NUTRITION KNOWLEDGE OF
ADOLESCENT FEMALES WITH AND WITHOUT ANOREXIA NERVOSA

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Science in Home Economics

by

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ABSTRACT

NUTRITION KNOWLEDGE OF ADOLESCENT FEMALES
WITH AND WITHOUT ANOREXIA NERVOSA

by
Lisa Futterman

Master of Science in Home Economics

Anorexia nervosa is a syndrome characterized by the patient's pursuit of extreme thinness which is often life-threatening. In recent years, the incidence of anorexia nervosa has risen dramatically in the Western nations. Although nutrition education is included in some treatment regimens for the disorder, no current research has dealt with the actual level of nutrition knowledge of this population or investigated what areas of nutrition education that may require particular attention. The purpose of this study was to determine the level of nutrition knowledge of these patients as compared to non-anorexic adolescent females and to more specifically identify the areas of nutrition knowledge that may be deficient.

A nutrition survey was distributed to approximately ninety high school students with twenty surveys randomly
selected from those completed by the female respondents. Twenty surveys were also obtained from anorexia nervosa out-patients in the Los Angeles area.

The findings of the study indicate that female anorexia nervosa patients have a lower level of nutrition knowledge than adolescent females without anorexia nervosa. It was apparent that both sample groups were susceptible to nutrition myths and fads. The responses from the anorexic sample group regarding a recommendation to lose weight rapidly was consistent with the attitudes and behavior common to the disorder. Both groups displayed only a fair understanding of vitamins and general nutrition. In general, the study indicated that both sample groups displayed a need for additional nutrition education.
CHAPTER I
INTRODUCTION

Overview

In recent years, health professionals have become increasingly concerned about the incidence and prevalence of the eating disorder anorexia nervosa. The incidence has been estimated to be as high as one in two hundred females per year in the high-risk age group (12-18 years of age), and the prevalence of this disorder has risen dramatically in western nations in the past twenty years (Doyen, 1982). Anorexia nervosa remains a puzzling disorder that appears to be a complex interaction of psychologic abnormalities and malnutrition (Schwabe, 1981). In addition, there continues to be a controversy surrounding its management. The literature indicates that in some treatment programs, nutrition education is an adjunct to other therapies. Although nutrition re-education is advocated, no current research has dealt with the actual level of nutrition knowledge of this population. It is also of interest that one of the primary characteristics of anorexia nervosa patients is a preoccupation with nutrition, cooking and menu planning (Schwabe, 1981). It is not uncommon for them to enter food-related professions as a dietician, cook or waitress and many enjoy feeding others while forbidding themselves
food (Garfinkel, 1982). Although this may be of benefit in increasing the patient's nutrition awareness, the anorexic may also be susceptible to nutrition fallacies and fads.

The objective of this study was to determine the level of nutrition knowledge of adolescent females with anorexia nervosa as compared to the non-anorexic adolescent female.

The goal of this research was to provide additional insight into this disorder and, in turn, to provide additional information into its treatment. This study may also be helpful in recognizing the need for nutrition education as a step in improving the general health of the American adolescent. With expanded interest in nutrition on the part of the general population, there has also been an upsurge of popular literature on this subject that may be confusing or misleading, especially to the adolescent. Nutrition education of the general public is needed in order to balance the false information created by these commercial influences (Mackie, 1980). Therefore, this study hopes to bring about a greater understanding of the nutrition knowledge among adolescents with anorexia nervosa and those who do not have the eating disorder, and to identify some of the popularly held notions about nutrition.
Alternate Hypothesis

1. There will be a significant difference in the nutrition knowledge of female adolescents with anorexia nervosa as compared with non-anorexic female adolescents.

Null hypothesis

1. There will be no significant difference in the nutrition knowledge of female adolescents with anorexia nervosa as compared with non-anorexic female adolescents.

Assumption

The following assumption was made for the purpose of this research study:

1. That the survey was a valid means of collecting data concerning the nutrition knowledge of anorexic adolescent females and non-anorexic adolescent females.

Limitations

The researcher recognizes the following limitations of this study:

1. Distribution of the survey to non-anorexics was confined to those students in a biology class at Agoura High School, Agoura, California, and, therefore, does not represent a complete spectrum of American adolescents.

2. Distribution of the survey to anorexia nervosa patients was confined to three Los Angeles eating disorder clinics.
3. There were no controls on the educational or socio-economic levels of the subjects which could affect their level of nutrition knowledge.

4. The study was limited to females, since they are most affected by this disorder (Schwabe, 1981).

**Definition of Terms**

Crash diet: An eating pattern which is unhealthful or nutritionally unsound, adopted by an individual in order to induce rapid weight loss.

Fast foods: Foods that are high in calories and sodium and generally low in fiber and other nutrients.

Obese: A bodily condition marked by excessive generalized deposition or storage of fat in adipose tissue with the individual being twenty percent above ideal weight determined for height, age and sex in standard weight tables (Mitchell, 1976).

Empty Calories: Calories obtained from food items that are high in energy value but low in other major nutrients.
CHAPTER II
REVIEW OF LITERATURE

The review of literature provided background for this study for better understanding of the condition of anorexia nervosa and gave some insight into adolescents' attitudes and beliefs towards nutrition.

Overview
Anorexia nervosa is a clinical syndrome characterized by a voluntary refusal to eat in the "triumphant" pursuit of thinness that often leads to life-threatening weight loss (Bruch, 1973). Although anorexics become thinner and thinner, they perceive themselves as fat and continue to deny their own hunger (Doyen, 1982). The term anorexia is a misnomer since this implies a loss of appetite when, in actuality, the patient's appetite is maintained until late in the starvation process. Most patients report a normal awareness of hunger; however, perception of satiety is extremely distorted with complaints of severe bloating and abdominal distention after eating a small quantity of food (Garfinkel, 1981). The anorexic girl's pursuit of thinness begins with a diet not unlike that of her peers. She frequently "feels" that a particular part of her body is too large and the initial intent is to "lose a few pounds." The anorexic's behavior would not initially
appear unusual, since adolescents have a high degree of interest in their body shape. In general, boys tend to want to be heavier and bigger, while girls want to lose weight or reduce certain areas of their bodies. Many girls have an unrealistic view of fatness or thinness and have a desire to conform to the current ideal of feminine shape (giff, 1972).

