

EXPERIENCE IN OBTAINING DIETARY  
INTAKE INFORMATION ON ARIZONA  
MEXICAN-AMERICANS

by

Donna Lu Anderson

---

A Thesis Submitted to the Faculty of the  
SCHOOL OF HOME ECONOMICS  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTER OF SCIENCE  
In the Graduate College  
THE UNIVERSITY OF ARIZONA

1 9 7 1

STATEMENT BY AUTHOR

This thesis has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: Donna L. Anderson

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Mary Ann Kight  
MARY ANN KIGHT  
Associate Professor  
of Home Economics

May 11, 1971  
Date

## ACKNOWLEDGMENTS

In the course of the preparation of this investigation, I am indebted to a number of individuals who have contributed much to its final realization.

Sincere appreciation is given to Dr. Mary Ann Kight who gave freely of her time as advisor and director of this thesis. Her helpful advice and insight contributed greatly to the successful completion of this study.

Special thanks are given to the members of the graduate committee, Dr. E. T. Sheehan for his advice and encouragement and to Miss Barbara Zeches for her contribution to the completion of this project.

To Mrs. Betty Graham, Miss Bernice Van der Schuur and Mr. David Kennon for their assistance in acquiring the subjects.

To each of the participants of this study who gave so willingly of their time. Their cooperation was an added encouragement in the completion of this study.

To my husband Waldo, and my children, Steve, Wayne, John, and Devon, who patiently accepted the inconvenience throughout my years of study.

## TABLE OF CONTENTS

	Page
LIST OF TABLES . . . . .	v
ABSTRACT . . . . .	vi
INTRODUCTION . . . . .	1
PROCEDURES AND METHODS . . . . .	4
Core Subject Matter Defined . . . . .	4
Subjects Selected . . . . .	4
Interview Method . . . . .	6
Data Evaluation . . . . .	8
RESULTS AND DISCUSSION . . . . .	9
Subject Information . . . . .	9
Dietary Intake Information . . . . .	10
SUMMARY AND RECOMMENDATIONS . . . . .	18
APPENDIX A: EVALUATION OF SELF-SELECTED DIETARY DATA . . . . .	21
APPENDIX B: ADDITIONAL INFORMATION ABOUT THE SUBJECTS . . . . .	30
APPENDIX C: CALORIC DISTRIBUTION--COMPARISON OF STUDIES REPORTED ON WOMEN IN ARIZONA . . . . .	31
APPENDIX D: COMPARISON OF MEAN PERCENT RDA VALUES OF STUDIES REPORTED ON WOMEN IN ARIZONA . . . . .	32
APPENDIX E: COMPARISON OF MEAN AGE, WEIGHT, AND PERCENT STANDARD WEIGHT OF STUDIES REPORTED ON WOMEN IN ARIZONA . . . . .	33
REFERENCES CITED . . . . .	34

## LIST OF TABLES

Table	Page
1. Family Income and Education Distribution . . . . .	9
2. Percent Calories and Percent Standard Weight . . . . .	11
3. Suggested Guide to Interpretation of Nutrient Intake Data Using Percent of RDA Values . . . . .	13
4. Caloric Distribution of Mexican-American Diets . . . . .	15
5. Caloric Distribution Reported in Literature . . . . .	16

## ABSTRACT

To suggest guidelines for developing an interview technique for obtaining dietary intake information from Mexican-Americans, eight Mexican-American women, thirty to sixty-five years of age participated in this experience.

Personal data revealed a group mean age, height, and weight of 45 years, 156 cm., and 60 kg., respectively. Subjects lived within the boundaries of two District Number 1 elementary schools in Tucson, Arizona. Income distribution of the subjects was variable (under \$3,000 to over \$10,000 per year).

Dietary intake information was evaluated with particular attention to total caloric distribution and eight nutrients, as set forth by the National Research Council. Attention was also given to cholesterol and selected fatty acids. The percent of total calories consumed from fat, carbohydrate, and protein was 38, 46, and 18, respectively. Results revealed the subjects to be consuming a mean value of 88 percent of the 1968 recommended caloric allowance; and variable percentages of recommended allowances for the eight nutrients.

Comparative dietary intake studies of this group with selected studies of other women living in Arizona revealed all subjects to be low in the intake of one or more nutrients. The present study revealed only two nutrients, namely, iron and

Vitamin A to be critically low. Therefore, information gleaned from the present (based on a 24-hour recall) and future (based on at least a 14-day dietary intake record) studies of this ethnic group should in part screen out poorly founded general conceptions with respect to the dietary profile of the Mexican-American.

## INTRODUCTION

Previous studies in the Human Nutrition Laboratories, The University of Arizona, have focused on characterizing baseline dietary, clinical and biochemical profiles in specific population groups. These studies have included Thompson, Cox, and Ridgway's (1) study on the basal metabolism of 218 girls and young women of southern Arizona. Hurley (2) did a study on girls twelve and thirteen years old living in southern Arizona, regarding growth patterns as related to basal metabolism. Further studies on basal metabolism were conducted on normal college age women born and reared in Arizona by Willard (3). Campbell (4) carried out a similar study on college age men. Ridgway (5) and Kight (6) both conducted studies on high school age girls of southern Arizona, concerning their basal energy expenditures. Tu (7) conducted a serum protein and lipid constituent study on men and women fifty-five to seventy-nine years of age living in Tucson, Arizona.

