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Obesity and Vegetarianism in Seventh-day Adventist Women

Charlotte Ann Van Camp Darnell

Abstract

OBESITY AND VEGETARIANISM IN SEVENTH-DAY ADVENTIST WOMEN

by Charlotte Ann Van Camp Darnell

This thesis describes a comparative study of 82 vegetarian and 21 non-vegetarian Seventh-day Adventist females ages 25 to 65 to discover if there is a possible correlation between diet and weight. The subjects were chosen by random sampling in the specified target population and were personally interviewed by the use of a questionnaire.

The general linear hypothesis analysis showed that present age and relative weight at age 25 were significant in terms of present relative weight; however, physical activity and socioeconomic stratum were not significant. Diet, defined as vegetarian or non-vegetarian, was only marginally significant.

Conclusions of this study are that weight at age 25 and present age are important associated factors in present weight.

LOMA LINDA UNIVERSITY

Graduate School

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OBESITY AND VEGETARIANISM IN

SEVENTH-DAY ADVENTIST WOMEN

by

Charlotte Ann Van Camp Darnell

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A Thesis in Partial Fulfillment

of the Requirements for the Degree

Master of Science in the Field of Dietetics

August 1975

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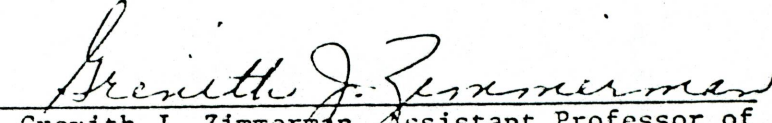
Each person whose signature appears below certifies that this thesis in his opinion is adequate, in scope and quality, as a thesis for the degree Master of Science.

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CHAPTER I   INTRODUCTION

A strong interest in the complexities of obesity led this
researcher to set up a project to determine the incidence of obesity
in a given population and further to discover whether there are
possible correlations between vegetarian and non-vegetarian diets
and weight.

Various theories have been proposed stating why vegetarians or
non-vegetarians show a greater incidence of obesity, but as seen in
the literature review no conclusive research has been carried out thus
far. A popular belief shared by many is that non-vegetarians have a
greater incidence of obesity because of the higher intake of saturated
fats in the diet, whereas, others believe that vegetarians have a
greater incidence of obesity because of a higher intake of carbo-
hydrates in the diet.

The research hypothesis for this study is that a greater inci-
dence of obesity is observed among non-vegetarians than among vege-
tarians. An additional goal is to characterize factors associated
with obesity. Factors of special consideration in this study are
diet, physical activity, socioeconomic stratum, present age, and
relative weight at age 25.

CHAPTER II   LITERATURE REVIEW

A review of the literature showed that much effort has been expended on the study of obesity as well as on the study of vegetarianism, but very little has been done in correlation studies of vegetarianism and non-vegetarianism as related to obesity. Thus there is presently no conclusive evidence to indicate that one's weight is significantly affected by either a vegetarian diet or a non-vegetarian diet. Studies by Hardinge (10, 11, 12) indicate that pure vegetarians tend to be less obese than do non-vegetarians. Others have made similar statements, but their references are generally to Hardinge's studies.

As recently as 15 years ago, the etiology of obesity was attributed to overeating. And the overeating was said to be due either to a lack of self-control or to more serious abnormalities of personality. Fortunately such over-simplifications are not now held as total truth. Instead, obesity is recognized as the result of an excessive caloric intake and can be the outcome of a number of factors such as:

1. Genetic abnormalities

2. Impairment of the hypothalamic regulation

3. The central nervous system

4. The endocrine system

5. Immobilization

6. Psychic disturbances

7. Social or cultural pressures

8. Learned behavior

Thus all instances of obesity cannot be considered to be of the same origin. Classifications of obesity may be according either to etiology or to pathogenesis. And these classifications are intimately involved in the regulation of food intake (8).

The types of obesity have been historically classified as exogenous and endogenous as popularized by von Noorden (2). Exogenous obesity results directly from the ingestion of excess food, whereas endogenous obesity results from endocrinopathies associated with fatness. However, advancing knowledge about the mechanisms controlling body weight have provided new classifications, two of which have been reported by Bray (2). These two are: 1) an anatomic classification based on the number of adipocytes and 2) an etiologic classification. In the first classification obesity is divided into two groups as follows: 1) hypertrophic obesity, which results from storing excess triglyceride in already present adipocytes and 2) hyperplastic obesity, which results from an increase in the total number of adipocytes. In the second classification obesity can result from any one of the following problems:

1. Hypothalamic injury

2. Endocrine abnormality

3. Restriction of physical activity

4. Dietary manipulation

5. Genetic transmission

6. Drug inducement

Thus, obesity is a complicated problem no matter what the cause may be. Obesity is not a disease, but merely a symptom of a disease.

A study (19) on causes of obesity was arranged as an experiment to observe both lean and obese subjects eating from an automatically monitored "feeding machine" that dispensed a nutritionally complete liquid diet. That lean adults spontaneously regulated their food intake by machine in order to maintain constant weight was expected, but that obese adults reduced their intake to levels of 20% of the necessary calories to maintain energy equilibuium was not an expected result. Thus, it was postulated that the usual obese subject overeats for non-physiologic reasons, being insensitive to hunger-satiety cues and that the non-nutritive aspects of food (appearance, variety, aroma, taste, and so on) are what drive the obese subject to excessive eating.

For the purpose of clarity it is necessary to differentiate between kinds of vegetarians. The following definitions refer to the vegetarians in this literature review:

1. Lacto-vegetarians: those who eat dairy products but exclude eggs and all flesh foods.

2. Lacto-ovo-vegetarians: those who eat both dairy products and eggs, but exclude all flesh foods.

3. Pure vegetarians: those who exclude dairy products, eggs, and all flesh foods.

4. Vegans: those who are pure vegetarians but in addition refrain from using leather products or any such products made from animals and, in some cases, even refuse vaccinations because they are prepared from animal culture (9).

Hardinge has carried out a study (10, 11, 12) in which he has

observed pure vegetarians to be less obese than lacto-ovo-vegetarians
and non-vegetarians. All subjects had voluntarily selected their diets
which had been followed for five or more years preceding the study.
The pure vegetarians weighed an average of 20 pounds less than the
lacto-ovo-vegetarians and non-vegetarians who averaged 12 to 15 pounds
above ideal weight, but the lacto-ovo-vegetarians and the non-vegetar-
ians showed no significant differences in their weights. The caloric
intakes and physical activities appeared to be approximately the same
for all three groups. Dietary histories were taken to determine
average daily caloric intake; however, the method used for determining
physical activity was not specified.

