamin C, iron, and calcium; the percent kilocalories received from protein, carbohydrates, fat, and alcohol; and, the number of servings consumed from each of the six major food groups in the "Dietary Guidelines for Americans" food pyramid (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 1990), which are servings of breads and cereals, fruit, vegetables, meats and protein, dairy, and fats and

sweets. The form used for recording diet recalls is in the appendix.

Housing expenditures and demographics survey. According to the Campbell and Desjardins' (1989) conceptual framework, the bottom line of nutrition and health is the result of household resource management of assets and liabilities of the household. Income, time, social support network, housing, and health all influence the next stage, family provisioning strategies. While all five areas of household resource management affect family provisioning strategies, this study only measured the effect of housing expenditures as a liability and income as an asset on these strategies.

The questionnaire, administered by the researcher, collected data on household expenditures including monthly rent, utility payments, telephone (excluding long distance calls), renters insurance, and any other housing related costs. It is recognized that housing expenses will vary at different times of the year depending on weather and whether the family participates in an equal payment utility program. This study did not control for variations in utility payments through the year but rather examined only current housing expenses as they related to money available for food.

Income data were calculated by adding together all sources of income for the household, including earned income, Aid to Families with Dependent Children (AFDC) grants, child support, food stamps, Women Infants and Children coupons (WIC), church support, alimony, Supplemental Security Income (SSI), Social Security, contributions from relatives and friends, worker's compensation, Veteran's benefits, retirement, pensions, and others sources of income. Demographic variables included the age, sex,

and race of the participant, as well as the size and composition of the household (see appendix for sample of questionnaire).

Food expenditures diary. Campbell and Desjardins' (1989) conceptual framework's end goal of nutrition and health first is dependent upon the household resource management or assets and liabilities of the household (income, time, social support network, housing, and health). The next level of their framework, management of family provisioning strategies, encompasses consumer decisions dealing with child care, transportation, clothing, laundry, and food. For this study food acquisition was examined.

A food expense diary was kept by each participant. Expenses included all food purchases for the household for 1 week. Participants and other family members were asked to record expenses of all food and beverage purchases at the grocery store, fast-food eating establishments, vending machines, restaurants and cafes, convenience stores, produce stands and vendors, and other sources of food.

Food received by the household, but not purchased, was counted by the number of events of donation. Each time food was received by the family, it was counted as one event, regardless of the amount of food in the donation. Such foods were identified as commodity foods, foods from family and friends, pantry or food banks, and the participant's garden or orchard.

The total number of meals eaten by all household members, but not purchased by them, was also counted by events. Such meals included breakfast, lunch, dinner, and

snacks. Meals may have come from family, friends, church, parties, free school lunch, shelter or community, and other sources. Each family member participating in the meal was counted as one event. Due to the difficulty in measuring dollar values of donated food and meals provided outside the household income, these events were not included in calculations. See appendix for sample of food expenditure forms.

Procedure

A mixed mode survey was used to collect data. Participants were contacted a total of four times, three of which were within 7 to 10 days. If the data could not be collected within 10 days from the time the first diet recall was recorded, the household was deemed ineligible and dropped from the study. The first contact was by letter from the Salt Lake County Housing Authority Office (see appendix for sample of letter). The letter introduced and validated the researcher and the research project and encouraged participation. Incentives for participation were food gifts donated by the Utah Food Bank through Salt Lake County Housing Authority.

The researcher contacted each household and in a personal interview format explained the research project, answered questions, recorded the first of three 24-hour diet recalls, completed the housing expenditure and demographics questionnaire, and gave directions on how to keep track of food expenditures for 1 week.

The third contact with the household was made by phone within 2 to 4 days of the personal visit. The participant was encouraged to record food expenditures, questions

were answered, and the second diet recall was recorded. If the household did not have a telephone, data were collected during a return visit to the home.

The final contact to the household was within 7 to 10 days of the first visit. A third 24-hour diet recall was conducted and any questions answered. The researcher and participant reviewed the food expenditures and clarified information. Upon completion of the diet recall, a gift of food was given to each participant.

Each household had three contacts with the researcher: first visit to the home, phone call or second visit to the home, and final visit to the home. At any stage, a household was counted as a nonresponse after three unsuccessful attempts to contact were made. If a household was considered ineligible, or a nonresponse, the next randomly drawn household took its place.

Data Analysis

Data from the questionnaire, food expenditures, and diet analysis were analyzed by the SPSS statistical analysis program. Statistical procedures included frequencies, Pearson correlations, the t test, and the nonparametric Mann-Whitney U test.

RESULTS

Descriptive Frequencies

The participant was the person primarily responsible for meal preparation and grocery shopping for the household. A household consisted of all individuals living in the household who were financially interdependent. Age of the participant ranged from 19 to 85 years with the mean age of 39 years. Twelve participants were male and 72 female. A descriptive summary of household demographics is presented in Table 2. The table includes the independent variables age, income, housing expenditures, percent of income spent on housing, food expenditures, percent of income spent on food, and the percent of poverty level of the household.

Hypothesis

The purpose of this study was to determine the effect of housing and food expenditures on the diet quality of low-income families. Specific hypotheses tested are:

1. There is no correlation between the percent of poverty level, the percent of income spent on housing, and the percent of income spent on food on the diet quality of low income households as measured by: percent RDA protein, percent RDA fiber, percent RDA vitamin A, percent RDA vitamin C, percent RDA iron, and percent RDA calcium consumed; percent calories from protein, percent calories from carbohydrates, percent calories from fat, and percent calories from alcohol; servings from

Table 2

Descriptive Summary: Demographics

	Combined N= 84			Public Housing N= 28			Section 8 Housing N= 32			Nonsubsidized Housing N= 24		
	Mean	± SEM	Median	Mean	± SEM	Median	Mean	± SEM	Median	Mean	± SEM	Median
Age	39	1.86	34	47	3.90	38	37	2.6	33	32	1.9	33
Housing Expenditures	\$290	\$20	\$237	\$860	\$100	\$683	\$840	\$64	\$763	\$876	\$82	\$759
Income Spent on Housing	37%	3%	30%	33%	4%	27%	30%	3%	27%	51%	8%	46%
Food Expenditures	\$75	\$7	\$60	\$79	\$14	\$62	\$71	\$10	\$55	\$74	\$12	\$60
Income Spent on Food	10%	1%	7%	11%	2%	7%	9%	1%	7%	9%	1%	7%
Poverty Level	49%	5%	53%	57%	9%	66%	46%	9%	36%	44%	9%	34%

bread/cereal, fruit, vegetable, meat/protein, dairy, and fats and sweets food groups consumed.