The most recent study completed at The University of Arizona in the Human Nutrition Laboratory was by Sauerwein (8), who focused on the Mexican-American. This study indicated the need for giving greater attention to obtaining dietary intake information from this particular ethnic group. Original dietary intake information was obtained by use of a written questionnaire, supplemented by necessity with a personal interview.



Spendlove, Yanochik, and Maruna (9) in a 1968 nutritional status survey done in Arizona, recognized the absence of documented nutritional studies which make it extremely difficult to pinpoint the exact number of persons affected by variable nutrient intake. They also stressed the need for investigative studies to tell it the way it really is.

The Western Hemisphere Nutritional Congress in 1965 indicated investigations are needed in areas where nutritional problems may be prevalent, which could be in the area of ethnic groups.

Hunger, U.S.A. (10), a report published in 1968 by CBS, stated it is difficult to construct a picture of the nutritional status in the United States because of a lack of available information. The number of studies has been limited throughout the population. Stewart (11), in an article on planning for the nation's health, also found we are suffering from an acute shortage of fundamental data in the nutrition field. Burke (12) further pointed out that development of a criteria to evaluate nutritional status with practical accuracy is of great public health importance. Mayer's (13) report on the White House Conference on Food, Nutrition and Health also gave impetus to the importance of obtaining dietary intake information. The need for such research, therefore, appears primary.

It is also important to note as Davey and McNaughton (14) reported that studies by sociologists and psychologists have documented the fact that changes in food consumption do not result purely from rational consideration. Emotions and cultural patterns

play a very important part. Schaefer (15) in discussing the National Nutrition Survey stated we should be interested in describing the population groups which could be vulnerable to nutritional problems and identify these groups, not on the basis of the state but on the basis of the type of environment, income, and other factors which should facilitate remedial programs or better utilization of existing programs. Walsh (16) stated in a study regarding mutual problems of nutritionists and social workers that it is important to consider human relationships. It is a necessary point to consider in solving nutrition problems as well as other areas relating to the subject.

Therefore, considering Arizona with a large population of Mexican-Americans, particularly in the southern area of the state, plus a keen interest (17) in nutritional information and diet evaluation of specific population groups evidenced by various individuals and agencies has stimulated interest in this investigation.

That, in essence, is the purpose of this thesis; to gain experience with the Mexican-American population for the purpose of reporting their diet status the way it really is, from their standpoint.

## PROCEDURES AND METHODS

### Core Subject Matter Defined

Experience: Active participation in events or activities, leading to the accumulation of knowledge or skill (18). It is a broadly understood principle that a great store of our knowledge comes from experience. To develop an interview technique appeared primary in this phase of the study. The experience gained in interviewing subjects would provide helpful information in developing guidelines for use of the interview as a technique in future studies.

Dietary Intake Data: Information relating to the dietary practices of the family or its individual members (19). The main thrust of the second phase of this study was to obtain nutrient intake information based on a 24-hour recall as suggested by the committee organizing the National Nutrition Survey (15). Assessment of the dietary intake data offers a direct means of estimating dietary levels for several nutrients.

### Subjects Selected

The initial contact to obtain Mexican-American subjects for this study was made through two teachers who taught in the

Menlo Park School and the Mission View School. Further reference to the schools will be made by designating Menlo Park as A and Mission View as B.

Subjects from school A were contacted on a person-to-person basis by the teacher in their school. Each one was asked if they would be willing to participate in a dietary study. When working with human subjects, as suggested by the Nuremberg Code (20), their voluntary consent is essential. Five women were originally contacted and gave their consent. They were then contacted by telephone, by the author, and a convenient time was established for an interview in their home.

Three telephone contacts were made with one of the subjects to establish an interview time. After three attempted visits to the home, without finding the subject there, it was decided not to pursue this contact any further. Four subjects were used from school A.

The principal of school B was contacted by the teacher in that school to arrange for possible subjects. He contacted one woman in the school, who assumed the role of contact person for the remainder of the study. The principal introduced the author to the first lady he had contacted plus women she had asked to participate in the study. Six women were initially contacted and consented to participate.

One of the six subjects chosen at school B did not speak fluent English, but this did not present a problem as the other subjects agreed to interpret for her. After the second interview

with this subject she could no longer continue because of a serious illness in her family.

A second subject from school B was not used as it was determined she was of Indian nationality. As this was a study of the Mexican-American population, she could not be included.

All of the women from school B were interviewed in the school cafeteria after they had served breakfast to the school children.

The women were very cooperative in all of the interview sessions. The subjects from school A always offered coffee or snacks while being interviewed. One of the subjects also prepared some typical Mexican dishes for the author. At school B, the subjects ate breakfast during the interview and the author was invited to join them.