Some researchers advocate a dualistic separation of the anorexic population into "restrictor" and "bulimic" subtypes due to differences in eating behaviors. The former are characterized by unremitting patterns of dietary control, while the latter periodically engage in eating binges. There may be specific links between subtypes and psychopathologic disorders, interactional patterns and eventual outcome. In spite of this subclassification, many characteristics remain common among the anorexic population (Strober, 1983).

**Nutrition Knowledge and Attitudes**

While a component of anorexia nervosa involves a weight or body size phobia, food, in addition, becomes a phobic object. Most often, carbohydrate foods are feared and are strictly avoided secondary to the patients' belief that these foods will immediately transform into large quantities of body fat (Garfinkel, 1982). The anorexic's diet characteristically consists of low or non-existent
carbohydrate intake; however, signs of vitamin deficiency are rare (Bruch, 1973). Patients' diets are consistently low in energy value with a large percentage of calories derived from protein and a greatly reduced intake of fats and carbohydrates. Caloric intake decreases as the condition progresses to a more severe phase of the illness. One study determined that the average caloric intake at the onset of the illness was approximately 700 calories per day with a reduction to approximately 300 calories per day when the patients were most severely emaciated (Beumont, 1981).

According to Hinton (1963), eating practices of girls are related to their nutrition knowledge, their values, maturation, standard weight, social status, psychologic adjustment, and family relations. It is therefore important to include a discussion of nutrition in the treatment regimen for anorexia nervosa. The education process should include meal planning, re-education about serving portion sizes, and elimination of misconceptions about nutrition (Garfinkel, 1982). Nutrition education should be attempted in the later stages of treatment when the starvation symptoms are no longer present since sixty-six percent of anorexic patients reported a reduced alertness and ability to concentrate when first diagnosed (Garfinkel, 1982).

The first step in the education process is to identify the misconceptions about nutrition and to understand the
patient's level of nutrition knowledge, so that treatment can be geared towards the patient's particular educational needs.

**Diagnostic Criteria for Anorexia Nervosa**

According to Bruch (1973), anorexia nervosa is a discreet psychiatric syndrome with characteristic signs and symptoms, of which there are primary and secondary forms. In the former, the pursuit of extreme thinness reflects a disturbance regarding the patient's sense of autonomy and control, disturbance in body image and internal sensations. In contrast, the secondary form of the disorder reflects a non-specific category in which weight loss is secondary to another psychiatric illness in which starvation occurs, not in the pursuit of thinness, but due to various symbolic misinterpretations of the eating function (Bruch, 1973). This study will concern itself with the primary form of anorexia nervosa.

Many clinical and psychiatric criteria are used to diagnose anorexia nervosa. The cardinal feature of anorexia nervosa is the patient's willful pursuit of behavior that results in extreme weight loss. It is of primary importance to rule out any other physical or psychiatric disorders that could account for the weight loss. The onset of the illness usually occurs between the ages of ten and thirty years; however, there have been some instances
in which onset occurred in the mid and late thirties (Garfinkel, 1980). A loss of at least twenty-five percent of original body weight or fifteen percent below normal weight for height is required for diagnosis, whereas this may be modified to a lower level for younger children (Bruch, 1973). Hyperactivity is a common manifestation of the eating disorder, with patients becoming involved in athletic activities such as running or dancing and often doing isometric activities while sitting -- anything to burn off calories (Schwabe, 1981).

Amenorrhea occurs in almost one hundred percent of cases and may even occur before substantial weight loss has occurred. Starvation and stress account for many of the abnormal physiological findings: epigastric distress, vomiting, constipation, hypothermia, low blood pressure, lanugo (a fine body hair which is found in approximately thirty percent of patients), bradycardia and disturbed sleep (Feighner, 1972). These features will be discussed further in connection with the complications of anorexia nervosa.

Bizarre eating habits, with a distorted attitude towards eating, food, or weight, are found in all cases and are represented by one or more of the following: denial of illness, with the patients perceiving themselves as being overweight even when grossly emaciated, preoccupation with food, food hoarding, laxative abuse and self-induced vomit-
Bulimia, the rapid consumption of large amounts of food in a short period of time, occurs in approximately fifty percent of patients with anorexia nervosa (Casper, 1980). Table 1 provides a summary of the diagnostic criteria for anorexia nervosa based upon research conducted by Bruch (1973) and Schwabe (1981).

**TABLE 1**

**CRITERIA FOR THE DIAGNOSIS OF ANOREXIA NERVOSA**

1. Age between 10 and 40 years and onset of illness between ages of 10 and 30

2. Loss of at least 25% of original body weight and/or 15% below normal weight for age and height

3. Demonstration of distorted attitude and behavior toward eating, food or weight that was represented by any of the following:
   - Denial of illness, with a failure to recongize nutritional needs
   - Apparent enjoyment in losing weight
   - A desired body image of extreme thinness
   - Unusual hoarding or handling of food

4. At least one of the following manifestations:
   - Lanugo (fine neo-natal like hair on the body)
   - Bradycardia (persistent resting pulse of 60 beats per minute or less)
   - Hypothermia (body temperature below 36.1 degrees C)
   - Episodes of bulimia (compulsive overeating)
   - Vomiting

5. Periods of overactivity
TABLE 1 (continued)

6. Amenorrhea of at least three months' duration unless illness occurred before onset of menses

7. No known medical illness that could account for the anorexia and weight loss

8. No other major psychiatric disorder, such as schizophrenia (Bruch, 1972 and Schwabe, 1981)

**Clinical Features**

A composite picture of anorexia nervosa can be drawn since many clinical features are typical of the disorder. The anorexic is generally female, with onset of the illness occurring during late childhood or adolescence. This condition appears to be predominant among whites and there is a strong suggestion that the disorder is most common in middle and upper socio-economic families. The patients are typically of normal to above average intelligence and are characterized as "achievers" and model students (Schwabe, 1981). Precipitating factors in the development of the disorder generally are new situations that demand social skills and independence that the individual has not been able to master at home. The patient finds it difficult to obtain independence at home secondary to the intrusive control of one or both parents (Doyne, 1982). Some common examples of precipitating situations are onset of puberty, sexual awareness, and departure from home for summer camp, college or marriage. Dieting is sometimes initiated in
response to teasing from others about weight or appearance. Approximately one-third of anorexics were slightly overweight before onset of the illness (Doyen, 1982). Due to the starvation process and loss of body fat, the patient frequently is intolerant to cold, is often agitated and, as the condition progresses, becomes lethargic (Schwabe, 1981). See Table 2 for a summary of clinical features.