2. There is no difference in low-income households who receive assistance with housing expenses and low-income households who do not receive assistance with housing expenses on diet quality as measured by: percent RDA protein, percent RDA fiber, percent RDA vitamin A, percent RDA vitamin C, percent RDA iron, and percent RDA calcium consumed; percent calories from protein, percent calories from carbohydrates, percent calories from fat, and percent calories from alcohol in the diet; servings from bread/cereal, fruit, vegetable, meat/protein, dairy, and fats and sweets food groups consumed.

Correlations Between Independent Variables and Measures of Diet Quality

The end goal of food acquisition and security, according to the Campbell and Desjardins' (1989) conceptual framework, is health and nutrition. Pearson's correlations were used to analyze the correlation of each dependent variable used to measure diet quality (percent RDA protein, percent RDA fiber, percent RDA vitamin A, percent RDA vitamin C, percent RDA iron, and percent RDA calcium consumed; percent calories from protein, percent calories from carbohydrates, percent calories from fat, and percent calories from alcohol in the diet; servings from bread and cereal, fruit, vegetable, meat and protein, dairy, and fats and sweets food groups consumed) with each the independent variable (percent of poverty level, percent of income spent on housing, and percent of

income spent on food). An alpha level of .05 was used to determine the level of significance of each correlation.

The number of servings from the bread and cereal group was significantly correlated with percent of income spent on housing ($p=.012$) with a negative correlation ($R = -.2722$). The greater the percent of income spent on housing, the lower the number of servings from the bread and cereal group. The percent of calories from fat was also significantly correlated with the percent income spent on housing ($p=.032$). The higher the percentage of income spent on housing, the higher the percent of calories coming from fat.

The percent of RDA for protein ($p=.024$) and fiber ($p=.037$) were significant with the percent of poverty level ($R = .2465$ and $.2276$, respectively). The higher the household income, the greater the percent of RDA for protein and fiber was consumed. Also statistically significant was the percent calories coming from protein ($p=.022$) and percent poverty level. The higher the income, the more protein consumed, thus improving the RDA for protein and the percent of calories coming from protein.

There was no diet quality variable significantly correlated with the percent of income spent on food. Table 3 summarizes all correlations.

Fewer than one fifth of the diet quality variables were significantly correlated with percent poverty. Less than one eighth of the diet quality variables were significant with percent income spent on housing. No diet quality variables were significantly correlated with percent income spent on food. Few variables were significantly correlated and all

Table 3

Correlation Coefficients: Diet Quality Variables with Independent Variable (N= 84)

Variable	% Poverty	% Income spent on housing	% Income spent on food	Age	Available transportation	Receiving government food assistance	Days past since receiving food stamps
% RDA Protein	.2465 p= .024	.0070 p= .949	-.1085 p= .326	.3094 p= .004	-.0216 p= .845	.2248 p= .040	.0598 p= .674
% RDA Fiber	.2276 p= .037	-.1634 p= .138	-.1179 p= .285	.3215 p= .003	.1395 p= .206	.0023 p= .984	.1131 p= .425
% RDA Vitamin A	-.0914 p= .408	-.1149 p= .298	.0021 p= .985	-.0197 p= .859	-.0203 p= .854	-.0115 p= .917	.1778 p= .207
% RDA Vitamin C	.0842 p= .446	-.1086 p= .326	-.0067 p= .952	-.1015 p= .358	-.0287 p= .795	.0859 p= .437	.0724 p= .610
% RDA Iron	.0044 p= .968	-.1955 p= .075	.0081 p= .942	.1610 p= .144	-.1723 p= .117	-.1154 p= .296	.1943 p= .168
% RDA Calcium	.1233 p= .264	-.1190 p= .281	.0653 p= .555	.1120 p= .310	-.1485 p= .178	-.0598 p= .589	-.0112 p= .937
Servings of bread and cereal	.0018 p= .987	-.2722 p= .012	.0776 p= .483	-.0804 p= .467	-.0894 p= .419	-.2209 p= .043	.0472 p= .739
Servings of fruit	.0503 p= .650	-.1365 p= .216	.0995 p= .368	.0178 p= .872	.1073 p= .331	-.1201 p= .276	.0519 p= .715
Servings of vegetables	.1180 p= .285	-.1542 p= .161	.0542 p= .624	.2695 p= .013	.1307 p= .236	.1328 p= .228	.0063 p= .965
Servings of meat and protein	.0408 p= .713	-.0297 p= .788	.1413 p= .200	-.1456 p= .186	-.0796 p= .472	-.1411 p= .201	.0498 p= .726
Servings of dairy	.1440 p= .191	-.0501 p= .651	.0267 p= .810	.1018 p= .357	-.1499 p= .174	-.022 p= .984	-.0940 p= .507

(table continues)

