BODY IMAGE AND DIETARY QUALITY IN RELATION TO SEX, AGE, AND WEIGHT AMONG COLLEGE STUDENTS AT OKLAHOMA STATE UNIVERSITY

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CHAPTER I

INTRODUCTION

Interest and concern in regard to the adequacy of nutrient intake of college students have been the subject among nutrition educators over the years (Bennett, 1965; Driskell, Keith and Tangney, 1979; Hernon, Skinner, Andrews, and Penfield, 1986; Jakobovits, Halstead, Kelly, Roe, and Young, 1977; Myers, Sullivan and Stare, 1963; and Ostrom and Labuza, 1977). The results of most of these nutrition studies were not always encouraging. Inadequate intakes of certain nutrients, especially iron among college women, were repeatedly pointed out by the researchers. Although group means of overall nutrient intake of college students were considered adequate, intakes of many individuals were well below recommended levels of specific nutrients according to several researches.

Disturbances of body image has been found as one of the major problems among subjects with eating disorders. Body image dissatisfaction has also been found in association with the dieting practices among normal college students (Miller, Coffman, and Linke, 1980).

The social attitudes toward the body, the overemphasis on beauty, and preoccupation with appearance have been cited as causing dissatisfactions of body image in non-obese individuals. As Bruch (1973) has pointed out "the obsession in the western world with slimness and the condemnation of any degree of overweight as undesirable and ugly may well be considered a distortion of the social body concept, but it dominates present day living" (p. 88).

The concern about physical appearance combined with poor eating practices make college students part of the vulnerable segments of the population. There has been relatively little effort, however in exploring the relationship between body image and diet quality of college students. The importance of body image in understanding the problems of eating practices among young people should be emphasized in order to expand our knowledge of human eating behaviors and to aid nutrition educators in planning weight control programs.

Purpose and Objectives

The main purpose of this study was to asses the variations and the associations between body image satisfaction and the nutrient intakes along with selected variables for a group of college men and women. Specific objectives for this study were:

1. The assess nutrient intakes of college men and women enrolled in a Basic Human Nutrition Class.
2. To determine the differences in body image satisfaction with regard to a) sex, b) age and sex, and c) body weight and sex.
3. To determine the differences in dietary intake with regard to a) sex, b) age and sex, and c) body weight and sex.
4. To determine whether there is a relationship between body image satisfaction and each of the following intakes: energy, protein, vitamin A, thiamin, riboflavin, vitamin B_b, vitamin B_{12}, folacin, niacin, vitamin C, vitamin E, calcium, iron, magnesium, phosphorus, and zinc.

5. To determine whether the relationships between the body image satisfaction and nutrient intakes remain constant with respect to a) sex, b) age and sex, and c) body weight and sex.

Hypotheses

1. There will be no differences in the Body Image Satisfaction Scores between: a) sex groups, b) age by sex groups, and c) body weight by sex groups.
2. There will be no differences in the Total Nutrient Intake Scores between: a) sex groups, b) age by sex groups, and c) body weight by sex groups.
3. There will be no difference in the mean nutrient intake for all: a)sex groups, b) age by sex groups, and c) body weight by sex groups. Hypothesis 3 will be tested for each of the 16 nutrients analyzed.
4. There will be no relationship between Body Image Satisfaction Score and intake of each of the 16 nutrients analyzed.
5. The relationship between Body Image Satisfaction Score and nutrient intakes remains constant between: a) sex groups, b) age by sex groups, and c) body weight by sex groups.

Assumptions

The following assumptions were made as a basis for this study:

1. All responses made by students were honest and complete.
2. The methods applied in the study were sensitive and reliable for acceptable results.

Limitations

The limitations for this study included:

1. The relationships among variables associated with individual food consumption behavior are complex. The associations between the satisfaction of body image and nutrient intakes may be influenced by other factors.
2. The sample was limited to a group of college students enrolled in a Basic Human Nutrition class at Oklahoma State University in Spring, 1986.

Definitions

Definitions of terms used in this study were:

Body Image: "The picture of our body which we form in our mind" (Schilder, 1950, p. 11).

Body Image Satisfaction Scale: This scale, a modified form of the Body Cathexis (Secord and Jourard, 1953) contains a 5-point scale, from 1 to 5, on which the subject rated degree of satisfaction with the condition of each of the 24 body characteristics. A total score over the 24 items for each subject was formed to measure the extent of satisfaction a student had about his or her body.

Recommended Dietary Allowances (RDA's): "The levels of intake of essential nutrients considered, in the judgement of the Committee on Dietary Allowances of the Food and Nutrition Board on the basis of available scientific knowledge, to be adequate to meet the known nutritional needs of practically all healthy persons" (National Academy of Science, 1980, p. 1).

Quality of Diet: The standard set by the National Research Council, Committee on dietary Allowances Food and Nutrition Board, was used as criterion for diet quality in this study. The closer the nutrient intakes to the 1980 RDA's, the better quality a diet is.