Hardinge referred to a study carried out by Ling and Chow (13) as
a possible explanation for pure vegetarians weighing less but having
approximately the same caloric intake. In their study Ling and Chow
observed that rats fed a diet deficient in vitamin B_{12} took off quant-
ities of carcass fat which could be restored when vitamin B_{12} was
administered. This suggested to them that vitamin B_{12} may be involved
in carbohydrate utilization and transformation to fat, instead of it
being involved in protein metabolism. This in turn suggests greater
efficiency in caloric utilization by the pure vegetarians.

Ellis and Montegriffo (6) found male vegans in England to weigh
an average of 4.5 kg. (9.9 pounds) and female vegans an average of
3.6 kg. (7.9 pounds) below normal. The reason for these lower weights
is suggested to be either a deficiency of vitamin B_{12} or a lower
daily caloric intake, but not a reduced intake of essential amino
acids, since the amounts of essential amino acids in vegan diets were

considered sufficient.

In another study Ellis and Montegriffo (5) reported that vegans tend to be lighter in weight than the non-vegetarians. They suggest that the observation mady by Ling and Chow (13) might have some relation to their findings.

Erhard (7) researched several vegetarian counter cultures in the San Francisco Bay area centered around Berkeley in an effort to discover nutritional needs and to develop a nutrition education program. She observed no overweight subjects, but some were excessively thin; however, she did not specify the types of vegetarians these subjects were.

In a study conducted by Dwyer et al. (4) one hundred young American adult vegetarians were studied by means of interviews, 24-hour dietary histories, and questionnaires for their diet and related aspects of life style. Of the one hundred subjects interviewed 56 reported weight decreases since becoming vegetarians, 5 reported weight increases, 7 experienced fluctuations, 25 observed no weight change, 5 did not know if their weight changed, and 2 failed to respond. Vegetarianism is considered the major factor in the weight losses observed by Dwyer et al. Dwyer et al. in another study (3) found that 51% of their subjects reported weight decreases since becoming veg-etarians, 8% reported weight gains, 25% experienced no weight change, and 16% were unsure or did not answer. Most of those experiencing weight changes attributed them to diet.

Grotta-Kurska (9) stated that "statistically, vegetarians in the United States are thinner, healthier, and may live longer than meat

eaters." He also stated that most meat eaters as a consequence of exceeding their protein and calorie limits tend to weigh more than vegetarians.

Therefore, studies done thus far seem to support the research hypothesis that a greater incidence of obesity is observed among non-vegetarians than among vegetarians.

CHAPTER III   METHODS AND MATERIALS

The target population for this study was limited to Seventh-day Adventist females between the ages of 25 and 65 years living in Loma Linda, California, whether vegetarian or non-vegetarian.   It is assumed that in this target population of Seventh-day Adventists the use of alcohol and tobacco is absent. The ages between 25 and 65 are considered to be the most typical for the largest part of one's life (18). Usually at age 25 a person is much more active and has just finished growth; after age 55 a person begins a much more sedentary life style. Previous studies (8) have shown sex differences in obesity, and because of this it was decided to limit this study to females.

A pilot project was not necessary since both Seventh-day Adventist vegetarians and non-vegetarians were known to live in the specified area.

In this study those who use flesh food less often than once a week are classified as vegetarians. Relative weight was determined by the following formula:

$$\text{relative weight} = \frac{\text{actual weight in pounds}}{\text{ideal weight* in pounds}} \times 100$$

Any respondent with a relative weight of 115 or above was considered obese for this study. Frame size was not determined; therefore, the

*Metropolitan Life Insurance Table of Ideal Weight for each Person According to Height.

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middle range of the Metropolitan Life Table was used (14). Although measuring skin fold was recommended it was decided against as too great an imposition on the respondents who were not voluntarily entering into this study.

The sample was selected from census tract 0073 (San Bernardino County) of the San Bernardino-Riverside-Ontario Standard Metropolitan Statistical Area. This tract consists of that part of the city of Loma Linda south of Redlands Boulevard. Specifically excluded were blocks 405, 406 and 407, which have been annexed to the city of San Bernardino. The total population of tract 0073 (1970 census) was 8,730 with 4,828 females. When reduced by the population of the three excluded blocks, the population of the target area was 8,463 with an estimated population of 4,680 females (15).

The target area consisted of 3,119 housing units in 73 blocks. However, any block consisting of fewer than 13 housing units was combined with an adjacent block of the same stratum. The adjusted total number of blocks was 61. Blocks were divided into socioeconomic strata, according to average home value (1970 census) (15), as follows:

TABLE 1   STRATUM AS DETERMINED BY AVERAGE HOME VALUE

Stratum	Average Home Value
1	greater than $30,000
2	$20,000 to $30,000
3	less than $20,000

In 1972 and 1973 community nutritional surveys were taken in

Loma Linda. In order not to impose unduly on the respondents, it was decided to omit any household included in the two previous surveys. Interviewers estimated that no more than eight households were thereby excluded.

Assuming differing response rates according to stratum (TABLE 2), 225 housing units would be required to obtain 100 valid responses. Within each socioeconomic stratum a random sample of blocks was chosen stratified proportionally to the number of housing units in the stratum. The results of block selection are shown in TABLE 2.

A corner of each block was randomly chosen as a starting point. A random number from 1 to 7 was chosen to designate the initial housing unit to be interviewed. Interviewers thereafter chose each sixth housing unit, proceeding clockwise around each block. The interviewer restricted the interviewing to the lady of the house, who in order to qualify had to be a Seventh-day Adventist between the ages of 25 and 65 years.

The questionnaire was designed to be administered by an interviewer, although with some minor alterations it could be self-administered. Before being administered, six questionnaires were pretested in the target population, and necessary adjustments and clarifications were made (Appendix A).

The questions were designed to obtain information as to eating habits and to behavior associated with eating. Attitudes were not asked for. Demographic questions were also included. Several questionnaires used in other studies and shown to be satisfactory were studied and evaluated to determine what format to use.

TABLE 2   SAMPLE SELECTION BY STRATUM

STRATUM	ADJUSTED NO. OF BLOCKS	NO. OF HU*	AVE. NO. HU PER BLOCK	% OF HU IN EACH STRATUM	AVE. NO. OF SAMPLED HU PER BLOCK	ASSUMED RESPONSE RATE	AVE. NO. QUALIFIED RESPONDENTS PER BLOCK	NO. OF BLOCKS SAMPLED	ACTUAL NO. OF RESPONSES RECEIVED
1	14	333	23.8	11	4.0	50%	1.8	5	20
2	28	1178	42.1	38	7.0	45%	3.1	12	33
3	19	1608	84.6	52	14.1	40%	6.3	9	50
	61	3119						26	103

*Housing Units (HU)

All questionnaires were precoded for key punching, and analysis was accomplished at the Scientific Computation Facility at Loma Linda University Medical Center. Tests used to determine significance were chi-square and general linear hypothesis analysis.