To categorize the subjects for reference throughout the study, they are referred to by numbers one through eight, beginning with the youngest subject as number one.

#### Interview Method

The first interview in all cases was very informal, friendly as suggested by Coulter and Brower (21) in an interview technique they found helpful and practical in gathering information from the Papago Indians.

To have a specific set of questions which will fit the subjects story into a pattern of our making will not give us an idea of how the situation seems to them; therefore, no formal

questionnaire was used at any interview. However, a skeleton question outline was formulated by the interviewer to be covered in some degree at each interview. General information regarding family, husband's and/or their occupation, activities engaged in outside the home, educational background and basic food habits were discussed at the first interview. Time was spent sharing common interests or problems with each subject. At the completion of the first interview, arrangements were made for a second interview.

The second interview included information regarding participation in government-sponsored programs. A 24-hour recall of food eaten the previous day was taken at this interview, without giving specific portion sizes. The third interview time was arranged at the conclusion of this visit.

Interview three began with a discussion on how to determine accurate portion sizes of food eaten. To encourage them in stating correct measures, an informal discussion on interpretation of the size of a teaspoon, tablespoon, one-quarter or one-half cup, etc. was discussed. Estimated portion size was then arrived at with the interviewee and interviewer interpreting it together. Sauerwein (8) pointed out that accuracy could be a problem when obtaining dietary information, thus the time spent discussing portion size. Specific amounts of food eaten were then stated by the subjects for the previous 24-hour period. This included all meals plus any snacks. Family income was categorized at this interview.

The fourth and final interview was arranged through a telephone contact. Subjects 2, 4, 5, and 6 from school B met at the nurse's office in the school and height and weight data were taken and recorded. The four remaining subjects were weighed and measured at home and the information collected there.

#### Data Evaluation

Personal data regarding age, height, weight, family size, income, educational background, and other pertinent information relating to the subject were tabulated to be reviewed with the dietary intake information.

The food consumed, as stated on their 24-hour recall, was evaluated in particular for calories (Kcal), protein (gm), calcium (mg), iron (mg), Vitamin A (I.U.), ascorbic acid (mg), thiamine (mg), riboflavin (mg), niacin (mg), total cholesterol (mg), and selected fatty acids (mg), by use of the 1968 revised Handbook No. 8, USDA (22).

Diets were estimated and calculated two times in order to provide a check on error with respect to interpretation and/or calculation of a food item.

## RESULTS AND DISCUSSION

### Subject Information

There were three subjects ranging in age from thirty to thirty-four, two in the thirty-five to forty-five age category and three ranging in age from fifty-five to sixty-five. Grades eight and nine were completed by two of the subjects, while the remaining subjects completed grades ranging from ten to twelve. Officer (23) in a study of joining habits of Mexican-Americans found the median number of years completed in school by the Spanish surname population of Tucson, Arizona, to be 8.1. Two subjects were involved in further training or educational courses at the time of this study. Table 1 shows the distribution of income and schooling.

Table 1. Family Income and Education Distribution of Subjects

Subject	Income Range	Educational Range
1	\$5,000-\$10,000	10-12
2	\$5,000-\$10,000	10-12
3	\$5,000-\$10,000	10-12
4	\$5,000-\$10,000	10-12
5	Under \$3,000	7-9
6	\$3,000-\$5,000	10-12
7	Over \$10,000	10-12
8	Retired	7-9



Schaefer (15) based on limited information from the National Nutrition Survey stated approximately 60 percent of the families interviewed in the beginning stages of the survey had incomes of less than \$3,000 per year. About 25 percent of the population had household incomes between \$3,000 and \$5,000; and about 12 percent, between \$5,000 and \$10,000; and approximately 2 percent, more than \$10,000. The income range of the subjects in this study (Table 1) was from \$3,000 to over \$10,000. Fifty percent of the subjects would be in the 12 percent category of the findings of the National Nutrition Survey. Officer (23) found the median family income in the Menlo Park area to be \$5,434.

Four subjects owned their home. Three subjects were employed outside their home in a full or part-time capacity. Subject 5 received government financial aid for three dependent children. None of the subjects was receiving government surplus food, although two had in the past.

#### Dietary Intake Information

The study of dietary information is important because action can be contemplated in terms of results. Steps can either be taken to preserve or change the dietary patterns in part or altogether.

The results of the evaluation of self-selected dietaries, as tabulated from the 24-hour recall, are presented in Appendix A.

The diets were evaluated using the composition of approximately 2,020 foods reported in Agriculture Handbook No. 8 on a

100-gram, edible-portion basis with corresponding values for cholesterol and selected fatty acids.

The total daily nutrient intake of the subjects was evaluated against the recommended allowance for the corresponding age, and the excess or deficit from the recommended values was revealed. Recommended allowances were used as given in the Recommended Dietary Allowances (RDA), seventh edition, revised, 1968 (24).