TABLE 2
CLINICAL FEATURES OF ANOREXIA NERVOSA

Demographic and historical features
Predominance of women
Onset in late childhood and adolescence
Predominately white
Middle to upper class
History of overweight period
Preoccupation with food, nutrition and physical exercise

Symptoms
Amenorrhea in almost 100% of patients
Constipation, often with complaints of abdominal pain
Cold intolerance
Agitation or lethargy
Emesis (vomiting)

Physical findings
Cachexia (malnutrition and wasting)
Skin abnormalities; increased lanugo-like body hair
Bradycardia
Hypotension (low blood pressure)
Hypercarotenic skin (yellowing of the skin secondary to high blood carotene levels)
Peripheral edema
Hypothermia

Adapted from Schwabe (1981)
The families of anorexics have been described extensively in the research. The families generally consist of a domineering and intrusive mother overly invested in the child, with a father who tends to be passive and weak. One parent, usually the mother, is frustrated in her own ambitions and lives through the offspring's achievements. The child tries to live up to the parents' ideals, yet still assert individuality. Anorexic symptoms appear to be the outcome of the impossibility to assert her individuality, with a final defiant statement of personal autonomy (Doyen, 1982).

**Psychological Aspects**

The main issue for the anorexic is a struggle for control, sense of identity, competence and effectiveness. There appear to be three areas of disordered psychological function:

1. Disturbance of body concept with an absence of concern, and a vigorous defense of their emaciation as normal and right.

2. Disturbance in the accuracy of the perception of interpretation of stimuli arising in the body. This is demonstrated by the denial of hunger with complaints of acute discomfort or fullness after intake of a very small quantity of food, and persistent hyperactivity with denial of fatigue.
3. Paralyzing sense of ineffectiveness which pervades all thinking and activities. The anorexic acts in response to demands and wishes of others. This may be camouflaged by enormous negativism and stubborn defiance after onset of the illness (Bruch, 1973).

It has been indicated that anorexia nervosa involves an avoidance of biological maturity in vulnerable adolescents in response to the demands and expectations of adulthood. Menstruation, and the body fat required for this, represents a developmental stage and signifies changes associated with adulthood. Also, menstruation is a pivotal event in the adolescent girl's life and requires a re-evaluation of body image and sexual identity. The tendency for some anorexic patients to overestimate their body sizes, in a manner similar to younger girls, may indicate a form of "regression" that is extended to this particular area of maturation (Garfinkel, 1981).

Another area that may contribute to the onset of this disorder is sociocultural factors. During the twentieth century there have been shifts of preference with regard to the feminine form. Recently, the preferences of American culture have returned to thinness as attractive for females. The media have capitalized upon and promoted this image and have portrayed the successful and beautiful as thin. In addition, thinness has become associated with self control
and success. One popular form of self control for women has been dieting. Most researchers agree that these socio-cultural pressures can be linked to an increased incidence of anorexia nervosa (Garfinkel, 1982).

According to Garfinkel (1982), the anorexic neither totally wants to revert to childhood, nor does she simply strive to meet societal standards. More specifically, the anorexic wishes to be an autonomous adult, but because of her ambivalence about her body, she rejects aspects of the feminine body which signify potential problems for her. In addition, Bruch (1973) also has described the struggle to live up to perfectionist or unrealistic performance standards set by the anorexic herself and her family's overconcern with achievement, dieting and weight.

The bulk of evidence suggests that the disorder is multidetermined, since not all individuals exposed to cultural pressures to perform, to be perfect and to be slim, develop anorexia nervosa. It is apparent that, in addition to these sociocultural factors, the anorexic has particular deficits in her personality and her capacity for autonomy (Bruch, 1973). The interaction of a number of individual, familial and cultural forces may facilitate the expression of this disorder.

Complications

The complications of anorexia nervosa are due to the
starvation process, attempts to control weight artificially by vomiting, laxative or diuretic abuse, and complications associated with weight-restoring treatments.

Bradycardia (slow heart rate) and hypotension are frequent manifestations in starvation. Generally the patient's heart rate is less than sixty beats per minute and, in some studies, the rate has been recorded as low as twenty-eight beats per minute. Hypotension (blood pressure of less than 90/50) was recorded in eighty-six percent of patients in one study (Garfinkel, 1982). Serum electrolyte levels can be depleted secondary to vomiting, large doses of laxatives and use of diuretics. The bulimic group of anorexic patients are at greater risk for developing hypokalemia (lowered potassium level); however, it was found that fasting anorexics (the "restrictors") also demonstrated a depletion of total body potassium. There is also an incidence of lowered serum sodium, although to a lesser extent than that for potassium (Garfinkel, 1982).

Menstrual irregularity or amenorrhea is a characteristic feature of anorexia nervosa. For many patients, loss of menses occurs shortly after onset of weight loss; however, in a significant proportion, estimated as high as twenty-four percent, amenorrhea appears to precede weight loss. It is not clear whether this is secondary to emotional upheaval preceding the dieting behavior or because of hypothalmic abnormality (Garfinkel, 1982). Research
supports a need for a critical fat storage in order for the menstrual function to take place. This fat storage at menarche averages approximately seventeen percent of body weight, and further maturation to reach full reproductive activity requires a minimum of twenty-two percent of body weight as fat. This level represents the fat storage required for maintenance of the menstrual cycle in girls aged sixteen years or older (Nillius, 1983).

Dental problems arise in many women with anorexia nervosa, especially those with bulimia, due to frequent vomiting, the composition of the diet which is often high in sugar, and reduced saliva from dehydration. Erosion of enamel, loss of teeth and increased prevalence of caries are all marked in anorexic patients who vomit (Crisp, 1977).