Interviewing was begun on March 18, 1974 and concluded on June 18, 1974, making a total time span of 13 weeks. The average length of time taken to administer each questionnaire was 21.3 minutes with a range of 10 to 40 minutes.

The interviewers endeavored to interview the respondents in private to avoid any influence by other persons, although this was not always possible. Respondents were discouraged from asking questions during the interview in order to take as little of their time as possible. There were two cases in which a family member served as interpreter for Spanish speaking respondents; however, there is little reason to believe any bias resulted.

The questionnaires were administered by two master's degree candidates and one doctor of health science degree candidate. Respondents were assured that their responses would be strictly anonymous and names were not requested.

Up to four calls were made at any housing unit. If there was no response the first time, a second call was made on a different day and at a different hour. If there was still no response, a third call was made. If on the third call there was no response, the survey was terminated for that housing unit. A fourth call was made only by appointment.

The total number of households contacted was 227 with the results

indicated in TABLE 3.

TABLE 3   CATEGORIES OF RESPONDENTS

Successful Interviews................... 103

Unsuccessful Interviews............... 1

Unqualified Contacts.................. 123
    under 25 or over 65.......... 54
    not SDA..................... 27
    no females.................. 19
    no answer................... 11
    vacant houses............... 6
    refusals.................... 4
    no English spoken........... 2

Total   227

A total of 103 interviews were successfully completed. This is 45% of the total housing units selected. The race distribution of these 103 respondents is shown in TABLE 4.

TABLE 4   RACE DISTRIBUTION

RACE	NO. INCLUDED IN INTERVIEW	% OF STUDY POPULATION	% OF TRACT* 0073 (GEN. POP.)
White	90	87.4	93.3
Non-white	13	12.6	6.7
Totals	103	100.0	100.0

*US Dept. of Commerce Bureau of the Census, 1972 (16).

In order to determine whether the sample selected was indeed representative of the community under study, several statistical comparisons were made. Census data for 1970 were used as a basis.

The area under study was in fact coterminus with census tract 0073 (San Bernardino County) of the San Bernardino-Riverside-Ontario Standard Metropolitan Statistical Area. Since the 1970 census, Loma Linda has become an incorporated city, including virtually all of tract 0073 plus portions of adjoining tracts (16).

The age distribution of women interviewed was compared with the distribution reported in the census (TABLE 5). There was no significant difference between the sample and the census tract population ($0.50 < p < 0.70$).

TABLE 5   AGE DISTRIBUTION OF WOMEN INTERVIEWED

Age Range	Actual No. Women Interviewed	No. Women Reported in 1970 Census	Expected No. Women Interviewed	$\frac{(o - e)^2}{e}$*
25-34	43	737	38.7	0.48
35-44	15	405	21.3	1.86
45-54	23	438	23.0	0.00
55-65	22	380	20.0	0.20
Totals	103	1960	103.0	$\chi^2 = 2.54$

*o = the observed number, e = the expected number

A somewhat more difficult problem was encountered in comparing the distribution of family income among those interviewed with the distribution reported in the census (TABLE 6). For example, median family income (1970) was $8,997; median income for families of those women interviewed was $10,442. During the period of April 1970 to April 1974, inflation as measured by the index of average hourly earnings, seasonally adjusted (private nonfarm economy), amounted to

TABLE 6   FAMILY INCOME DISTRIBUTION OF WOMEN INTERVIEWED

Monthly Income (Interview Question-naire)	Monthly Income (Endpoints Adjusted)	Annual Income (Endpoints Adjusted)	Annual Income (Corrected to 1970 Dollars)	No. of Families 1970 (Inter-polated)	Actual No. of Women Inter-viewed	Expected No. of Women Inter-viewed	$\frac{(o - e)^{2*}}{e}$
$400 or less	$449 or less	$5399 or less	$4449 or less	417	15	18.4	0.53
$500 - 700	$450 - 749	$5400-8999	$4450-7415	456	24	19.8	0.89
$800 - 1000	$750 - 1049	$9000-12,599	$7416-10,379	511	27	22.2	1.04
$1100-1300	$1050-1349	$12,600-16,199	$10,380-13,349	288	14	12.5	0.18
$1400 & up	$1350 & up	$16,200 & up	$13,350 & up	627	23	27.4	0.71
Totals				2299	103	103.0	χ^2 = 3.35

*o = observed number, e = expected number

19.3% (17). This inflation factor is equivalent to a deflation factor of 17.6%, arrived at by the computation:

$$D = \frac{I}{1 + I}$$

where I is the inflation factor and D the deflation factor. Correction of 1974 dollars to the 1970 level requires application of the deflation factor. When adjusted to 1970 dollars, the median family income for the women interviewed becomes $8,604. The index of average hourly earnings was chosen over the more popular consumer price index as an inflation indicator because it is more specifically related to changes in income (17).

Since class intervals for income in the interview questionnaire were not identical to those used in the census, interpolations had to be made in order to attain comparability. These were made from census data, linear within each class, and rounded to the nearest whole person. Each class interval of the questionnaire was adjusted to 1970 dollars. There was no significant difference (0.40 < p < 0.50) in income between the sample and the census tract population.

CHAPTER IV   RESULTS AND DISCUSSION

Many factors other than diet may influence weight. Some of these factors are age, physical activity, and socioeconomic class. Because of possible interactions among various factors, a general linear hypothesis analysis was used to determine significant factors.

In the analysis of this study the following factors were considered in the general linear hypothesis test: diet, physical activity, socioeconomic stratum, present age, and relative weight at age 25. Diet was defined as vegetarian or non-vegetarian according to the definition used in this study. Socioeconomic stratum was divided into three categories which are determined by average home value (TABLE 2). Age was divided into 8 five-year categories from age 25 to 65. Relative weight at age 25 and present relative weight were calculated by using the formula:

$$\text{relative weight} = \frac{\text{actual weight in pounds}}{\text{ideal weight* in pounds}} \times 100$$

Physical activity was divided into three categories which are determined by the amount of physical activity attained per week. Points for each respondent were determined by adding up the response codes for each of the seven activities listed in question 3 of the questionnaire (Appendix A). TABLE 7 shows the three categories of physical activity with the range of points for each category.