Young, Chalmers, Church, Clayton, Murphy, and Tucker (25) in comparing dietary study methods found the 24-hour recall useful in estimating group intakes. They further pointed out subject errors in estimating food eaten seemed to have relatively little effect on the calculated nutritive value, except for a group of school children studied.

A comparison of total caloric intake as percent of RDA with percent standard weight is shown in Table 2.

Table 2. Percent Calories and Percent Standard Weight

Subject	Calories Percent of RDA	Weight Percent of Standard
1	83	100-104
2	66	125-129
3	76	90-94
4	80	110-114
5	57	110-114
6	104	100-104
7	97	110-114
8	<u>144</u>	<u>130-134</u>
Mean	88	109-113

Tu (7) found no correlation between percent standard weight and percent of RDA calories. Kight (26) found in her study a balance of these two was preferred to describe subjects as clinically healthy.

The Interdepartmental Committee on Nutrition for National Defense (ICNND) has published a guide (19) for nutrient intake in terms of low, acceptable and high which was used in combination with RDA percent for interpreting nutrients other than calories (see Table 3).

The approach of using the ICNND guide in combination with the RDA percent of standard would more accurately reflect the severity of nutrient problems than an absolute figure. It is also recognized that the RDA allowances should only serve as a reference and deviations of individual intakes would be significant only in terms of the individual's total health status. A biochemical and clinical study is recommended as a follow-up evaluation to this study.

A comparison of the caloric intake shows that subjects 6, 7, and 8 or approximately 40 percent of the subjects, had a caloric intake that was either termed adequate or high. Subject 8 was consuming a high percent of calories, well above the amount needed to maintain desirable body weight, as revealed in the percent standard weight comparison with percent of RDA calories.

Ninety percent of the subjects studied were deficient in iron. Kight (26) found 85 percent of the dietitians she studied

to be deficient in iron intake. Thiamine, riboflavin and niacin content were variable among the subjects.

Table 3. Suggested Guide\* to Interpretation of Nutrient Intake Data Using Percent of RDA Values

Nutrient	Subjects							
	1	2	3	4	5	6	7	8
Calories	83	66	76	80	57	104	97	144
Protein	107	144	93	134	123	82	99	187
Calcium	26	50	48	100	114	54	56	213
Iron	60	59	42	70	50	76	80	117
Vitamin A	9	98	44	55	92	76	18	77
Thiamine	108	67	51	146	63	94	65	142
Riboflavin	48	100	50	88	82	56	74	192
Niacin	118	131	79	76	63	82	81	106
Ascorbic Acid	248	68	54	155	171	566	34	293

\*Guide: less than 90% of RDA = low  
 90-124% of RDA = acceptable  
 125% or more of RDA = high

Ascorbic acid intake was high for five of the eight subjects. Three of the four subjects participating in the serving of the volunteer breakfast program at school B had adequate Vitamin C intake. This may serve as a key to introducing into individual diets nutrients which would not otherwise be consumed. It has been reported that meal patterns follow a cultural pattern. That the family meets more often at dinner, stabilizes this meal pattern

more so than the patterns at breakfast and lunch; therefore, these could be the key times to successfully introduce different kinds of foods. The schools with lunch programs could serve as a prime link in this teaching process. The weakest link in meal patterns is where change should and can be introduced into eating habits.

Cholesterol, linoleic and total saturated fatty acid intake is also shown in Appendix A. Cholesterol ranged from 86 to 615 milligrams daily with a mean of 238 milligrams. The Food and Nutrition Board of the National Research Council (27) suggests that linoleic acid in the range of 1 to 3 percent of total calories appears to meet the requirements of adults. All the subjects except 7 consumed levels from 1 to 6 percent of total calories with a mean of 2.

Table 4 reveals the percent of calories from fat, protein and carbohydrates. The proportion of total calories derived from fat calories ranged from 24 to 48 with a mean of 38 while linoleic acid was found from .8 to 6 percent of total calories with a mean value of 2. Protein in the diets of the group ranged from 13 to 25 percent of total calories with a mean of 18. Calories from carbohydrates accounted for 28 to 58 percent with a mean of 46.

Table 4. Caloric Distribution of Mexican-American Diets

Subject	Calories Percent of RDA	Percent Fat Calories	Percent Linoleic Calories	Percent Protein Calories	Percent Carbohydrate Calories
1	83.13	45.64	6.31	14.17	41.39
2	66.85	48.29	1.03	23.84	29.33
3	76.56	29.65	4.29	13.47	58.22
4	80.86	24.50	1.85	19.70	57.85
5	57.26	46.13	2.24	25.57	28.89
6	104.56	34.41	2.11	23.01	58.24
7	97.61	44.75	0.80	13.20	42.31
8	<u>144.43</u>	<u>33.08</u>	<u>2.04</u>	<u>16.79</u>	<u>51.92</u>
Mean	88.90	38.30	2.58	18.71	46.01

Sauerwein (8) in a study of ten Mexican-American women found values of 42, 14, 42 and 3 percent for fat, protein, carbohydrate and linoleic acid, respectively. Calories from fat and linoleic acid were higher while those derived from protein and carbohydrate were lower in this study. Kight (26) reporting on seven Arizona dietitians found mean values for calories derived from fat, protein, carbohydrate and linoleic to be 41, 14, 44 and 3 percent, respectively. These findings are similar to the Sauerwein findings.