Variable	% Poverty	% Income spent on housing	% Income spent on food	Age	Available transportation	Receiving government food assistance	Days past since receiving food stamps
Servings of other group	.0272 p= .806	-.0944 p= .393	.1020 p= .356	-.1455 p=.187	-.2068 p= .059	-.1976 p= .072	-.0499 p= .725
% Calories from protein	.2495 p= .022	.0228 p= .837	-.1159 p= .294	.2919 p= .007	-.0348 p= .753	.2281 p= .037	.0550 p= .699
% Calories from carbohydrates	-.1627 p= .139	-.1906 p= .083	.0615 p= .578	-.1789 p= .104	.1128 p= .307	-.2373 p= .030	-.0834 p= .557
% Calories from fat	.0836 p= .450	.2338 p= .032	-.0700 p= .527	.1228 p= .266	-.1559 p= .157	.1944 p= .076	-.1085 p= .444
% Calories from alcohol	.0621 p= .575	.1272 p= .249	.0628 p= .571	-.1029 p= .352	.1171 p= .289	.1487 p= .177	-.1714 p= .224

Signif. LE .05 (2 tail)

variables had low R values, thus the null hypothesis was accepted that overall there is no correlation between the percent of poverty level, the percent of income spent on housing, and the percent of income spent on food on the measures of diet quality of these low income households.

By using Pearson r , additional correlations were calculated for each diet quality measure and the independent variables: age of the participant, available transportation in the household, receiving government food assistance, and the number of days since the household received food stamps. Significant positive correlations were found between age of the participant and consumption of protein ($p=.004$), fiber (.003), servings of vegetables (.013), and the percent calories from protein (.007). The older the participant the better their diet was in relation to protein, vegetables, and fiber. No other diet variables were correlated with age.

A statistically significant correlation was found between RDA for protein ($p=.040$), consumption of bread and cereals ($p=.043$), percent of calories from protein ($p=.037$) and percent of calories from carbohydrates ($p=.030$). Participants who received food assistance had higher RDA's for protein and consumed more calories from protein, but consumed less servings from bread and cereal and had fewer calories from carbohydrates. There was no significant relationship between any other dependent and independent variables.

It is recognized that the statistical significance of a correlation hinges on the size of the sample, with the larger the sample the greater the likelihood of a significant correlation

correlation between the two variables. The strength of the association between the two variables may be measured by Pearson's r . The larger the r the stronger the association between the variables and the higher the resulting r^2 when a regression is calculated using the two variables. None of the Pearson correlations was high enough to warrant further statistical analysis.

The Effect of Receiving Housing Assistance on Diet Quality

To measure the hypothesis that there is no difference in the diet quality between households that received housing assistance and those that did not receive housing assistance, t tests were calculated for each independent variable and each dependent variable. Public and Section 8 housing are both subsidized housing and so were combined into one group for this test. Nonsubsidized housing participants did not have government assistance with their housing expenses. The two groups, subsidized and nonsubsidized, were compared using two-tailed t tests (see Tables 4 and 7). Results of the t tests indicated that there is no statistical difference between the diets of the two groups as measured by each diet quality variable. The number of servings from the vegetable and the meat and protein groups approached significance with a p value of .086 and .082, respectively.

To confirm that no assumptions about the data had been unwittingly violated, which would have invalidated the t -test results, nonparametric tests were also calculated. The nonparametric test most frequently substituted for t tests, the Mann-Whitney U test,

requires limited distribution assumptions about the data and was used to confirm t tests results. No statistically significant difference was found between the two groups. The researcher accepted the null hypothesis there is no difference in diet quality between low-income households that receive assistance with housing expenses and low-income households that do not receive housing assistance with housing expenses. Table 4 shows the results of the t tests used to measure the differences between the two groups for each measure of diet quality. Because the t test is a stronger test and showed the same results as the Mann-Whitney U test, the Mann-Whitney U test is not included in this thesis.

Discussion

Correlation of Independent Variables

Logically the independent variables (percent of poverty level, percent of income spent on housing, percent of income spent on food, age of participant, available household transportation to purchase food, number of days past since receiving food assistance, and receiving government food assistance) should be correlated. Pearson r correlation coefficients were used to measure the association between these variables. The strongest correlation among these variables was between the percent of poverty level of the household and the incidence of receiving food assistance with $R=.5390$ and $p=.000$. There is a negative correlation between percent of income spent on food and the percent of poverty level of the household. The higher the income of the household, the lower the percent of income spent on food. A negative correlation exists between

Table 4

Receiving Housing Assistance Versus Not Receiving Housing Assistance:Diet Quality Variables

	t tests		
	t value	Degrees Freedom	p value
% RDA Protein	-.50	44	.617
% RDA Fiber	1.06	60	.292
% RDA Vitamin A	.00	31	.997
% RDA Vitamin C	.02	35	.988
% RDA Iron	.58	37	.568
% RDA Calcium	.64	38	.527
Servings of Bread and Cereal	.79	38	.436
Servings of Fruit	.80	82	.425
Servings of Vegetables	1.74	82	.086
Servings of Meat and Protein	-1.76	82	.082
Servings of Dairy	.09	46	.925
Servings of Other Group	-.53	82	.597
% Calories from Protein	-.69	45	.496
% Calories from Carbohydrates	.80	41	.429
% Calories from Fat	-.87	40	.387
% Calories from Alcohol	-1.03	82	.306

Subsidized Housing n = 60

Nonsubsidized Housing n = 24

transportation and percent income spent on housing. The higher the percent of income spent on housing, the less likely the household will have their own transportation.

Transportation was also negatively correlated with age. The older the participant, the less

personal transportation they possessed and thus had to rely upon public transportation or friends and family to get to and from the grocery store. Older participants were also more likely to be receiving food assistance and to be living at a lower poverty level than younger participants.

All statistically significant correlations are logical. Households above the poverty level are making higher incomes and do not need government assistance programs to help meet basic needs. When an individual retires, income is reduced. Pension plans, retirement, and Social Security do not match what the individual could be making if he/she were still employed full time. Death of a spouse reduces Social Security income. The majority of the study participants were female. Older females belonged to a cohort that was less likely to work full time outside of the home and thus had lower Social Security benefits and retirement than their male counterparts. The death of a spouse would further reduce available money for household budgets. A summary correlation matrix is found in Table 5.