Edema is a frequent complication seen in most forms of semi-starvation. This occurs when severely emaciated patients are rapidly re-fed (Garfinkel, 1982).

Other complications commonly found in these patients include renal changes, anemia, gastrointestinal complications such as constipation and neurological problems manifested by convulsions due to metabolic changes (Garfinkel, 1982).

**Treatment**

Many management plans have been advocated for the treatment of anorexia nervosa; however, at present, in the
absence of controlled studies describing clear-cut effectiveness of a particular treatment, no mode of treatment is regarded as definite for anorexia nervosa. Flexibility on the part of the physician is required since treatment needs of different patients can vary.

It is generally agreed by researchers that treatment must address several key issues relating to this eating disorder, summarized by Garfinkel (1982), in *Anorexia Nervosa: A Multidimensional Perspective*, as follows:

1. The anorexic has difficulty in feeling control of her body with an impaired recognition of internal bodily states.
2. Difficulty in autonomous functioning and in emotional separation from the family or domineering individual.
3. A sense of personal mistrust; rather than trusting her body, the anorexic fears it.
4. Feelings of self-worth that are based upon external standards for appearance and performance.
5. Starvation perpetuates many of the psychological standards for appearance and performance.

The management of these patients will, therefore, involve the treatment of these characteristic signs. Reversal of the starvation process must take place if the patient is to benefit from psychotherapy. In many cases, this involves admitting the patient to the hospital in order to break the cycle of starvation, bulimia and vomit-
ing, and to restore body weight. In a recent evaluation, it was found that admission to the hospital was warranted in sixty-two percent of the anorexic patients (Garfinkel, 1977). Once the patient is admitted to the hospital, the method of weight restoration is variable. Some physicians advocate a direct confrontation of the weight loss and refusal to eat by use of tube feeding or parenteral hyperalimentation. However, Bruch (1973) advocates that little attention be paid to the anorexic's eating habits and weight emphasizing instead the psychological treatment once a medically safe weight is reached. In-patient treatment requires approximately six to eight weeks, depending upon the initial weight loss (Russell, 1981).

Weight gain is usually accompanied by a relief of the patient's depressive symptoms. This is in contrast to what one might expect, since one of the main preoccupations of the patient before treatment is her body size and fear of fatness. Correction of the malnourished state plays only a part in the patient's improvement and long-term psychological counseling is indicated (Russell, 1981).

Psychotherapeutic treatment in the management of anorexia nervosa begins with open and honest communication with the patient, with particular attention to her disordered self-esteem, even though much of her overt behavior appears to be stubbornly defiant. Psychotherapies must be directed at the specific predisposing factors to prevent recurrences
and to develop a working alliance and mutual trust between the therapist and the patient (Garfinkel, 1982).

The frequency of disturbed relationships within the family structure has led to the promotion of family therapy (Russell, 1981). Care must be taken to elicit the cooperation of the family and to avoid blaming one family member for the presence of the illness. In general, the parents and the patient share many misconceptions about the illness. Clarification and education about the disorder should be included as part of a treatment plan.

Most patients will deny their illnesses and strongly defend their emaciated states. For the patient, it is not effective to simply indicate how thin she is. It is generally more effective to emphasize particular behavior or attitudes which the patient herself views as distasteful; for example, her food preoccupation, fear of losing control, irritability, low self-esteem, and social isolation (Garfinkel, 1982).

The goals in the treatment of anorexia nervosa must include the correction of inaccurate body perception and increase the anorexic's awareness of internal cues. Abnormal attitudes toward food and weight may persist in many patients even after normal weight is maintained. Nutrition education will play an important role in helping to eliminate inaccurate ideas about food since many patients believe that certain foods will produce undue weight gain. The
diet is often rigidly restricted: cottage cheese, salad, fruits and vegetables. Some patients will eat exactly the same foods every day for many months (Garfinkel, 1982). These attitudes may be indicators of recurrence of the condition at times of crisis in the patient's future. Therefore, a favorable course in anorexia nervosa cannot be confined to a mere gain in weight, especially if it occurs in the hospital. Often weight gained in the hospital is relentlessly lost over the weeks or months after discharge. The prognosis is brighter when the patient maintains the normal weight outside the hospital for an extended period of time, with a return to mental health and resumption of menstruation (Garner, 1978).

One of the mysteries that remains is the unpredictability of the prognosis of an individual patient. It is difficult to forecast whether one admission to the hospital will suffice or whether repeated admissions will be required. In one study, a very low weight on admission was associated with a less favorable outcome as was a longer duration of illness before treatment (Russell, 1977).

Family dynamics also provided a prediction of outcome with a less favorable prognosis when there was a disturbed relationship between the patient and another family member (Russell, 1977). Studies indicated that a good outcome occurred in approximately twenty-nine to thirty-nine percent of patients treated, with a mortality rate of from
five to twenty percent. The remainder continue to display signs of the disorder (Schleimer, 1981).

Behavior modification therapy appears to promote rapid weight gain and therefore can be useful in weight restoration; however, it appears to be of little benefit in the long term management of anorexic patients. There is no evidence that behavior therapy is harmful and it is, in fact, recommended as an adjunct to other therapies (Garfinkel, 1977).

Anorexia nervosa is clearly a life-threatening, maladaptive behavior. It appears to involve an interaction of deficiency in self-concept; particularly related to effectiveness and personal trust; confused personal identity with an inability to achieve autonomy; and fear of psychosexual and social maturity (Garfinkel, 1982).

A large number of researchers have proposed many theories on the etiology and treatment of anorexia nervosa; however, additional research is needed to study the relationship between various treatments and their outcome. In the meantime, the outlook for anorexics appears to be brightening. The use of family therapy, psychotherapy supported by behavior therapy, and nutrition education shortens treatment time, leads to symptom remission and, in many cases, provides a cure for this puzzling disorder (Doyen, 1982).
Adolescent Nutrition

Adolescence is a period of dramatic growth and development of both psychological and psychological parameters. Because of the changes that take place during this time, total nutrient requirements are higher during adolescence than at any other period in the life cycle. Puberty is characterized by a period of rapid linear growth and is marked by an increase in body weight. The average boy usually begins puberty around twelve years of age, with maximum growth velocity occurring at around age fourteen. Girls begin puberty approximately two years earlier, at ten years of age, and reach maximum growth velocity at age twelve. The timing of the growth spurt and the onset of reproductive function varies considerably in individuals (Marino, 1980).