The values obtained by studies done in Arizona and by Robinson, Rayne, and Calvo (28) in Mexico City are presented in Table 5.

Table 5. Caloric Distribution Reported in Literature

Author	Group	Percent from Fat	Percent from Protein	Percent from Car- bohydrate	Percent from Linoleic
Kight	Dietitians	41	14	44	3
Tu	North American	38	18	44	1
Sauerwein	Mexican-American	42	15	42	3
Robinson	Mexican	23	12	63	-
Present Study	Mexican-American	38	18	46	2

The comparison of Mexican diets with other studies on diet analysis revealed a high percent of calories from carbohydrate, perhaps typical of this population group. It is noted the present study along with Tu's (7) study of North Americans age fifty-five to seventy-nine compares in the percent of calories from protein. The dietitians, who could serve as a reference point with respect to preferred caloric intake and distribution, show a lower percent of protein calories than either of the studies done with Mexican-American subjects. This may indicate an area where further study would be warranted on the accuracy of calculation in regard to source evaluated as consumed by the Mexican-American population.

Six of the subjects consumed some type of Mexican food on the day dietary information was collected. It was interesting to note that subject 2 ate a diet consisting of all Mexican foods, while subjects 1, 4, 5, and 7 ate a combination of Mexican and

North American foods, the evaluation revealed the number of nutrients in the acceptable to high range was very comparable in all five subjects. Subjects 3, 6, and 8 consumed only North American food items with only subject 8 revealing a high degree of acceptable nutrient intake.

Sauerwein's (8) findings that Mexicans living in Tucson are more similar to North Americans than Mexicans in their caloric distribution of nutrients is confirmed in this study also.

Kight, Reid, Forcier, Donisi, and Cooper (29) pointed out in an article on Mexican-American food and its influence on nutrition in Arizona that the Mexican factor in the North American may be immense with time. The article further predicts a favorable impetus to Arizona's total health status as a result of the developing adaptation of Mexican food practices.



## SUMMARY AND RECOMMENDATIONS

Eight Mexican-American women between thirty and sixty-five years of age living within the boundaries of two District Number 1 elementary schools in Tucson, Arizona, (see Appendix B), were interviewed to gain experience with the interview technique and to gather dietary intake data.

The author believes the following set of guidelines has some valuable contribution to aid in the practice of obtaining dietary intake information from Mexican-American and other ethnic groups.

### Guidelines:

1. Initial contact made through liaison person known by prospective subjects.
2. The voluntary consent of each subject is vitally important.
3. First contact should be made to introduce yourself in a friendly manner, with interest shown in the individual. Establish rapport by sharing, with the subjects, personal conversation. Don't be afraid to laugh.
4. Set up interview at their convenience so they feel their time is as important as yours.
5. Use terms they understand--listen to them talk.
6. A formal questionnaire does not lend itself to freedom in sharing of information.

7. Begin the interview by collecting information the subjects would feel pleased to share.

8. Keep encouraging the subjects, that they are being helpful and useful in the study.

9. Use tact to encourage honest answers in areas of pride. Ask personal data at subsequent interviews after the first.

10. Utilize results of study as an educational tool in the community studied, in order to facilitate cooperation for further follow-up research, if needed.

A summary of the dietary intake information has led to the following suggestions:

1. A high percentage of calories derived from protein would warrant further study to determine value of actual protein consumed by the subjects.

2. The need to analyze the nutrient content of authentic Mexican food is important.

3. Continue and encourage the volunteer mother program for serving breakfast, as done in school B. Incorporating nutrition education for mothers could meet another need in the community.

4. It has been noted that eating patterns developed in childhood are the basis for adult consumption patterns; basic nutrition education beginning in grade one would greatly aid in this learning process.

5. Encourage more involvement of ethnic group members in the planning and implementing of programs to improve human health. They know and understand the culture of their community better than the "experts."

6. Improvement is needed in meshing the art of human understanding with the scientific knowledge of human nutrition.

Comparative studies of this ethnic group with studies on other women living in Arizona (see Appendices C, D, and E) should aid in screening out poorly founded general conceptions with respect to the dietary profile of the Mexican-American. The present study revealed only two nutrients believed to be critically low, namely, iron and Vitamin A. Therefore, the author recommends additional future studies of this ethnic group be encouraged and that they include more than a 24-hour recall, preferably a 14-day dietary intake record.

APPENDIX A .