The lack of a stronger correlation between transportation and the percent of income spent on food was surprising to the researcher. It was assumed if the household lacks personal transportation, they will be more likely to shop in convenience stores and other sources of food close to home, which may be more costly than shopping at large grocery stores. While additional research is needed on this population to determine significant relationships between transportation and choice of food acquisition sources, it may indicate that households without their own transportation were wisely using dollars

Table 5

Correlation Coefficients: Independent Variables (N = 84)

Variable	% Income spent on housing	% Income spent on food	Age	Available transportation	Days past since receiving food stamps	Receiving food assistance
% Poverty	-.0902 p= .415	-.3250 p= .003	.3362 p= .002	.1630 p= .139	-.0588 p= .679	.5390 p= .000
% Income spent for housing	--	-.0829 p= .453	.0005 p= .997	-.2255 p= .039	-.0747 p= .599	.1667 p= .130
% Income spent on food		--	-.0272 p= .806	.0877 p= .428	.1051 p= .459	-.1988 p= .070
Age			--	-.2267 p= .038	.0103 p= .942	.3165 p= .003
Available transportation				--	.1838 p= .192	.0529 p= .633

Signif. LE .05 (2 tail)

when they did have transportation to shop for food.

Total dollars spent for food appeared low and had a range of \$0 to \$271. Only two households did not spend any money for food during the week in which data were collected. The mean expenditure was \$75 and the median \$60. The one week used for this study may not have been sufficient to adequately determine total food expenses. Some of the participants complained they had just gone to the store and purchased their groceries for the month. Others indicated they would not get their food stamps for a while and so would not be shopping. Additional research with a longer survey time period is suggested for a clearer picture of total food expenses.

The Effect of Receiving Housing Assistance on Independent Variables

Public and Section 8 housing are both subsidized housing and so were combined into one group for this test. Nonsubsidized housing participants did not have government assistance with their housing expenses. The two groups, subsidized and nonsubsidized, were compared using t tests for each dependent variable of which there was no statistically significant difference between the groups. Additional t tests were calculated on the independent variables: percent of poverty, percent of income spent on housing, and percent of income spent on food. Table 6 summarizes the t tests of independent variables percent poverty, percent income spent on housing, and percent income spent on food (see also Tables 2 and 6).

The variable percent of income spent on housing was significant with a p value

Table 6

Receiving Housing Assistance Versus Not Receiving Housing Assistance:Independent Variables

	t tests		
	t value	Degrees Freedom	p value
% Poverty	.65	44	.520
% Income spent on housing	-3.19	82	.002
% Income spent on food	.56	82	.575

Subsidized housing $n = 60$ Nonsubsidized housing $n = 24$

of .002. This is a logical assumption. Nonsubsidized households had a higher mean and median housing expenditure than the subsidized groups. The poverty level of the two groups was not statistically different. Logically both groups had available at their disposal about the same amount of money but the subsidized housing group spent a lower percentage of money on housing. The null hypothesis was accepted that the two groups did not differ. It may then be hypothesized that the subsidized housing group, due to lower housing expenses, had more discretionary money to spend than the nonsubsidized group. This money may then be used for other necessities.

There is no statistical difference between subsidized and nonsubsidized housing in the amount of money spent on food. According to this study there is also no statistical difference between the diets of the two groups as measured by each independent variable (see Table 6). While additional research is needed to confirm

these findings and study the effects of other variables on diet quality of low-income households, this study suggests that improving a household's living accommodations will not improve diet or the total food expenditure of the household, but will make available a greater amount of money, which may then be used as deemed necessary by the household.

Diet Quality of Sample

The percentage of RDA for vitamin A (244%), vitamin C (158%), and iron (107%) was above normal while the RDA for protein was just below normal at 95%. Servings of bread and cereal, and meat and protein were also above the normal recommended servings. Each of the other measures of diet quality was close to recommended amounts. This finding was a surprise to the researcher. The researcher expected to find a poorer diet. Diet quality measures that were low were RDA for fiber (61%), calcium (79%), servings of fruit (1.37 servings), servings of vegetables (.79 servings), and servings of dairy (1.05 servings). Lack of calcium is directly related to servings of dairy products. Low fiber is related to servings to fruit and vegetables. A descriptive summary of each diet quality measure is found in Table 7.

Donated food and meals. According to the Campbell and Desjardins' model (1989), health and nutrition status of households is affected by how and where food is acquired. Due to the difficulty of measuring dollar values of donated food and meals

Table 7

Descriptive Summary: Diet Analysis

Variables	Recommend	Combined N= 84			Public Housing N= 28			Section 8 Housing N= 32			Nonsubsidized N= 24		
		Mean	± SEM	Median	Mean	± SEM	Median	Mean	± SEM	Median	Mean	± SEM	Median
RDA for Protein	100%	95.33	2.66	96.00	98.39	5.47	98.50	91.09	3.60	88.00	97.42	4.82	96.00
RDA for Fiber	100%	61.43	3.44	57.00	67.61	7.78	61.50	59.22	4.68	56.50	56.17	4.87	50.50
RDA for Vitamin A	100%	244.2 1	30.52	124.00	173.96	28.26	124.50	305.50	50.37	183.00	244.46	75.12	99.50
RDA for Vitamin C	100%	158.2 3	12.91	147.00	129.96	19.65	103.00	183.22	19.33	185.00	157.88	28.79	142.50
RDA for Iron	100%	107.5 4	7.94	88.00	95.21	10.88	77.00	124.13	13.64	95.00	99.79	16.55	75.00
RDA for Calcium	100%	79.56	5.54	67.00	80.89	9.20	73.00	82.06	8.88	67.00	73.25	11.30	55.50
Servings of bread and cereal	6-11	7.25	.34	7.40	7.00	.66	6.00	7.79	.43	8.15	6.80	.69	6.30
Servings of fruit	2-4	1.37	.19	.70	1.64	.44	.60	1.31	.27	.75	1.13	.25	.75
Servings of vegetables	3-5	.79	.11	.45	.95	.20	.60	.87	.19	.60	.50	.12	.30
Servings of meat and protein	2-3	3.98	.27	3.65	3.45	.38	3.20	3.90	.32	4.05	4.72	.70	4.30