*Metropolitan Life Insurance Table of Ideal Weight for Each Person According to Height.

TABLE 7   DETERMINATION OF TOTAL PHYSICAL ACTIVITIES PER WEEK

Activity	Sum	No. of Subjects
low	7-10	27
medium	11-14	39
high	15-32	37
Total		103

The general linear hypothesis analysis determines whether differences in levels or measurements on the design variables and covariates (i.e. diet, physical activity, socioeconomic stratum, present age, and relative weight at age 25) result in significant differences in the present relative weight.

Present age and relative weight at age 25 were found to be significant (p < .01), while diet was found to be marginally significant (p = .064). Physical activity and socioeconomic stratum were not found to be significant in this analysis (1). However, the physical activity categories used in this analysis were only very crude indicators of physical activity level, which may account for the lack of significance of this variable.

The distribution of present relative weight for vegetarians and non-vegetarians is given in TABLE 8a and shown graphically in GRAPH 1. A chi-square analysis was done on this data to determine whether obesity and diet are independent variables (TABLE 8b). This association just misses statistical significance (p = .059) suggesting that a non-vegetarian diet carries a risk of obesity after age 25. Diet may have its greatest effect on weight while an individual is maturing prior to age 25.

TABLE 8   PRESENT RELATIVE WEIGHT AMONG DIET GROUPS

a)

Present Relative Weight Class Interval	Diet			
	Vegetarian		Non-vegetarian	
	No.	%	No.	%
75- 84	12	14.6	1	4.8
85- 94	25	30.5	4	19.0
95-104	20	24.4	4	19.0
105-114	12	14.6	5	23.8
115-124	7	8.5	3	14.3
125-134	1	1.2	1	4.8
135-144	4	4.9	0	0.0
145-154	0	0.0	1	4.8
155-164	1	1.2	1	4.8
165-174	0	0.0	0	0.0
175-184	0	0.0	1	4.8
Totals	82	99.9	21	100.1

b)

Present Relative Weight Class Interval	Diet			
	Vegetarian		Non-vegetarian	
	No.	%	No.	%
Non-obese (Rel. Wt. < 105)	57	69.5	9	42.8
Borderline Obese (105 $\leq$ Rel. Wt. < 125)	19	23.1	8	38.1
Obese (Rel. Wt. $\geq$ 125)	6	7.3	4	19.0
Totals	82	99.9	21	99.9

GRAPH 1   PRESENT RELATIVE WEIGHT FREQUENCY vs. DIET GROUP
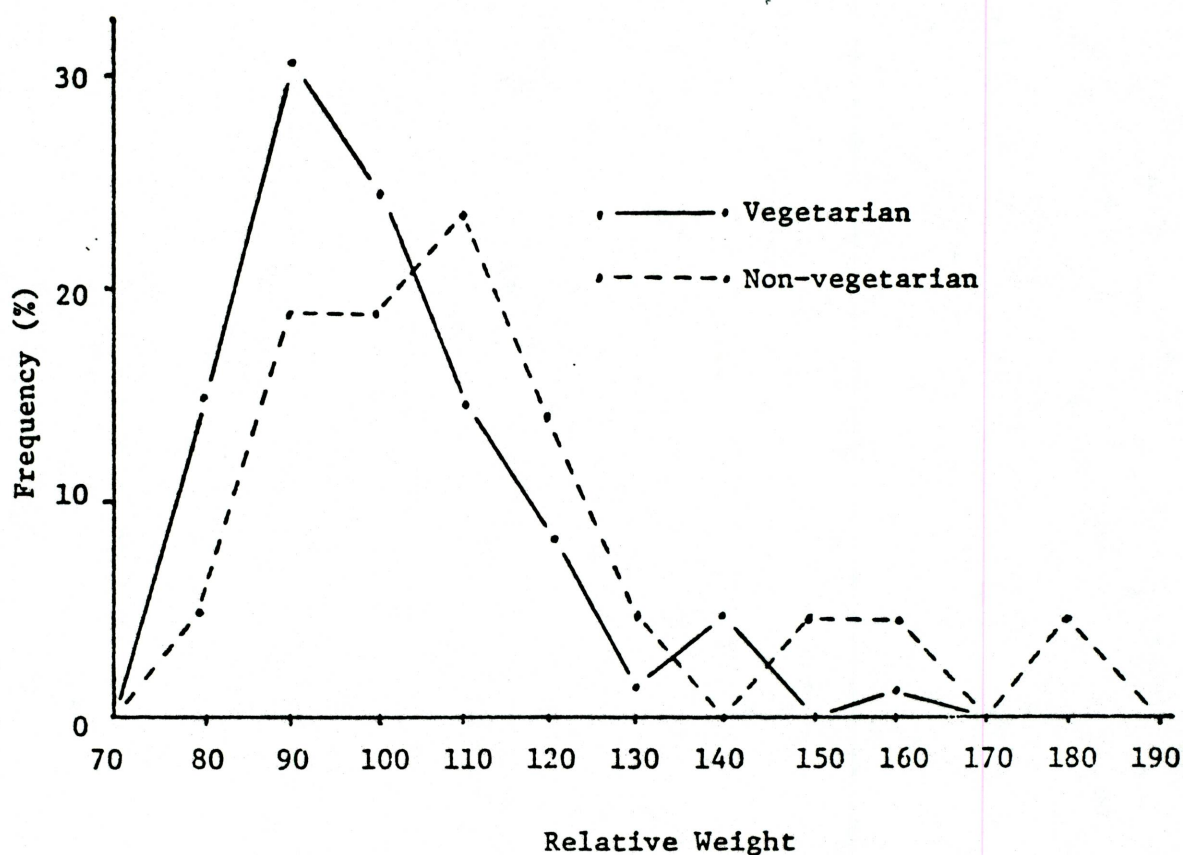
Chi-square analysis was performed on each question of the question-naire to determine statistically significant differences between obese and non-obese respondents. TABLE 9 indicates those responses that showed statistically significant differences in this analysis. Meal frequency was divided into 6 categories as follows: never, occasionally but less than once per week, 1 or 2 times per week, 3 or 4 times per week, 5 or 6 times per week, and daily. Respondents who ate breakfast, lunch, and supper 5 or 6 times per week or daily were considered to eat their meals more regularly. A later supper was considered to be at 7 P.M. or later. Four categories used to determine the largest meal of