These physiological changes create special nutritional needs in a period when many adolescents have irregular eating patterns, such as meal skipping, between meal snacking and an increase in the incidence of eating away from the home (Marino, 1980).

Presently there is limited information on the range and variation of food intakes of adolescents living in affluent societies. It is accepted that there are social as well as biological influences on adolescent food habits and that these are affected by the opportunities that ado-
Adolescents have of eating with their peers and away from the family. In addition, adolescents are influenced by food manufacturers and caterers who provide products, advertising and eating places aimed at this age group. Adolescents frequently find the need to forge their own identity as a newly emerging adult and are likely to express this partly in their food habits (Truswell, 1981). Consumption of franchise fast foods, which are low in many vitamins and fiber and high in energy, fat and sodium, are especially popular among teenagers. The adolescent does, however, have an advantage over an adult in that his or her energy requirements are so high that these "empty calories" can be eaten and nutrient requirements can still be met, provided that higher quality foods are eaten at other times of the day (Marino, 1980).

A health concern of great importance is the prevalence of adolescent obesity. It has been estimated that ten percent of adolescent girls are obese (Burman, 1979). Adolescence is a time when individuals are developing self-image. Obesity can hamper social and psychological development, leading to feelings of rejection, withdrawal, isolation, depression and inactivity. The adolescent may have a distorted body image with unrealistic ideals of attractiveness which are perpetuated by cultural influences which place emphasis on being thin (Marino, 1980).

Obese individuals frequently seek methods for quick
weight loss which are often not medically or nutritionally sound (Marino, 1980). This may be due, in part, to the fact that adolescent dieters have about the same limited understanding and misconceptions about nutrition as the rest of the population (Truswell, 1981).

Treatment for obesity is unlikely to be helpful unless the patient is motivated to be slim and has the cooperation and support of the family. Moderate dietary restrictions and increased activity are the goals of therapy, with reinforcement to modify eating behaviors. Excessive dietary restrictions or "crash diets" are not recommended in the growing and maturing adolescent (Burman, 1979). Unfortunately, the prognosis for the severely obese adolescent in obtaining ideal body weight is poor (Truswell, 1981).

Adolescence has been described as a period of stress when the individual is striving for independence with rebellion from family control and adult supervision. Peer group identification, with emphasis on conforming with accepted behavior and body image, often leads to poor nutritional practices. Meal times are erratic and snacks in "fast food" restaurants are part of their way of life (Burman, 1979). Stewart Truswell and Ian Narton-Hill (1981), in "Food Habits of Adolescents," support this, indicating that eating habits of adolescents reflect the weakening influence of the family, the teenager's increasing social involvement with his or her peers, his or her concern about
appearance and increased needs for food energy.

Interestingly, it is common practice today to ridicule teenagers' eating habits, although it has been proven that American youth is larger in size and has increased vitality in comparison with those in past years. Therefore, one author contends that more consideration must be given before condemning adolescent food choices (Truswell, 1981).

Good nutrition is important during the adolescent period of growth and development, not only to satisfy the increase in nutrient requirements, but to establish sound eating habits for the future for maintenance of optimal health throughout adulthood.
CHAPTER III
PROCEDURES

Population
The population used in this study consisted of students enrolled at Agoura High School in Agoura, California, and anorexic patients being treated at three eating disorder clinics in Los Angeles.

The Research Design
The study was done to determine the level of nutrition knowledge of female adolescents with anorexia nervosa as compared to female adolescents who did not have the eating disorder. A non-probability survey technique was used.

Data Collection
Prior to data collection the nutrition surveys were administered to a tenth grade biology class of thirty students at Agoura High School to pre-test the survey and determine if the statements were clear and at the appropriate academic level. Verbal responses from the students indicated that the test was understandable. To obtain data for the study, the nutrition survey was distributed to twenty anorexia nervosa patients in three eating disorder clinics in the Los Angeles area. All the patients were on out-patient programs and were at varying stages of treat-
ment. The survey forms were distributed to non-anorexic students in three tenth grade biology classes at Agoura High School, located in a middle to upper-middle class suburb of Los Angeles. There were approximately thirty students in each class. Students were advised to circle one correct answer in each series of statements. All participants were informed that the surveys would be used in a graduate study, but that all respondents would remain anonymous. Each respondent was requested to include sex, age, height and weight on the survey form. Height and weight information was used to eliminate any possible anorexics that could possibly be enrolled in the biology classes. After the students had completed the surveys, with a maximum allowance of fifteen minutes for completion, the forms were collected and separated by sex of the student. The surveys completed by the male students were discarded. Twenty forms were randomly selected from the female students' surveys. The survey forms were also given to the anorexia nervosa patients after group counseling sessions at the three eating disorders clinics. All of the twenty survey forms collected from the patients were used in the study.

The Instrument

The nutrition survey contained three groups of statements. Each group contained four statements, comprising a
series of statements. Only one statement in each series was determined to be correct by generally accepted nutrition practice. The statements in Section One dealt with calories and weight control. Section Two dealt with food myths and fads, and Section Three was concerned with nutrients and general nutrition information.

Data Analysis

The surveys were corrected, with unanswered questions considered as incorrect responses. Test scores were hand-tallied, and the total percentage of correct responses were compared for both sample groups by ANOVA.
CHAPTER IV
RESULTS AND DISCUSSION

The purpose of this study was to determine the level of nutrition knowledge of female adolescents with anorexia nervosa versus female adolescents without anorexia nervosa. A nutrition knowledge survey was conducted at Agoura High School and at three eating disorder clinics in the Los Angeles area. The following results are based upon the responses of twenty high school students and twenty anorexia nervosa out-patients.