(table continues)

Variables	Recommend	Combined N= 84			Public Housing N= 28			Section 8 Housing N= 32			Nonsubsidized N= 24		
		Mean	\pm SEM	Median	Mean	\pm SEM	Median	Mean	\pm SEM	Median	Mean	\pm SEM	Median
Servings of other	--	8.97	.51	8.50	8.08	.70	8.75	9.43	.69	8.40	9.40	1.30	8.05
% Protein calories	15%	14.16	.40	14.00	14.61	.82	14.50	13.44	.56	13.00	14.58	.73	14.50
% Carbohydrates calories	55-65%	53.60	1.16	53.00	53.93	1.97	56.00	54.38	1.78	53.00	52.17	2.13	52.00
% Fat calories	\leq 30%	31.80	.88	32.00	30.93	1.42	31.50	31.63	1.47	32.00	32.00	8.39	70.30
% Alcohol calories	--	.66	.31	.00	.46	.34	.00	.44	.35	.00	1.17	.92	.00

provided outside the household income, these events were not included in the statistical analysis. Foods received from other sources such as government commodity programs, gardens, churches, pantries and food banks, and friends and neighbors were counted by events. Each time the household received food was counted as one event, regardless of the amount received. Seventy-four percent of all households surveyed did not receive any food from nonmonetary sources. Fifty-six percent of all families did not receive meals from any nonmonetary source. The most frequent source of food and meals was from the household's extended family. Twenty-seven percent of households reported at least one event of food given to them by family and 44% had at least one event of a meal provided by the extended family. The school lunch program was the next highest donor of free meals with 41% of households reporting at least one free meal at school. For a complete summary of foods received through nonmonetary sources, see Tables 8 and 9.

The effects of receiving food assistance on diet quality. According to Schwenk (1991), food consumption is influenced by several factors, including awareness and concern about diet and health, changes in income, governmental food programs, and demographics. Of concern to this study is the effect of decreased food spending, income restrictions, and budget allocation of scarce resources on diet quality. Sixty-five percent of the households studied did not receive government food assistance (food stamps or WIC food vouchers). According to the Utah Community Childhood Hunger Identification Project (1993), an average of 58% of eligible households are not participating in any food assistance program. The study states two major reasons for

Table 8

Percentage of HouseholdsReceiving Food Not Paid For (N = 84)

Nonmonetary source of food	Percent
Government commodities	5%
Family	27%
Friends	15%
Pantry or food bank	9%
Garden or orchard	15%
Any other source	10%

Table 9

Percentage of HouseholdsReceiving Meals Not Paid For (N = 84)

Nonmonetary source of meals	Percent
Extended family	44%
Friends	24%
Church	3%
School	41%
Other sources	8%

nonparticipation in food stamps: the household belief they were not eligible, and embarrassment at participation.

To determine the effect of receiving food assistance, the *t* test was used to measure the effect of receiving food assistance on the diet quality versus not receiving food assistance. Out of the 16 variables used to measure diet quality for this study, 4 were statistically different between the two groups: servings of bread and cereal; servings from the other group; percent calories from protein; and percent calories from carbohydrates. Nearing statistical significance is the percent of RDA consumed for protein and the calories from fat with a *p* value of .055 and .069, respectively (see Tables 7 and 10 for a complete summary).

The percent of calories received from protein is directly related to the percent of RDA for protein. The servings of bread and cereal and percent calories from carbohydrates are related. Also related is percent calories from fat and servings of food from the other group (which is comprised of fat and sugar). It stands to reason if one variable is significant, then the other variable would also be significant or close to it. No other variables were statistically significant between the two groups.

The measures of diet quality that was low according to descriptive frequencies (see Table 6) are not the same ones that are statistically significant between the two groups: receiving food assistance and not receiving food assistance. The findings of this study indicate that households that participate in government food assistance programs do not have superior diets due to this participation.

Further research is needed to determine effects of food assistance on diet quality of low-income households and how to improve the inadequate areas. Education has been

Table 10

Receiving Food Assistance Versus Not Receiving Food Assistance:Diet Quality Variables

	t tests		
	t value	Degrees Freedom	p value
% RDA Protein	-1.97	49	.055
% RDA Fiber	-.02	67	.983
% RDA Vitamin A	.11	69	.911
% RDA Vitamin C	-.74	49	.464
% RDA Iron	1.10	65	.275
% RDA Calcium	.56	61	.581
Servings of bread and cereal	2.03	55	.047
Servings of fruit	1.10	82	.276
Servings of vegetables	-1.17	52	.246
Servings of meat and protein	1.29	82	.201
Servings of dairy	.02	55	.984
Servings of other group	1.83	82	.072
% Calories from Protein	-2.01	49	.050
% Calories from Carbohydrates	2.30	64	.025
% Calories from Fat	-1.85	62	.069
% Calories from Alcohol	-1.36	82	.177

Not Receiving Food Assistance $n = 55$ Receiving Food Assistance $n = 29$

demonstrated to be effective in improving diet quality. For example, the Expanded Food and Nutrition Education Program (EFNEP) in Salt Lake County during 1995 reported 95% of all families improved the quality of their diet after participation in an education

program focusing on shopping wisely for and nutritional quality of the diet (Expanded Food and Nutrition Education Program, 1995).