TABLE 9   VARIABLES EXHIBITING SIGNIFICANT DIFFERENCES BETWEEN

OBESE AND NON-OBESE RESPONDENTS

VARIABLE	LEVEL OF SIGNIFICANCE (χ^2)
Eating Habits	
non-obese eat lunch more frequently	.0051
non-obese eat supper more frequently	.0005
non-obese eat supper at an earlier hour	.0000
non-obese eat largest meal at breakfast or lunch	.0434
Method of Food Preparation	
non-obese bake foods less frequently	.0005
Frequency of Use	
non-obese eat poultry less frequently	.0094
non-obese eat fish less frequently	.0427
non-obese eat frozen vegetables less frequently	.0000
non-obese eat canned fruit less frequently	.0004
non-obese eat rice less frequently	.0114
non-obese eat low-fat cheese less frequently	.0381
non-obese eat ice milk less frequently	.0001
non-obese eat pies more frequently	.0051
non-obese eat sweet rolls less frequently	.0002
non-obese drink tea less frequently	.0000
non-obese drink low cal beverage less frequently	.0008
non-obese eat snacks less frequently	.0007
Other Variables	
non-obese watch TV more hours	.0030
non-obese are younger	.0006

SELECTED BIBLIOGRAPHY

1. Belloc, Nedra B., and Breslow, Lester. "Relationship of Health Status and Health Practices." Preventive Medicine 1 (August 1972): 409-421.

2. Bray, George A. "Types of Human Obesity - A System of Classification." Obesity and Bariatric Medicine 2 (1973): 146, 147, 152, 154.

3. Dwyer, Johanna T.: Kandel, R. F.; Mayer, L. D. V. H.; and Mayer, J. "The New Vegetarians." Journal of the American Dietetic Association 64 (April 1974): 376-382.

4. Dwyer, Johanna T.; Mayer, L. D. V. H.; Kandel, R. F.; and Mayer, J. "The New Vegetarians." Journal of the American Dietetic Association 62 (May 1973): 503-509.

5. Ellis, Frey R., and Montegriffo, V. M. E. "The Health of Vegans." Plant Foods for Human Nutrition 2 (1971): 93-103.

6. Ellis, Frey R., and Montegriffo, V. M. E. "Veganism, Clinical Findings and Investigations." The American Journal of Clinical Nutrition 23 (March 1970): 249-255.

7. Erhard, Darla. "Nutrition Education for the 'Now' Generation." Journal of Nutrition Education (Spring 1971): 135-139.

8. Goodhart, Robert S., and Shils, Maurice E. Modern Nutrition in Health and Disease. 5th Ed. Philadelphia: Lea and Febiger, 1973.

9. Grotta-Kurska, Daniel. "Before You Say 'Baloney'... Here's What You Should Know About Vegetarianism." Today's Health (October 1974): 18, 21, 73, 74.

10. Hardinge, Mervyn G. "A Nutritional Study of Vegetarians and Non-vegetarians." Thesis, Harvard School of Public Health, Boston, 1951: 82, 83.

11. Hardinge, Mervyn G., and Crooks, Hulda. "Non-flesh Dietaries. II. Scientific Literature." Journal of the American Dietetic Association 43 (December 1963): 550-558.

CHAPTER V   CONCLUSIONS

This analysis has shown that weight in later life depends more upon age and relative weight at age 25 than it does on socioeconomic status or physical activity among Seventh-day Adventist females in Loma Linda, California. Although vegetarians and non-vegetarians have more similarities than differences, the extent to which a vegetarian diet contributes to the maintenance of normal weight can be determined only by a more detailed study.

From a practical standpoint prevention of obesity and health complications resulting from obesity might be effectively accomplished by maintaining proper diet prior to age 25.

Further study should concentrate on the question, "Is there a decreased risk of obesity associated with a vegetarian diet prior to age 25?"

the day were breakfast, lunch, supper, or none. The non-obese ate their meals more regularly, ate supper earlier, and had their largest meal at breakfast or lunch. The methods of food preparation considered in this study were boiling, baking, broiling, frying, and other. The only method showing statistical significance was baking, with the obese doing more baking than the non-obese.

How frequently certain foods were included in the diet was determined by dividing the responses into 6 categories as follows: never, occasionally but less than once per week, 1 or 2 times per week, 3 or 4 times per week, 5 or 6 times per week, and daily. These responses did not take into account the quantity of the foods consumed. In most cases the obese and non-obese ate those foods listed with the same frequency. That the obese ate poultry, fish, frozen vegetables, rice, and low-fat cheese more frequently may indicate a greater consumption of food. That the obese ate more canned fruit, ice milk, sweet rolls and tea (assuming that sugar is added) may indicate a greater intake of foods higher in calories. A greater use frequency of low-calorie carbonated beverages by the obese may indicate a need to drink something other than water to quench thirst. That the non-obese ate pie more frequently than did the obese, though statistically significant, does not necessarily mean that the non-obese ingest more calories.

The frequency of eating snacks was divided into 7 categories as follows: none, occasionally but less than once per day, once per day, twice per day, 3 times per day, 4 times per day, and 5 or more times per day. As would be expected, the obese snacked more frequently than did the non-obese.

Each respondent was asked how many hours he spent watching TV on the day previous to the interview. The response categories were divided as follows: 1/2 hour or less, 1 hour, 2 hours, 3 hours, 4 hours or more. It would be expected that the obese would spend more time watching TV since it is a sedentary pastime; however, according to the responses the non-obese watched TV more than did the obese. The validity of the data of this question is itself questionable.

Age was divided into 8 five-year categories and the obese respondents were older than the non-obese respondents, again as would be expected.

Of seemingly significant importance was the fact that there was no statistically significant difference in the level of physical activity attained by the obese and non-obese respondents.

The questionnaire questions were also analyzed using the classifications, vegetarian and non-vegetarian. The statistically significant differences which were determined by chi-square analysis with these classifications are shown in TABLE 10.

Respondents were asked how many hours of sleep they usually got at night with responses divided as follows: 5 hours or less, 6 hours, 7 hours, 8 hours, 9 hours, and 10 hours or more. Vegetarians were found to sleep significantly more hours per night than did non-vegetarians.