EVALUATION OF SELF-SELECTED DIETARY DATA

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 1</u>				
Calories	Kcal	1662.67	2000.00	- 337.33
Protein	gm	58.93	55.00	3.93
Fat	gm	84.32	-	-
CHO Total	gm	172.08	-	-
CHO Fiber	gm	4.28	-	-
Ash	gm	9.58	-	-
Calcium	mg	215.68	800.00	- 584.32
Phosphorus	mg	715.13	-	-
Iron	mg	10.89	18.00	- 7.11
Sodium	mg	1221.53	-	-
Potassium	mg	2523.67	-	-
Vitamin A	I.U.	491.20	5000.00	-4508.80
Thiamine	mg	1.08	1.00	.04
Riboflavin	mg	.72	1.50	- .78
Niacin (equiv)	mg	15.36	13.00	2.36
Ascorbic Acid	mg	136.55	55.00	81.55
Total Saturated FA	gm	28.16	-	-
Oleic	gm	33.61	-	-
Linoleic	gm	11.66	-	-
Cholesterol	mg	131.40	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 2</u>				
Calories	Kcal	1337.01	2000.00	- 662.99
Protein	gm	79.71	55.00	24.71
Fat	gm	71.74	-	-
CHO Total	gm	98.04	-	-
CHO Fiber	gm	2.47	-	-
Ash	gm	7.84	-	-
Calcium	mg	400.85	800.00	- 399.15
Phosphorus	mg	1027.39	-	-
Iron	mg	10.63	18.00	- 7.37
Sodium	mg	690.08	-	-
Potassium	mg	2237.45	-	-
Vitamin A	I.U.	4934.77	5000.00	- 65.23
Thiamine	mg	.67	1.00	- .33
Riboflavin	mg	1.50	1.50	-
Niacin (equiv)	mg	17.12	13.00	4.12
Ascorbic Acid	mg	37.43	55.00	- 17.57
Total Saturated FA	gm	32.17	-	-
Oleic	gm	30.81	-	-
Linoleic	gm	1.54	-	-
Cholesterol	mg	334.36	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 3</u>				
Calories	Kcal	1531.20	2000.00	- 468.80
Protein	gm	51.46	-	-
Fat	gm	50.46	-	-
CHO Total	gm	222.90	-	-
CHO Fiber	gm	1.27	-	-
Ash	gm	10.49	-	-
Calcium	mg	389.09	800.00	- 410.91
Phosphorus	mg	683.56	-	-
Iron	mg	7.68	18.00	- 10.32
Sodium	mg	1654.64	-	-
Potassium	mg	1397.78	-	-
Vitamin A	I.U.	2211.70	5000.00	-2788.30
Thiamine	mg	.51	1.00	- .49
Riboflavin	mg	.76	1.50	- .74
Niacin (equiv)	mg	10.31	13.00	- 2.69
Ascorbic Acid	mg	30.11	55.00	- 24.89
Total Saturated FA	gm	16.78	-	-
Oleic	gm	17.07	-	-
Linoleic	gm	7.30	-	-
Cholesterol	mg	86.25	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 4</u>				
Calories	Kcal	1495.97	1850.00	- 354.03
Protein	gm	73.70	55.00	18.70
Fat	gm	40.73	-	-
CHO Total	gm	216.36	-	-
CHO Fiber	gm	5.05	-	-
Ash	gm	12.24	-	-
Calcium	mg	806.79	800.00	6.79
Phosphorus	mg	1374.49	-	-
Iron	mg	12.69	18.00	- 5.31
Sodium	mg	960.74	-	-
Potassium	mg	2443.86	-	-
Vitamin A	I.U.	2761.08	5000.00	-2238.92
Thiamine	mg	1.46	1.00	.46
Riboflavin	mg	1.33	1.50	.17
Niacin (equiv)	mg	9.91	13.00	3.09
Ascorbic Acid	mg	85.47	55.00	30.47
Total Saturated FA	gm	28.27	-	-
Oleic	gm	24.96	-	-
Linoleic	gm	3.09	-	-
Cholesterol	mg	242.05	-	-



Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 5</u>				
Calories	Kcal	1059.41	1850.00	- 790.59
Protein	gm	67.74	55.00	12.74
Fat	gm	54.31	-	-
CHO Total	gm	76.54	-	-
CHO Fiber	gm	1.41	-	-
Ash	gm	9.83	-	-
Calcium	mg	918.88	800.00	118.88
Phosphorus	mg	1100.01	-	-
Iron	mg	9.00	18.00	- 9.00
Sodium	mg	1228.96	-	-
Potassium	mg	1777.06	-	-
Vitamin A	I.U.	4640.80	5000.00	- 359.20
Thiamine	mg	.63	1.00	- .37
Riboflavin	mg	1.23	1.50	- .27
Niacin (equiv)	mg	8.29	13.00	- 4.71
Ascorbic Acid	mg	94.29	55.00	39.29
Total Saturated FA	gm	30.40	-	-
Oleic	gm	23.33	-	-
Linoleic	gm	2.64	-	-
Cholesterol	mg	615.40	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 6</u>				
Calories	Kcal	1752.20	1700.00	52.30
Protein	gm	45.20	55.00	- 9.80
Fat	gm	67.28	-	-
CHO Total	gm	252.62	-	-
CHO Fiber	gm	4.72	-	-
Ash	gm	11.99	-	-
Calcium	mg	438.14	800.00	- 361.82
Phosphorus	mg	691.92	-	-
Iron	mg	7.73	10.00	- 2.27
Sodium	mg	2076.23	-	-
Potassium	mg	2061.30	-	-
Vitamin A	I.U.	3835.90	5000.00	-1165.00
Thiamine	mg	.93	1.00	- .07
Riboflavin	mg	.89	1.50	- .61
Niacin (equiv)	mg	10.72	13.00	- 2.28
Ascorbic Acid	mg	306.75	55.00	251.75
Total Saturated FA	gm	25.34	-	-
Oleic	gm	30.08	-	-
Linoleic	gm	4.15	-	-
Cholesterol	mg	111.70	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 7</u>				
Calories	Kcal	1659.32	1700.00	- 40.68
Protein	gm	54.77	55.00	- .23
Fat	gm	82.52	-	-
CHO Total	gm	175.52	-	-
CHO Fiber	gm	1.71	-	-
Ash	gm	6.57	-	-
Calcium	mg	449.15	800.00	- 350.85
Phosphorus	mg	783.09	-	-
Iron	mg	8.09	10.00	- 1.91
Sodium	mg	602.87	-	-
Potassium	mg	1679.07	-	-
Vitamin A	I.U.	900.20	5000.00	-4099.80
Thiamine	mg	.65	1.00	- .35
Riboflavin	mg	1.11	1.50	- .39
Niacin (equiv)	mg	10.54	13.00	- 2.46
Ascorbic Acid	mg	18.70	55.00	- 36.30
Total Saturated FA	gm	27.60	-	-
Oleic	gm	22.68	-	-
Linoleic	gm	1.48	-	-
Cholesterol	mg	262.44	-	-

Nutrients	Units	Total Nutritive Values	Mean Daily Requirements	Difference
<u>Subject Number 8</u>				
Calories	Kcal	2455.29	1700.00	755.29
Protein	gm	103.09	55.00	48.09
Fat	gm	90.25	-	-
CHO Total	gm	318.74	-	-
CHO Fiber	gm	3.85	-	-
Ash	gm	21.82	-	-
Calcium	mg	1708.53	800.00	908.53
Phosphorus	mg	2109.59	-	-
Iron	mg	11.74	10.00	1.74
Sodium	mg	3122.60	-	-
Potassium	mg	3903.37	-	-
Vitamin A	I.U.	3872.80	5000.00	-1127.20
Thiamine	mg	1.42	1.00	.42
Riboflavin	mg	2.88	1.50	1.38
Niacin (equiv)	mg	13.79	13.00	.79
Ascorbic Acid	mg	161.46	55.00	106.46
Total Saturated FA	gm	30.40	-	-
Oleic	gm	23.53	-	-
Linoleic	gm	5.58	-	-
Cholesterol	mg	127.22	-	-

APPENDIX B

ADDITIONAL INFORMATION ABOUT THE SUBJECTS

Subject	Age (yrs.)	Height (cm.)	Weight (kg.)	Lived in Arizona (yrs.)
1	30	160	58	30
2	30	152	65	30
3	34	160	52	34
4	45	157	60	45
5	47	154	58	47
6	55	145	50	55
7	56	160	62	56
8	<u>65</u>	<u>165</u>	<u>78</u>	65
Mean	45.1	156.6	60.3	

APPENDIX C

CALORIC DISTRIBUTION--COMPARISON OF STUDIES  
REPORTED ON WOMEN IN ARIZONA

Author	Calories Percent of RDA	Percent from Fat	Percent from Linoleic	Percent from Protein	Percent from Car- bohydrate
Kight	101.00	41.89	3.35	14.26	44.41
Tu	83.04	39.43	2.07	18.39	43.32
Sauerwein	116.09	42.00	3.67	15.53	42.05
Present Study	88.90	38.30	2.58	18.71	46.01

APPENDIX D

COMPARISON OF MEAN PERCENT RDA VALUES OF  
STUDIES REPORTED ON WOMEN IN ARIZONA

Author	Calo- ries	Pro- tein	Cal- cium	Iron	Vit. A	Ascor. Acid	Thia- mine	Ribo.	Nia- cin
Kight	101	123	101	73	135	174	128	131	188
Tu	92	113	73	109	187	196	115	110	111
Sauerwein	115	141	66	88	84	137	111	87	118
Present Study	88	121	82	69	58	198	92	86	92

APPENDIX E

COMPARISON OF MEAN AGE, WEIGHT, AND PERCENT STANDARD  
WEIGHT OF STUDIES REPORTED ON WOMEN IN ARIZONA

Author	Age (yrs.)	Height (cm.)	Weight (kg.)	Standard Weight Group (%)
Kight	37.5	162.1	58.0	97 - 101
Tu	65.2	158.8	67.1	118 - 122
Sauerwein	36.3	154.3	77.5	134 - 138
Present Study	45.1	156.6	60.3	109 - 113