Vitamin A. The consumption of vitamin A was high for all three housing groups with the median percentage consumed being 125% for subsidized housing, 183% for Section 8 housing, and 100% for nonsubsidized housing. Vitamin A consumption ranged from 6% to 1522% of RDA. Fifteen percent of the sample had RDA values over 500%. On the other end of the scale, 35% of public housing participants had RDA percentages of less than 100, Section 8 housing had 34%, and of nonsubsidized housing subjects, 50% had less than 100% RDA.

High levels of vitamin A are easy to obtain. Vitamin A fortification is found in many cereals and milk. Foods rich in vitamin A will supply more than the RDA requirements. For example, one cup of raw sliced carrots, a commonly recognized source of vitamin A, will provide 38,300 international units (IU) of vitamin A. The vitamin A RDA for women between 23 and 50 years old is 4,000 IUs. One cup of carrots will provide 958% of the RDA for vitamin A (Gebhardt & Matthews, 1991). Measurement for vitamin A has changed from international units (IU) to retinol equivalents (RE), which are more accurate (Wardlaw, Insel, & Seyler, 1994). International units are still in use and was the measure used by the Mosby Diet, the vitamin A database used for the dietary analysis of this study.

Vitamin A is a fat-soluble vitamin and stores easily in the body. It is not necessary to consume vitamin A-rich foods on a daily basis. According to nutrition text

books (Wardlaw et al., 1994; Whitney & Nunnelley, 1987), vitamin A was first discovered in 1913, but researchers are still baffled as to its exact role in the cell. It is most commonly known for its role in vision.

Toxicity of vitamin A occurs when intakes of 10 times the RDA is consumed for prolonged periods of time. Toxicity can lead to birth defects; spontaneous abortions; permanent damage to the liver, bones, and eyes; and joint and muscle pain (Wardlaw et al., 1994; Whitney & Nunnelley, 1987). Two percent of the sample had RDA levels over eight times the recommendations. It is not known how long these households maintained this level of consumption. Further research is needed to determine if they are at risk of toxicity.

There are two forms of vitamin A. The most common is chemical forms called preformed vitamin A or retinoid, of which retinol is one example. The second form is plant pigments called provitamin A or carotenoid. The most common carotenoid is beta-carotene or carotene. Beta-carotene is the plant pigment yellow-orange. Yellow, orange, and deep green vegetables are high in carotene. Consuming high levels of carotene will cause the skin to turn yellow-orange, especially the palms of the hands and the soles of the feet. The body converts carotene to retinol slowly and on a controlled basis, thus preventing vitamin A toxicity. Of greater concern for toxicity of vitamin A is the supplementation of diets with retinol.

World wide, vitamin A deficiency is second only to accidents as a cause of blindness. People in the United States are at little risk comparatively speaking.

However, most at risk for vitamin A deficiency are preschoolers who do not eat enough vegetables, the urban poor, the elderly, and alcoholics. While this study may indicate the majority of the study population is receiving adequate vitamin A levels, the study was conducted during later summer when fresh produce was plentiful and may have been consumed more frequently. Further research is needed to determine if these high levels are maintained year round and whether the intakes of vitamin A are from carotene or retinol.

Further research is needed to determine if the participant reporting the 24-hour diet recall is also reflective of all diets in the household, especially that of young children. It is suspected participants may have been inclined to report favorable diet recalls amounts in order to "look good" to the researcher. It is also not known whether the diet of the participant was also the diet of other members of the household.

Fruit, vegetable, and fiber consumption. Consumption of fruit and vegetables was low with a median of less than one serving per day. The combined recommended servings for the two food groups is five a day. Approximately 33% of the sample did not have any fruit and a little less than half ate no servings of vegetables. According to USDA food intake surveys in 1989-90 (Putnam, 1994), more than a fourth of the population of the United States did not eat fruit or drink fruit juice during three consecutive days of record keeping. A larger proportion of low-income people (33%) ate neither fruit nor drank juice compared to 23% of higher income families (Putnam, 1994). The results of this study are comparable to national data, but levels of fruit and vegetable

consumption are much higher than Utah data. According to Utah Department of Health yearly behavioral risk factor survey (Summary Index of Fruits and Vegetables, 1994), approximately 5% households with an annual income up to \$10,000 consume less than one serving of fruit or vegetables per day. Thirty-three percent have at least one serving, but less than three servings per day. Only 18% of the state's population consumed five or more servings of fruit and vegetables per day. In this study, 18% of the sample consumed at least two servings of fruit and only 2% consumed three servings of vegetables, the recommended servings per day.

As has been noted, the fiber consumption for this study was low, with a mean of less than 62% and a median of 57%. The U.S. Department of Agriculture and The U.S. Department of Health and Human Services (1990) in "Dietary Guidelines for Americans" recommended choosing a diet with plenty of vegetables, fruit, and grain products. These foods supply carbohydrates for energy, vitamins A and C for regulation of body processes and body chemical reactions, and fiber for proper elimination of body wastes. The recommended fiber consumption for the adult population is between 20 and 35 grams of fiber per day. The average intake in America is about half this amount (Wardlaw et. al., 1994). The results of this study are comparable to national trends of fiber consumption with a median intake of 57% of the RDA for fiber.

Fiber is needed in the body to aid in the proper elimination of body wastes. Too little fiber in the diet leads to constipation, hemorrhoids, diverticulitis, and some forms of colon cancer. Dietary fiber plays a key role in prevention of colon cancer. The most

deadly form of colon cancer is second only to lung cancer in occurrence and mortality rates in the United States (Wardlaw et al., 1994). Most at risk for diet-related diseases due to inadequate fiber consumption is the nonsubsidized housing group with a median intake of 50% the RDA for fiber. Subsidized housing participants consumed more than 50% of the RDA for fiber, but were well under the 100% recommended.

The elderly are particularly sensitive to diseases related to fiber consumption. On a positive note is the awareness the elderly appear to have on the need to increase fiber in the diet. Although no statistically significant correlation was found in each diet quality variable and the independent variables, there was a positive correlation between age and fiber consumption. The older the participant, the higher the consumption of fiber.