The amount of vigorous physical activity attained was determined by the responses to the frequency of hiking or outdoor walking, running or jogging, bicycling or stationary cycling, swimming, tennis, vigorous gardening, and other vigorous activities. Each of these activities had

TABLE 10   VARIABLES EXHIBITING SIGNIFICANT DIFFERENCES BETWEEN

VEGETARIAN AND NON-VEGETARIAN RESPONDENTS

VARIABLE	LEVEL OF SIGNIFICANCE (χ^2)
Habits	
vegetarians sleep more hours per night	.0190
vegetarians hike more frequently	.0050
Method of Food Preparation	
vegetarians broil less frequently	.0001
Frequency of Use	
vegetarians eat fresh vegetables more frequently	.0110
vegetarians eat white bread less frequently	.0009
vegetarians eat sweet rolls less frequently	.0450
vegetarians eat TV dinners less frequently	.0080
vegetarians drink coffee less frequently	.0180
vegetarians drink decaffeinated coffee less frequently	.0040
vegetarians drink cereal beverage less frequently	.0400
vegetarians drink low calorie beverage less frequently	.0000

response categories as follows: never, occasionally but less than once

per week, 1 or 2 times per week, 3 or 4 times per week, 5 or 6 times

per week, and daily. The only level of physical activity showing any

statistical significance was hiking or outdoor walking, with vegetarians

doing more.

The method of food preparation showing statistical significance

was broiling, with the non-vegetarians broiling more frequently than

the vegetarians. This would be expected since broiling is usually

associated with preparation of meat, poultry, or fish.

The frequency with which certain foods were included in the diet were very nearly the same for both vegetarians and non-vegetarians, except for those food items listed in TABLE 10. Vegetarians were found to include fresh vegetables in their diets significantly more often than did non-vegetarians which would be expected. If non-vegetarianism can be equated to a poorer diet, then that non-vegetarians included white bread, sweet rolls, TV dinners, coffee, decaffeinated coffee, cereal beverage, and low calorie carbonated beverages more often in their diets was to be expected since these foods are more highly refined and less nutritious.

Chi-square analysis failed to show an association between socioeconomic stratum and either obesity or vegetarianism.

It is interesting to note that in this study 65 persons (63%) used no flesh foods; however, 73 persons (71%) responded with a "yes" to the question "Are you vegetarian?" This shows some variation in definitions of vegetarianism. Data from an unpublished study of Seventh-day Adventists by Scharffenberg indicate that approximately 85% of Seventh-day Adventists are vegetarians based upon a comparable definition of vegetarianism. This estimate is close to the 80% (82 persons) vegetarians found in this study.

Since the design of this study was to initially determine obesity rates in Seventh-day Adventist females between ages 25 and 65 living in Loma Linda, California, statements made about diet and weight have an inherent weakness due to the relative imbalance in the proportions of the subgroups (vegetarian versus non-vegetarian and obese versus non-obese).

12. Hardinge, Mervyn G., and Stare, Fredrick J. "Nutritional Studies of Vegetarians. I. Nutritional, Physical, and Laboratory Studies." The Journal of Clinical Nutrition 2 (March – April 1954): 73-82.

13. Ling, Chiun T., and Chow, Bacon F. "Effect of Vitamin B_{12} on the Body Composition of Rats." Journal of Biological Chemistry 198 (1952): 439-444.

14. National Dairy Council. Weight Control Source Book. Chicago, 1969.

15. U.S. Department of Commerce. Bureau of the Census. Census of Housing: 1970. Block Statistics, San Bernardino-Riverside California Urbanized Area. Washington, D.C. 1971.

16. U.S. Department of Commerce. Bureau of the Census. Census of Population and Housing: 1970. Census Tracts San Bernardino-Riverside-Ontario California SMSA. Washington, D.C. 1972.

17. U.S. Department of Commerce. Survey of Current Business. Various monthly issues for 1970 through 1973. Index 129.5 April, 1970 and 154.5 April, 1974. Washington, D.C.

18. U.S. Department of Health, Education, and Welfare, Vital and Health Statistics Series 11, No. 8. National Center for Health Statistics: Weight, Height, and Selected Body Dimensions of Adults: 1960-1962. 1965.

19. Van Itallie, Theodore B., and Campbell, Robert G. "Multidisciplinary Approach to the Problem of Obesity." Journal of the American Dietetic Association 61 (October 1972): 385-390.

APPENDIX A

QUESTIONNAIRE

STUDY NO. _____   1-2

I. D. NO. _____   3-5

NUTRITIONAL SURVEY

6

$\frac{1}{7}$

8

INTERVIEWER: FILL OUT THIS SECTION BEFORE KNOCKING

Interviewer's Name: _____

Date: Month ____ Day ____ Year 19 __ __   9-13

Day of week: 1( ) Sun 2( ) Mon 3( ) Tue 4( ) Wed 5( ) Thu 6( ) Fri 7( ) Sat

Time: __ __ : __ __   1( ) AM 2( ) PM   14-19
        9 10   11 12

Respondent's Address: _____

Tract No. __ __ __   Block No. __ __ __   20
        14 15 16   17 18 19

Socio-Economic Status Rating:
1( )Wealthy 2( )Above average 3( )Average 4( )Below aver. 5( )Poor

INTRODUCTION: GOOD (MORNING, AFTERNOON, EVENING). I'M _____
FROM THE LOMA LINDA UNIVERSITY SURVEY RESEARCH CENTER. WE ARE DOING A
NUTRITIONAL SURVEY ON SEVENTH-DAY ADVENTIST ADULTS. I WOULD LIKE TO
ASK YOU A FEW QUESTIONS.

INTERVIEWER: ASK TO INTERVIEW THE LADY OF THE HOUSE

1. Are there any Seventh-day Adventists presently living in this   21
household? .... ( ) Yes ( ) No IF "NO" TERMINATE INTERVIEW   22

2. How many Seventh-day Adventists live in this household? _____   23

3. How many Seventh-day Adventist males live in this household? _____   24

4. Is the lady of the house a Seventh-day Adventist and between the   25
ages of 25 and 65? ... ( ) Yes ( ) No IF "NO" TERMINATE INTERVIEW

CHECK THE APPROPRIATE CATEGORY ON THE FIRST CALL

1( ) Vacant house
2( ) No one answered door
3( ) No qualified person at home
4( ) Refused to be interviewed
5( ) Respondent started but would not complete interview   26
6( ) Completed interview

CHECK THE APPROPRIATE CATEGORY ON THE SUBSEQUENT CALLS

1( ) Completed interview on second call
2( ) Completed interview on third call
3( ) Completed interview by appointment on fourth call
4( ) Unable to interview

INTERVIEWER: IF RESPONDENT REFUSED OR WOULD NOT COMPLETE INTERVIEW
GIVE REASON (GUESS IF NECESSARY).

I. D. No. _____

NUTRITIONAL SURVEY

DIRECTIONS: Please answer all questions by placing an "X" in the appropriate square(s). Please do not leave any questions unanswered. Thank you.