Level of Nutrition Knowledge

The total test results of the nutrition survey are presented in Table 3 for the non-anorexic respondents and Table 4 for the anorexia nervosa patients. The mean score for the students was 7.35 correct responses out of twelve. This was calculated to a sixty-one percent average. The anorexic patients' mean score was 5.25 which is equivalent to a forty-four percent score. The data indicated that adolescents without anorexia nervosa displayed a higher level of nutrition knowledge than the non-anorexic sample group. The average age of the anorexic sample was 17.3 years, which was higher than the non-anorexics at 15.2 years; however, both samples were considered in the adolescent age grouping. The ANOVA test was used for statistical
analysis and showed a significant difference between the two sample groups at the .01 level.

TABLE 3
TEST SCORES FOR HIGH SCHOOL STUDENTS

<table>
<thead>
<tr>
<th>Student</th>
<th>Height</th>
<th>Weight</th>
<th>Age</th>
<th>Test Score (Correct Responses)</th>
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</tr>
<tr>
<td>3</td>
<td>5'8&quot;</td>
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<td>8</td>
</tr>
<tr>
<td>4</td>
<td>5'4½&quot;</td>
<td>115</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>5'5&quot;</td>
<td>140</td>
<td>14</td>
<td>5</td>
</tr>
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<td>7</td>
<td>5'2&quot;</td>
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<td>5'3&quot;</td>
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</tr>
<tr>
<td>11</td>
<td>5'1½&quot;</td>
<td>102</td>
<td>15</td>
<td>8</td>
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<tr>
<td>12</td>
<td>5'7½&quot;</td>
<td>115</td>
<td>15</td>
<td>5</td>
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<tr>
<td>13</td>
<td>5'7&quot;</td>
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<td>107</td>
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<td>7</td>
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</table>

TABLE 4
TEST SCORES FOR ANOREXIA NERVOSA PATIENTS

<table>
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<tr>
<th>Student</th>
<th>Height</th>
<th>Weight</th>
<th>Age</th>
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<tr>
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<td>5'2½&quot;</td>
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<td>5'4&quot;</td>
<td>81</td>
<td>18</td>
<td>2</td>
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### TABLE 4 (continued)

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<th>Age</th>
<th>Test Score (Correct Responses)</th>
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<td>4</td>
</tr>
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<td>5'3&quot;</td>
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<td>7</td>
</tr>
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<td>5'1½&quot;</td>
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</tr>
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<td>14</td>
<td>5'6&quot;</td>
<td>90</td>
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</tr>
<tr>
<td>17</td>
<td>5'7&quot;</td>
<td>106</td>
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<tr>
<td>18</td>
<td>5'2½&quot;</td>
<td>78</td>
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<td>5'5&quot;</td>
<td>107</td>
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<td>3</td>
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</tbody>
</table>

### Areas of Nutrition Knowledge

On the nutrition survey, Section 1, dealt with calories and weight reduction. Although anorexics typically are very interested in weight reduction, diets and calories, the average score in this section was forty percent versus an average score of seventy-five percent for the non-anorexic respondents. Fifty-five percent of the anorexic sample incorrectly responded that it was advisable to eat two meals daily instead of three in order to reduce weight, and sixty percent indicated that the purpose of a reducing diet was to achieve rapid weight loss. Sixty-seven percent of the anorexics correctly responded that pregnant women require more calories than non-pregnant women. Seventy-five percent of the anorexics were aware
that calories are provided by the protein, fat and carbohydrates in the diet. The non-anorexic sample were more varied in their responses in Series 1. Thirty percent of the non-anorexics indicated that it was advisable to eat two meals instead of three meals daily in order to reduce weight.

Thirty percent of the non-anorexics answered that overweight children should not be put on a weight reduction diet. Thirty-five percent answered correctly that raw sugar is not a more nutritious food than white sugar. In Series 2, 3 and 4, a large percentage of students correctly responded that pregnant women required more calories than non-pregnant women, that calories were provided by protein, fat and carbohydrates in the diet, and that it was advisable to lose one to two pounds per week on a weight reduction diet (eighty-five percent, ninety percent and eighty-five percent, respectively). See Table 5 for a breakdown of the responses in Section 1.

The statements in Section 2, Series 5-8, dealt with food myths and fads. The average score in this section for the sample with anorexia nervosa was 47.5% as compared with 67.5% for the non-anorexic sample. A majority in both groups, ninety percent for the non-anorexic and seventy percent for the anorexics, were correct in their response that a calorie is a measurement of heat used to determine the energy content of food and its metabolic activity. A
TABLE 5
BREAKDOWN OF RESPONSES: SECTION 1

Correct Responses

<table>
<thead>
<tr>
<th></th>
<th>Anorexic</th>
<th>Non-Anorexic</th>
</tr>
</thead>
<tbody>
<tr>
<td>N   %</td>
<td>N   %</td>
<td></td>
</tr>
<tr>
<td>Series 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. To reduce weight, it is advisable to eat two meals daily instead of three.</td>
<td>11 55 6 30</td>
<td></td>
</tr>
<tr>
<td>B. Overweight young children should not be put on a weight control diet.</td>
<td>3 15 6 30</td>
<td></td>
</tr>
<tr>
<td>C. To reduce weight it is advisable to substitute honey for sugar.</td>
<td>3 15 1 5</td>
<td></td>
</tr>
<tr>
<td>D. Raw sugar is not a more nutritious food than white sugar</td>
<td>3 15 7 35</td>
<td></td>
</tr>
<tr>
<td>Series 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Adults undertaking the same activities have identical calorie requirements.</td>
<td>0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>B. Calorie requirements increase with age.</td>
<td>6 30 2 10</td>
<td></td>
</tr>
<tr>
<td>C. A pregnant woman requires more calories than a non-pregnant woman of the same age and height and undertaking similar activity.</td>
<td>8 40 17 85</td>
<td></td>
</tr>
<tr>
<td>D. Mental activity greatly increases calorie requirements.</td>
<td>6 30 1 5</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 5 (continued)

Correct Responses

<table>
<thead>
<tr>
<th>Anorexic</th>
<th>Non-Anorexic</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
</tbody>
</table>

Series 3

A. Calories are provided by the protein, fat and carbohydrates in our diet.

15 75 18 90

B. High protein, high fat, low carbohydrate diets are a nutritionally sound method for weight reduction.

0 0 2 10

C. Lengthy periods of fasting are a sound health practice for weight control.

3 15 0 0

D. Butter is a rich source of animal protein.

2 10 0 0

Series 4

A. The purpose of a reducing diet is to reduce the calorie intake to achieve rapid weight loss.

12 60 1 5

B. The purpose of most sound reducing diets is to provide nutritious meals and reduce the total calorie intake to achieve 1-2 pounds of weight loss per week.