Low fiber and the low consumption of fruits and vegetables are related. Fiber may be increased by increasing fresh fruits and vegetables, especially when the skin or peel of the fruit is also consumed. To follow general recommendations to eat less fat and eat more fiber, people need to better understand what the major food sources of these components are and how their present diet compares to the recommendations. This study supports the need for continuing nutrition education programs, which focus on improving consumption of fruits, vegetables, and other high fiber foods.

Dairy consumption and calcium. The consumption of dairy products in this study is low. Forty-four percent of the sample had no servings of dairy products during the three diet recalls. Seventy-one percent had one or less servings from the dairy food group. This low consumption of dairy products resulted in median RDA for calcium of

67% and mean RDA less than 80%. The most at risk for inadequate consumption of calcium rich foods was the nonsubsidized housing group with a median of 56% RDA and a mean of 73%.

Calcium is needed by all cells for blood clotting, muscle contraction, nerve transmission, cellular metabolism, and the major role of forming and maintaining bones. Ninety-nine percent of calcium in the body is used for strengthening bones and teeth (Wardlaw et al., 1994; Whitney & Nunnelley, 1987). Long-term poor calcium intake is a contributor of poor bone density, which in later years may result in osteoporosis. Osteoporosis or poor bone density results in painful and debilitating fractures. One measure of prevention is increasing the bone mass before middle age. Consumption of calcium-rich foods will aid in this process.

Calcium from dairy products is the largest and most dense source for dietary calcium (Wardlaw et al., 1994). Unfortunately, according to the U.S.D.A. Economic Research Service (as cited in International Dairy Foods Association, 1995), the per capita pounds of fluid milk products has decreased steadily over the last 20 years. Per capita consumption has dropped from 245.9 pounds in 1974 to 209.3 pounds in 1995.

There was no difference in calcium consumption between study participants receiving government food assistance and those not receiving food assistance. Foods rich in calcium should be easier to obtain for families receiving food assistance yet there was no significant difference between the two groups. While further research is needed to determine the effects of educational programs on diet and consumer choices, education is

a means to increase consumption of dairy and other calcium-rich foods. Increased education could be patterned after or joined with successful education programs such as EFNEP (Expanded Food and Nutrition Education Program, 1995), which reported in 1995 that participants increased intake of dairy foods after participating in consumer and nutrition education lessons.

CONCLUSION

Limitations

Sample

The sample for this study was obtained from the Salt Lake County Housing Authority resident population and waiting lists. To avoid languages difficulties, participation was restricted to English-speaking residents. Of the original sample of 187 households, 84 households, or 45%, completed participation. Twenty eight participants (33%) were from Public housing, 32 participants (38%) from Section 8 housing, and 24 participants (29%) were from the waiting list for housing. The response rate was calculated by dividing total completed samples by the total contacts minus ineligible households. The response rate was similar for all three groups: Public housing, 57%; Section 8 housing, 57%; and Nonsubsidized housing, 55%.

Households were deemed ineligible if they did not speak English, moved prior to or during the collection time period, were mentally or physically unable to complete the survey during the data collection time period of 7 to 10 days, or were not living at the same private residence for at least 30 days. A summary of response rates is found in Table 11.

Circumstances surrounding the homes of two potential participants threatened the safety of the researcher and resulted in a nonresponse. Further research is needed to determine what effect housing and food expenditures have on the diets of those

Table 11

Response Rate

Status of attempted contacts	Public housing	Section 8 housing	Nonsubsidized housing
Response rate	57%	57%	55%
Completed surveys	28	32	24
Ineligibles (*)	13	10	15
Refused	13	14	7
Not home	5	10	10
On vacation	2		
Safety of researcher		1	1
Total sample (N = 187)	62	66	59
Ineligible households summary			
Non-English speaking	3		
Data collection time expired	5		
Moved	5	8	5
Dementia		1	
Died		1	
Living at shelter			3
Homeless			3
Temporary lodging			3
Not living in county			1

households that did not respond or were ineligible for the study.

It is recognized this sample may reflect the better-off poor since only those households that were more stable and settled were available and eligible for the study. The study was also limited to English-speaking residents of Salt Lake County. Further research is needed to include all possible combinations of low income, such as the homeless, non-English speaking, rural Utah, and transient low-income households, as

well as low-income families seeking housing through other agencies other than Salt Lake County Housing Authority. This study presents one piece of a large puzzle and opens the door for further research on the links between income and diet quality.

Donated Food and Meals

The number of events of donated food surprised the researcher. It was expected more participants would be receiving nonmonetary food. Further research is needed to ascertain the impact of free food and meals on the diet quality of households who receive this benefit. Research is needed to determine the amount of food received, dollar value of food received, and the resulting diet quality of the recipients.

Summary

During a time of national and local debate over welfare reform, research is needed to determine the effectiveness of specific welfare programs and their impact on the lives of households participating in these programs. The objective of this study was to determine the effect housing and food expenditures have on the diet quality of low-income families. Participants for the study were drawn from government-subsidized housing rolls and waiting lists to receive housing assistance. Diet quality and health, the end result of the Campbell and Desjardins (1989) framework, was not found to be affected by income, housing costs, or food acquisition. Pearson correlation, t tests, the Mann-Whitney U test, and statistical frequencies were used to analyze significance and

correlations of the diet quality variables with percent of poverty level, and the percent of income spent on housing and food. Few statistically significant correlations were discovered. Each diet quality variable was also statistically analyzed by *t* tests, and Mann-Whitney *U* tests were used to determine if participants who received housing assistance were any different from participants who did not receive housing assistance. Again, no significance was found between the two groups.