#### REFERENCES CITED

1. Thompson, E. M., Cox, E. W., and Ridgway, A. M. The basal metabolism of 218 girls and young women of southern Arizona, 14 to 23 years of age, inclusive. *J. Nutr.* 36:507, 1948.
2. Hurley, E. B. The prediction value of the Wetzell grid and basal metabolism standards for girls of southern Arizona twelve and thirteen years of age. Master's thesis, The University of Arizona, 1949.
3. Willard, M.E. The basal metabolism of normal college women born and reared in Arizona. Master's thesis, The University of Arizona, 1942.
4. Campbell, A. D. The basal metabolism of normal college men born and reared in Arizona. Master's thesis, The University of Arizona, 1943.
5. Ridgway, A. M. Basal energy expenditure of high school girls of southern Arizona correlated with age. Master's thesis, The University of Arizona, 1947.
6. Kight, M. A. Basal energy expenditure and growth patterns of girls of southern Arizona. Master's thesis, The University of Arizona, 1958.
7. Tu, Eugenia. Serum protein and lipid constituents of men and women 55-79 years of age living in Tucson, Arizona. Master's thesis, The University of Arizona, 1969.
8. Sauerwein, M. T. Serum protein and lipoprotein components of Mexican-American women living in Tucson, Arizona. Master's thesis, The University of Arizona, 1970.
9. Spendlove, G., Yanochik, A., and Maruna, D. Nutritional Status Survey-1968. Arizona State Department of Health, Phoenix, 1969.
10. "Hunger, U.S.A.": Citizen's Board of Inquiry into Hunger and Malnutrition in the U. S. New Community Press, Washington, D.C., 1968.

11. Stewart, William H. Planning for the nation's health. *J. Am. Diet. A.* 52:25-27, 1968.
12. Burke, B. S. The dietary history as a tool in research. *J. Am. Diet. A.* 23:1041, 1947.
13. Mayer, J. The White House Conference on food, nutrition and health. *J. Home Econ.* 61:499-503, 1969.
14. Davey, P. L. H., and McNaughton, J. W. Nutrition education in developing countries. *Nutrition Newsletter.* 7:35, 1969.
15. Schaefer, E. A. The national nutrition survey. *J. Am. Diet. A.* 54:371-375, 1969.
16. Walsh, E. Nutritionists and social workers cooperate on mutual problems. *J. Am. Diet. A.* 25:681-683, 1947.
17. Kelsay, J. L. A compendium of nutritional status studies and dietary evaluation studies conducted in the U. S., 1957-67. *J. Nutr.* 99, sup. 1:51, 1969.
18. Morris, William (ed.). *The American Heritage Dictionary of the English Language.* New York: American Heritage Publishing Co., Inc., 1970. P. 462.
19. Interdepartmental Committee on Nutrition for National Defense. *Manual for Nutrition Surveys.* Washington: U.S. Government Printing Office, 1963.
20. Beecher, H. K. Ethnics and clinical research. *New England J. Med.* 274:1354, 1966.
21. Coulter, P. P., and Brower, M. J. Parallel Experience: An Interview Technique. *American Journal of Nursing.* 69:1028, 1969.
22. Watt, B. K., and Merrill, A. L. Composition of foods-raw, processed, prepared. *USDA. Agric. Handbook No. 8,* 1963.
23. Officer, J. E. The joining habits of urban Mexican-Americans. Ph.D. dissertation, The University of Arizona, 1964.
24. Food and Nutrition Board. *Recommended Dietary Allowances.* *Natl. Acad. Sci.-Natl. Research Council Pub. No. 1694,* 1968.

25. Young, C. M., Chalmers, F. W., Church, H. N., Clayton, N. M., Murphy, G. C., and Tucker, R. E. Subjects' estimation of food intake and calculated nutritive value of the diet. *J. Am. Diet. A.* 29:1216, 1953.
26. Kight, M. A. Serum fatty acid patterns of clinically healthy women living in the southeast section of Arizona. Ph.D. dissertation, The University of Arizona, 1967.
27. Food and Nutrition Board: Recommended Dietary Allowances. *Natl. Acad. Sci.-Natl. Research Council Pub. No. 1146*, 1964.
28. Robinson, W. D., Rayne, G. C., and Calvo, J. A study of nutritional status of a population group in Mexico City. *J. Am. Diet. A.* 20:289-297, 1944.
29. Kight, M. A., Reid, B. L., Forcier, J. I., Donisi, C. M., and Cooper, M. Nutritional influences of Mexican-American foods in Arizona. *J. Am. Diet. A.* 55:557-561, 1969.

- 17. Jones, C. H., "The Role of the ...", *Journal of ...*, 1957.
- 18. Smith, J. D., "The Role of the ...", *Journal of ...*, 1957.
- 19. Brown, R. E., "The Role of the ...", *Journal of ...*, 1957.
- 20. White, G. A., "The Role of the ...", *Journal of ...*, 1957.

201