6 30 18 90

C. Sugar is essential for energy.

0 0 1 5

D. Honey may be substituted for sugar in a reducing diet.
large percentage, sixty percent of the anorexics, believed that grapefruit burned away body fat with forty percent correctly responding that toasting bread did not decrease the caloric value. Conversely, sixty-five percent of the non-anorexics answered correctly in this series. In Series 7, half of the anorexic respondents (fifty percent) correctly responded that it is possible to take too many vitamins as compared with eighty percent in the non-anorexics' sample. Thirty percent of the anorexics believed that organically grown vegetables were richer in vitamins and minerals than conventionally grown vegetables with fifteen percent responding that yoghurt has many important health properties and should be included in everyone's daily diet. In Series 8, the two sample groups' responses were very similar; forty percent of the non-anorexics and fifty percent of the anorexics responded that margarine was lower in calories than butter, while twenty-five percent of the non-anorexics and twenty percent of the anorexics believed that the enzymes in some fruits help to "burn off" fat. Thirty percent of the anorexics and thirty-five percent of the non-anorexics correctly indicated that it is generally recommended that some bread or starch be included in a weight reduction diet. Refer to Table 6 for a breakdown of the responses in Section 2.
TABLE 6
BREAKDOWN OF RESPONSES: SECTION 2

<table>
<thead>
<tr>
<th>Correct Responses</th>
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</thead>
<tbody>
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<td>%</td>
</tr>
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<td></td>
<td>14</td>
<td>70</td>
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<td>10</td>
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<tr>
<td></td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

Series 5

A. A calorie is a measurement of heat which is used to determine the energy content of food and its metabolic activity.

B. Protein yields more calories than an equal quantity of fat.

C. Protein is not essential in the diet, especially when trying to lose weight.

D. Vegetables do not contain protein.

Series 6

A. Cider vinegar is beneficial in the treatment of arthritis.

B. Grapefruit burns away body fat.

C. Eating cheese will cause cellulite to form in some women.

D. Toasting bread does not decrease the calorie value.
TABLE 6 (continued)

Correct Responses

<table>
<thead>
<tr>
<th>Anorexic</th>
<th>Non-Anorexic</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
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<td>10</td>
<td>50</td>
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<tr>
<td>1</td>
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</table>

Series 7

A. Organically grown vegetables are richer in vitamins and minerals than conventionally grown vegetables.

B. Yoghurt has many important health properties and should be included in everyone's daily diet.

C. It is possible to take too many vitamins.

D. Vegan vegetarians include milk and cheese in their diet.

Series 8

A. It is best not to mix protein foods and carbohydrate foods in the same meal.

B. The enzymes in some fruit help to "burn off" the fat in foods eaten, thereby preventing weight gain.

C. It is generally recommended that some bread or other starches be included in a weight reduction diet.

D. Margarine is lower in calories than butter.
The statements in Section 3, Series 9-12, were concerned with nutrients and general nutrition. In Series 9, it was found that the anorexic had a lower level of knowledge regarding vitamins as compared with the non-anorexic sample. Fifty percent of the anorexics versus thirty percent of the non-anorexics believed that a lack of vitamin A led to scurvy; twenty-five percent of the anorexics incorrectly answered that fruits and vegetables were rich sources of vitamin A. Twenty-five percent of the anorexics as compared to sixty percent of the non-anorexics correctly answered that yellow peaches, apricots and carrots contain carotene which is converted to vitamin A in the body. A large percentage in both groups (forty percent of the non-anorexics and fifty-five percent of the anorexics) believed that white bread was a poor quality food, with the remainder of the responses dispersed between the other answers. Only ten percent of the non-anorexics and fifteen percent of the anorexic nervosa patients correctly responded that reconstituted powdered milk is a good substitute for fresh milk. In Series 11, the majority in both samples believed that physical activity greatly increased the body's protein requirements (eighty-five percent of the non-anorexics and fifty percent of the anorexics). The anorexia nervosa patients were more aware than the non-anorexic sample group that skim milk contained the same amount of protein as whole milk (thirty percent versus ten percent). Twenty
percent of the anorexics incorrectly responded that potatoes are fattening. In the last series of statements, eighty-five percent of the non-anorexics correctly responded that frying food in vegetable oil increases the calorie content of the food. Only thirty-five percent of the anorexics answered correctly in this series. Thirty-five percent of the anorexics versus fifteen percent of the non-anorexics believed that well-cooked meat is healthier than meat eaten rare and thirty percent of the anorexic sample indicated that freezing reduced the protein content of meat. See Table 7 for a breakdown of the responses in Section 3.
### Correct Responses

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<td>6</td>
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</tr>
</tbody>
</table>

**Series 9**

- **A.** An extreme lack of vitamin A in the diet will lead to scurvy.
- **B.** Yellow peaches, apricots and carrots contain carotene which is converted to vitamin A in the body.
- **C.** Fruits and vegetables are a rich source of vitamin D.
- **D.** Meats, fish and poultry are rich in vitamin C.

<table>
<thead>
<tr>
<th>Series 10</th>
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</tbody>
</table>

**Series 10**

- **A.** White bread is a poor quality food.
- **B.** Cheese at the end of a meal aids digestion.
- **C.** Meat is a good source of roughage in the diet.
- **D.** Reconstituted powdered milk is a good substitute for fresh milk.
TABLE 7 (continued)

Correct Responses

<table>
<thead>
<tr>
<th></th>
<th>Anorexic</th>
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<th>Non-Anorexic</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
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<td>10</td>
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<tr>
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<tr>
<td>0</td>
<td>0</td>
<td>1</td>
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</table>

Series 11

A. Skim milk contains the same amount of protein as whole milk.

B. Physical activity greatly increases the body's protein requirements.

C. Potatoes are fattening.

D. The protein in eggs is less nutritious than the protein in cow's milk.

Series 12

A. Freezing reduces the protein content of meat.

B. Frying foods in vegetable oil increases the calorie content of the food.

C. Well-cooked meat is healthier than meat eaten rare.

D. A baked potato contains less vitamin C than a boiled potato.
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In October of 1983, a study was conducted to determine the level of nutrition knowledge of adolescent females with anorexia nervosa as compared to non-anorexic female adolescents. A nutrition survey was used as the data collection instrument and was composed of three sections dealing with various areas of nutrition.