The diets of the sample population were found to be fairly normal in comparison to recommended daily dietary allowances of the population of the United States. Further research is needed to determine the effect and the magnitude of the impact education can have on health and nutrition status of low-income households. Decision makers and program leaders heading welfare reform efforts must act cautiously as this study and other research only explain one aspect of a very complicated social puzzle. The right motive and objective must be attached to the right programs in order to assist the poor effectively. According to this study, money spent on government-subsidized housing to improve the quality of life of low-income households would be better spent elsewhere if diet quality were the only aspect measuring the quality of life. Further research on the impacts of subsidized housing on low-income households is recommended.

Since housing is the largest single expense of most households and since food is the second or third largest expense, it is reasonable to believe that less money will be available for food and other necessities as the cost of housing increases. Even though this study found no significant correlation between housing expenditures and diet quality, it is

recommended further research be conducted to explore the effects not studied here. Recommendations for future search would include: collecting data on one month's worth of food expenses, rather than one week, to match the one month's worth of housing expenses; increase the sample size and diversity of the sample (i.e., non-English speaking, homeless, extended geographical area for sample, and include transient households); and to study the diet of more than one member of a multi-member household.

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APPENDIX

Sample Letter Sent from Salt Lake County Housing Authority

August 5, 1995

Dear:

Congratulations! Your name was drawn to participate in a very important study. Becky Low, a student at Utah State University, is currently collecting information from households in Salt Lake County to complete a study about diets. She will be visiting your home in the next two weeks.

Becky will be asking you to share with her a list of foods you ate on three different days, how much you pay in housing expenses, and what you spend for food during the week. Your answers will be confidential. The responses you give will not have your name on them. For the final report, all responses will be combined.

To make this study accurate it is important for you to participate, but if you do not want to participate please call 797-1569 within the next week. You may also refuse to participate, without consequences, at any time throughout the study by telling Becky when she visits your home.

To thank you for your time, at the completion of Becky's visit to your home you will be given a gift. If you would like, you may also receive a final copy of the study. Thank you for your help.

Sincerely,

Mary Thompson
Director of Resident Services

HOUSING EXPENDITURES AND DEMOGRAPHICS QUESTIONNAIRE

ID # _____

Date (month, day) _____

Sub-Group

1. Public Housing
2. Section 8 Housing
3. Nonsubsidized Housing

How much did you pay for the following this month? (dollar amount)

- Monthly Rent
 Electricity
 Gas (for cooking, hot water, or heating)
 Water
 Telephone
 Insurance (renters)
 Other - Specify _____

Do you live with another household at this address?

- Yes
 No

How much money did you receive from the following sources, within the last 30 days.

(Total dollars for household)

- Child Support
 Net Earned Income (total for household)
 AFDC
 Food Stamps (what was the last date you received food stamps? _____)
 WIC (what was the last date you received WIC vouchers? _____)
 Church
 Alimony
 SSI
 Social Security
 Relatives
 Friends
 Worker's Compensation
 Veterans Benefits
 Housing
 Other - Specify _____

How many adults lived in your home this month (19 years or older)? _____

How many children lived in your home this month

- _____ less than 2 years old
- _____ 3 to 5 years old
- _____ 6 to 12 years old
- _____ 13 to 18 years old

What is your age, in years _____

What is your sex?

1. Male
2. Female

Are you Pregnant?

1. No
2. Yes, in 1st trimester
3. Yes, in 2nd trimester
4. Yes, in 3rd trimester

Are you nursing?

1. No
2. Yes, for 6 months or less
3. Yes, for longer than 6 months

Which of the following best describes your racial or ethnic identification?

1. Black
2. Hispanic
3. Native American
4. White
5. Asian / Pacific Islander
6. Other--specify _____

What is the usual way you get to the grocery store or to eat out?

1. Own car
2. Bus
3. Cab
4. Friend or Family
5. Walk
6. Other (specify: _____)

Food Expenditure Diary

ID # _____

Date began _____

For each day this week write down the amount of money you spent in each area long the top of the table.

	Grocery Store	Fast Food Hamburgers Pizza Tacos	Vending Machines	Restaurant Cafes	Convenience Stores Gas N Goodies Maverick 7-11	Fruit & Vegetable stands Farmer's Market Road side stands	Other
Sample	self others						
Day 1	self others						
Day 2	self others						
Day 3	self others						
Day 4	self others						
Day 5	self others						
Day 6	self others						
Day 7	self others						

For each day this past week, check each time you received food for which you did not have to pay.

	Commodities	Parents or Family	Friends	Pantry or Food Bank	Your Garden or Fruit Trees	Other
Sample						
Day 1						
Day 2						
Day 3						
Day 4						
Day 5						
Day 6						
Day 7						

(Over)

For every day this week write the number of family members eating any meal or snack provided by someone else. B = Breakfast, S = Snacks, L = Lunch, D = Dinner

Sample	Family	Friends	Church	Party	Shelter	School	Other
Day 1	B						
	S						
	L						
	S						
	D						
	S						
Day 2	B						
	S						
	L						
	S						
	D						
	S						
Day 3	B						
	S						
	L						
	S						
	D						
	S						
Day 4	B						
	S						
	L						
	S						
	D						
	S						
Day 5	B						
	S						
	L						
	S						
	D						
	S						
Day 6	B						
	S						
	L						
	S						
	D						
	S						
Day 7	B						
	S						
	L						
	S						
	D						
	S						

Diet Recall

ID # _____

Date _____

Diet Recall # 1 2 3 Day of Week M T W Th F S S

Vitamin Supplement

_____	Centrum Advanced Formula	_____	One-A-Day Stressgard
_____	Flinstone-Complete Children	_____	Safeway - Daily Plus Iron
_____	Geritol Complete	_____	Safeway - One Tab Daily
_____	Nature Made-Multi	_____	Shaklee - Vita Lea
_____	One-A-Day Maximum Formula	_____	Stresstabs 600
_____	Pre-Natal	_____	Other (?)

Meal Type	Amount	Foods Eaten and Description
Breakfast		
Snack		
Lunch		
Snack		
Dinner		
Snack		