1.   How many hours of sleep do you usually get at night?

PLEASE CHECK THE NEAREST CATEGORY   27

^{1}( ) 5 or less
^{2}( ) 6
^{3}( ) 7
^{4}( ) 8
^{5}( ) 9
^{6}( ) 10 or more

2.   On a week day what time do you generally get up?

PLEASE CHECK THE NEAREST CATEGORY   28

^{1}( ) 5 AM or before
^{2}( ) 6 AM
^{3}( ) 7 AM
^{4}( ) 8 AM
^{5}( ) 9 AM
^{6}( ) 10 AM or later
^{7}( ) Other SPECIFY

3.   How often do you engage in the following VIGOROUS activities?

ACTIVITY	Never	Occas. but less than 1/wk	1 or 2 times/wk	3 or 4 times/wk	5 or 6 times/wk	Daily	
Hiking or outdoor walking. ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		29
Running or jogging......... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		30
Bicycling or stationary cycling......... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		31
Swimming.......... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		32
Tennis........... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		33
Vigorous gardening (spading, hand-mowing, etc.)... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		34
Other vigorous activities...... ^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )		35

PLEASE SPECIFY

4. How many large 8 oz. glasses of water did you drink in the last 24 hours? PLEASE CHECK THE NEAREST CATEGORY

        ¹( ) 2 or less
        ²( ) 3-4
        ³( ) 5-6
        ⁴( ) 7-8
        ⁵( ) 9-10
        ⁶( ) 11 or more

    36

5. How often do you eat breakfast?, lunch?, supper?

PLEASE CHECK THE NEAREST CATEGORY

MEAL	Never	Occas. but less than 1/wk	1 or 2 times/wk	3 or 4 times/wk	5 or 6 times/wk	Daily	
Breakfast..	¹( )	²( )	³( )	⁴( )	⁵( )	⁶( )	37
Lunch......	¹( )	²( )	³( )	⁴( )	⁵( )	⁶( )	38
Supper.....	¹( )	²( )	³( )	⁴( )	⁵( )	⁶( )	39

6. At what times do you most often eat breakfast?, lunch?, supper?

PLEASE CHECK THE NEAREST CATEGORY

Breakfast?
  ¹( ) 5 AM or before
  ²( ) 6 AM
  ³( ) 7 AM
  ⁴( ) 8 AM
  ⁵( ) 9 AM
  ⁶( ) 10 AM or after
  ⁷( ) irregular hours

    40

Lunch?
  ¹( ) 10 AM or before
  ²( ) 11 AM
  ³( ) 12 Noon
  ⁴( ) 1 PM
  ⁵( ) 2 PM
  ⁶( ) 3 PM or after
  ⁷( ) irregular hours

    41

Supper?
  ¹( ) 4 PM or before
  ²( ) 5 PM
  ³( ) 6 PM
  ⁴( ) 7 PM
  ⁵( ) 8 PM
  ⁶( ) 9 PM or after
  ⁷( ) irregular hours

    42

7. Which is your largest meal of the day?
    ¹( ) Breakfast
    ²( ) Lunch
    ³( ) Supper
    ⁴( ) None
    ⁵( ) Other PLEASE SPECIFY _____

    43

8. How frequently do you eat out?

PLEASE CHECK THE NEAREST CATEGORY

^{1}( ) twice a month or less
^{2}( ) once a week
^{3}( ) twice a week
^{4}( ) 3 times a week
^{5}( ) 4 times a week
^{6}( ) 5 times a week

44

9. How frequently do you eat foods prepared by the following methods?

PLEASE CHECK THE NEAREST CATEGORY

ITEM	Never	Occas. but less than 1/wk	1 or 2 times/wk	3 or 4 times/wk	5 or 6 times/wk	Daily	
Boiling.....	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	45
Baking......	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	46
Broiling....	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	47
Frying......	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	48
Other.......	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	49

PLEASE CHECK HOW OFTEN AND SPECIFY WHAT

10. How often do you use the following foods?

PLEASE CHECK THE NEAREST CATEGORY AND GIVE
RESPONDENT CARD NO. 1 WITH RESPONSE CATEGORIES

ITEM	Never	Occas. but less than 1/wk	1 or 2 times/wk	3 or 4 times/wk	5 or 6 times/wk	Daily	
Meat........	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	50
Poultry.....	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	51
Fish........	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	52
Soyameats...	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	53
Nuts........	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	54
Eggs........	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	55
Legumes.....	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	56
Fresh veg...	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	57
Canned veg..	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	58
Frozen veg..	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	59
Fresh fruit.	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	60
Canned fruit	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	61
Dried fruit.	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	62
Frozen fruit	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	63
Tortillas...	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	64
Rice........	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	65
Noodles.....	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	66
Corn bread..	^{1}( )	^{2}( )	^{3}( )	^{4}( )	^{5}( )	^{6}( )	67

10. (cont.) How often do you use the following foods?