The results showed that female adolescents with anorexia nervosa had a lower level of nutrition knowledge as compared to female adolescents without anorexia nervosa (p < 0.01). The anorexic female scored lower in all sections of the survey and scored higher in only two series, both of which were in the section on general nutrition and vitamins. Many of the respondents in both sample groups believed it was advisable to eat two meals per day instead of three in order to lose weight; however, the non-anorexics also indicated that it was not advisable to lose weight rapidly and that a one to two pound weight loss per week was recommended. A large percentage of the anorexics indicated that rapid weight loss was desirable on a weight reduction diet, which is consistent with the attitudes and behavior regarding weight reduction common to this disorder. It was interesting to note that, although anorexics typi-
cally avoid carbohydrate foods, none of the anorexics responded that the high protein, high fat, low carbohydrate diets was a nutritionally sound method for weight reduction.

A majority of the respondents in both sample groups were aware that calories were provided by the protein, fat and carbohydrates in foods and were familiar with the definition of a calorie. Although it might be expected that anorexics would be familiar with most scientifically based methods for reducing calories and body weight, a large number of the anorexics believed the nutrition fallacy that grapefruit burned away body fat. Both sample groups were susceptible to some common food fads or fallacies, since a large number in both samples believed that margarine was lower in calories than butter, that white bread was a poor quality food and that physical activity greatly increases the body's protein requirements. Most non-anorexics were aware that frying foods would increase the caloric value of the food, whereas the anorexics showed greater confusion in regard to nutrients and food preparation; for example, many anorexics also indicated that well-cooked meat was healthier than rare meats and that freezing reduced the protein content of meat.

It appeared from the study that even though patients with anorexia nervosa display a great deal of interest in food and nutrition, they also are susceptible to nutrition
misinformation. It is apparent that nutrition education should be included in the treatment regimen for anorexia nervosa in order to correct the misconceptions about nutrition held by these patients. In addition, the non-anorexic students also displayed a need for further nutrition education since their total scores, although higher than the anorexic patients, were still relatively low. However, the non-anorexic subjects were from a biology class, which may have given them a greater knowledge of nutrition than the average student might have had.

**Recommendations**

The following are suggestions for further research in this area:

1. Investigate, more specifically, the areas of nutrition that may be especially deficient in both these populations so that education can be directed towards these areas.

2. Assess whether the length of treatment in anorexia nervosa has effect upon the nutrition knowledge of these patients.

3. Investigate whether nutrition education, as part of the treatment for anorexia nervosa, has an effect upon the eventual outcome.

4. Utilize a larger sample for the study in order to more accurately determine the level of nutrition
knowledge and to assess what aspects of nutrition may require more attention in the education process for both the patients with anorexia nervosa and the non-anorexic adolescent population.

5. Compare a group of non-science high school students with a group of science students to determine differences in nutrition knowledge.
REFERENCES


NUTRITION SURVEY

Each of the series of statements below contains one statement which is most correct. Circle the statement which is correct or most correct.

Section I

Series 1

A. To reduce weight, it is advisable to eat two meals daily instead of three.

B. Overweight young children should not be put on a weight control diet.

C. To reduce weight, it is advisable to substitute honey for sugar.

D. Raw sugar is not a more nutritious food than white sugar.

Series 2

A. Adults undertaking the same activities have identical calorie requirements.

B. Calorie requirements increase with age.

C. A pregnant woman requires more calories than a non-pregnant woman of the same age and height and undertaking similar activity.

D. Mental activity greatly increases calorie requirements.

Series 3

A. Calories are provided by the protein, fat and carbohydrates in our diet.

B. High protein, high fat, low carbohydrate diets are a nutritionally sound method for weight reduction.
C. Lengthy periods of fasting are a sound health practice for weight control.

D. Butter is a rich source of animal protein.

Series 4

A. The purpose of a reducing diet is to reduce the calorie intake to achieve rapid weight loss.

B. The purpose of most sound reducing diets is to provide nutritious meals and reduce the total calorie intake to achieve 1-2 pounds of weight loss per week.

C. Sugar is essential for energy.

D. Honey may be substituted for sugar in a reducing diet.

Section II

Series 5

A. A calorie is a measurement of heat which is used to determine the energy content of food and its metabolic activity.

B. Protein yields more calories than an equal quantity of fat.

C. Protein is not essential in the diet, especially when trying to lose weight.

D. Vegetables do not contain protein.

Series 6

A. Cider vinegar is beneficial in the treatment of arthritis.

B. Grapefruit burns away body fat.

C. Eating cheese will cause cellulite to form in some women.

D. Toasting bread does not decrease the calorie value.
Series 7
A. Organically grown vegetables are richer in vitamins and minerals than conventionally grown vegetables.

B. Yoghurt has many important health properties and should be included in everyone's daily diet.

C. It is possible to take too many vitamins.

D. Vegan vegetarians include milk and cheese in their diet.

Series 8
A. It is best not to mix protein foods and carbohydrate foods in the same meal.

B. The enzymes in some fruit help to "burn off" the fat in foods eaten, thereby preventing weight gain.

C. It is generally recommended that some bread or other starches be included in a weight reduction diet.

D. Margarine is lower in calories than butter.

Section III
Series 9
A. An extreme lack of vitamin A in the diet will lead to scurvy.

B. Yellow peaches, apricots and carrots contain carotene which is converted to vitamin A in the body.

C. Fruits and vegetables are a rich source of vitamin D.

D. Meats, fish and poultry are rich in vitamin C.
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### CALCULATION OF F VALUE

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<td>(Anorexia Nervosa Patients)</td>
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<td>Sample 2</td>
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<td>19</td>
<td>1.47</td>
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<tr>
<td>(Non-Anorexic Students)</td>
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\[
F \text{ Value} = \frac{6.51}{1.47} = 4.43
\]