ITEM	Never	Occas. but less than 1/wk	1 or 2 times/wk	3 or 4 times/wk	5 or 6 times/wk	Daily	
White breads.....	1( )	2( )	3( )	4( )	5( )	6( )	68
Whole grn. brds..	1( )	2( )	3( )	4( )	5( )	6( )	69
Granolas.........	1( )	2( )	3( )	4( )	5( )	6( )	70
Other dry cereal.	1( )	2( )	3( )	4( )	5( )	6( )	71
Cooked cereals...	1( )	2( )	3( )	4( )	5( )	6( )	72
American cheeses.	1( )	2( )	3( )	4( )	5( )	6( )	73
Low fat cheeses..	1( )	2( )	3( )	4( )	5( )	6( )	74
Reg. cott cheese.	1( )	2( )	3( )				75
Low fat cottage cheese.........	1( )	2( )	3( )	4( )	5( )	6( )	76
Yogurt...........	1( )	2( )	3( )	4( )	5( )	6( )	77
Pwd. skim milk...	1( )	2( )	3( )	4( )	5( )	6( )	8
Skim milk........	1( )	2( )	3( )	4( )	5( )	6( )	9
Low fat milk.....	1( )	2( )	3( )	4( )	5( )	6( )	10
Whole milk.......	1( )	2( )	3( )	4( )	5( )	6( )	11
Buttermilk.......	1( )	2( )	3( )	4( )	5( )	5( )	12
Imitation milk...	1( )	2( )	3( )	4( )	5( )	6( )	13
Soymilk..........	1( )	2( )	3( )	4( )	5( )	6( )	14
Half and half....	1( )	2( )	3( )	4( )	5( )	6( )	15
Cream............	1( )	2( )	3( )	4( )	5( )	6( )	16
Non-dairy creamer.........	1( )	2( )	3( )	4( )	5( )	6( )	17
Butter...........	1( )	2( )	3( )	4( )	5( )	6( )	18
Margarine........	1( )	2( )	3( )	4( )	5( )	6( )	19
Ice cream........	1( )	2( )	3( )	4( )	5( )	6( )	20
Sherbet..........	1( )	2( )	3( )	4( )	5( )	6( )	21
Ice milk.........	1( )	2( )	3( )	4( )	5( )	6( )	22
Pies.............	1( )	2( )	3( )	4( )	5( )	6( )	23
Cakes............	1( )	2( )	3( )	4( )	5( )	6( )	24
Cookies..........	1( )	2( )	3( )	4( )	5( )	6( )	25
Swt. rolls, donut	1( )	2( )	3( )	4( )	5( )	6( )	26
Candy, chocolate.	1( )	2( )	3( )	4( )	5( )	6( )	27
Other desserts...	1( )	2( )	3( )	4( )	5( )	6( )	28
Frozen TV dinners	1( )	2( )	3( )	4( )	5( )		29
Fruit juices.....	1( )	2( )	3( )	4( )	5( )	6( )	30
Coffee...........	1( )	2( )	3( )	4( )	5( )	6( )	31
Tea..............	1( )	2( )	3( )	4( )	5( )	6( )	32
Decaf. coffee....	1( )	2( )	3( )	4( )	5( )	6( )	33
Cereal beverages.	1( )	2( )	3( )	4( )	5( )	6( )	34
Carbonated beverages......	1( )	2( )	3( )	4( )	5( )	6( )	35
Low calorie carbonated beverages......	1( )	2( )	3( )	4( )	5( )	6( )	36
Sugar or honey...	1( )	2( )	3( )	4( )	5( )		37

11. Are you vegetarian?

   ¹( ) Yes   ²( ) No   IF "NO" SKIP QUESTION 12

12. How long have you been vegetarian?

   PLEASE CHECK THE NEAREST CATEGORY
   ¹( ) 4 years or less
   ²( ) 5 to 9 years
   ³( ) 10 to 14 years
   ⁴( ) 15 to 19 years
   ⁵( ) 20 years or longer
   ⁶( ) Entire life

13. How many snacks do you usually have every day?

   ¹( ) 5 or more
   ²( ) 4
   ³( ) 3
   ⁴( ) 2
   ⁵( ) 1
   ⁶( ) Occasionally, but less than once per day
   ⁷( ) None

14. How frequently do you use vitamin supplements?

   PLEASE CHECK THE NEAREST CATEGORY
   ¹( ) Daily
   ²( ) 5 or 6 times a week
   ³( ) 3 or 4 times a week
   ⁴( ) 1 or 2 times a week
   ⁵( ) Occas. but less than once a week
   ⁶( ) Irregular use
   ⁷( ) Never

15. When you salt your food do you generally salt it before or after tasting?

   ¹( ) Before tasting
   ²( ) After tasting
   ³( ) Never add salt

16. During the past year have you been following any special diet?

   ¹( ) Diabetic
   ²( ) Salt restricted
   ³( ) Low calorie
   ⁴( ) Low cholesterol
   ⁵( ) High protein
   ⁶( ) Other SPECIFY _____
   ⁷( ) No special diet

17. How many hours did you spend watching TV yesterday?
    PLEASE CHECK THE NEAREST CATEGORY
    1( ) 1/2 hour or less
    2( ) 1 hour
    3( ) 2 hours
    4( ) 3 hours
    5( ) 4 hours or more

18. What is your occupation? _____

19. What are your job duties at this occupation? _____
    _____
    _____

20. What is your family's monthly income before taxes?
    PLEASE CHECK THE NEAREST CATEGORY
    1( ) $400 or less
    2( ) $500 to $700
    3( ) $800 to $1,000
    4( ) $1,100 to $1,300
    5( ) $1,400 or above

21. What is the last grade or degree you completed? _____

22. What is your marital status?
    1( ) Never married
    2( ) Married
    3( ) Separated or divorced
    4( ) Widowed

23. How long have you been a Seventh-day Adventist?
    PLEASE CHECK THE NEAREST CATEGORY
    1( ) 4 years or less
    2( ) 5 to 9 years
    3( ) 10 to 14 years
    4( ) 15 to 19 years
    5( ) 20 years or longer
    6( ) Entire life

24. How long have you maintained your present weight?
    PLEASE CHECK THE NEAREST CATEGORY
    1( ) 4 years or less
    2( ) 5 to 9 years
    3( ) 10 to 14 years
    4( ) 15 years or longer

25. What was your weight at 25 years of age? _____ _____ _____ lbs.   53-55
53   54   55

26. What is your weight now in pounds?   _____ _____ _____ lbs.   56-58
56   57   58

27. What is your height now in inches without shoes?   _____ _____ ins.   59-60
59   60

28. What is your age?

   PLEASE CHECK THE NEAREST CATEGORY

   1( ) 25 to 29   61
   2( ) 30 to 34
   3( ) 35 to 39
   4( ) 40 to 44
   5( ) 45 to 49
   6( ) 50 to 54
   7( ) 55 to 59
   8( ) 60 to 65

29. Would you estimate your average caloric intake?

   PLEASE CHECK THE NEAREST CATEGORY

   1( ) 900 or less   62
   2( ) 1000 to 1400
   3( ) 1500 to 1900
   4( ) 2000 to 2400
   5( ) 2500 to 2900
   6( ) 3000 or more
   7( ) Don't know

INTERVIEWER: PLEASE COMPLETE THE REMAINING QUESTIONS

30. Sex: 1( ) Female   2( ) Male   63

31. Race: 1( )Black 2( )Oriental 3( )Mexican-American 4( )White   64

32. Ending time: __ __ : __ __   1( ) AM   2( ) PM   65-69
65 66   67 68

PLEASE MAKE SURE ALL QUESTIONS ARE ANSWERED.   THANK YOU.

INTERVIEWER'S REMARKS:

ANALYSIS CODES

Actual time of interview
1( )S 2( )M 3( )Tu 4( )W 5( )Th 6( )F 7( )Sa   70

Time: __ __ : __ __   1( ) AM 2( ) PM   71-75
71 72   73 74

Relative Weight: _____ _____ _____   76-78
76   77   78

Diet: 1( ) Veg.   2( ) Non-veg.   79

APPENDIX B

MAP OF TRACT 0073

Loma Linda, California

73

Loma Linda—Bryn Mawr Div.

ED 335