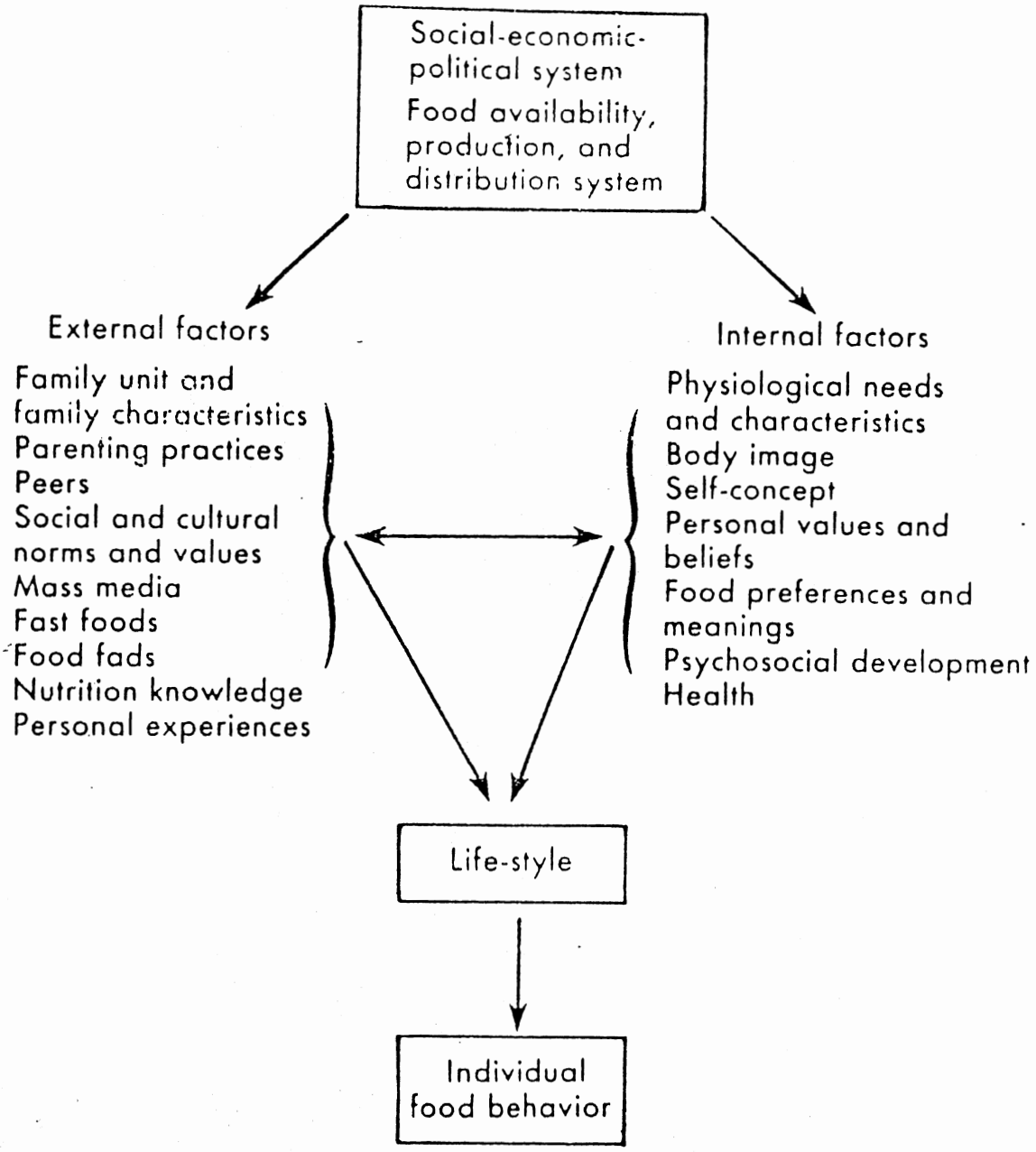
CHAPTER II

REVIEW OF LITERATURE

While most of the nutrition surveys have concentrated on the dietary information such as nutrient intakes, eating habits, and food preferences, only a few studies have investigated the association between food intake and attitudes and feeling about the body. Individuals eat not only to provide nutrients for physiological requirements, but also to satisfy psychological needs. Body image is the perception of physical appearance. This research in concerned with the variations and the associations between nutrient intakes and body image with respect to sex, age, and body weight for selected college students. In order to provide background information for this study, the pertinent literature is reviewed in the following areas: factors associated with eating, food preference and consumption patterns, nutrient intakes, concern of body appearance and dieting efforts, self-concept and body image, body image measurement, and physical attractiveness and body attitudes.

Factors Related to Eating

Food consumption behaviors are complex. They are based upon past experience and are deeply interwoven with living environment. Factors associated with food habits include: geographic, religious, biological needs, cultural, emotional, health and nutrition knowledge, changing of life style, economy, and improvement of food technology (Todhunter, 1973). Figure 1



Source: Story, M. Adolescent life-style and eating behavior. In: K. Mahan and J. M. Rees (Eds.), Nutrition in Adolescence. St. Louis, Missouri: Time Mirror/Mosby College Publishing, 1984 (p. 78).

Figure 1. Schematic Diagram of Factors Influencing Food Behavior

(Story, 1984) illustrates a detailed model of factors influencing individual's food behavior.

Psychologically, there is an internal society composed of images, concepts, memories, and fantasies about people which exists in the mind and exerts great impact on food intake behaviors (Menzies, 1970). Starting from birth, food is associated with primitive feelings such as intimacy, security, love, and also deprivation (Babcock, 1961). Food can also be used to satisfy emotional needs by increasing pleasure and reducing pain (Menzies, 1970). How people feel about themselves may influence their food selection in that a positive association between self-concept and quality of food intake has been shown (Schafer, 1979). Disturbances in body image development during adolescence are closely related to some eating disorders (Bruch, 1973; Halmi, Goldberg and Cunningham, 1977). The emphasis on slimness for women and masculinity for men in this society has put tremendous pressure on those who are striving to conform to the social ideal of physical attractiveness.

Food Preferences

In a nationwide food preference report of 50,000 college students (representing 1% of the total college enrollment in the school year of 1966-67), the preference for 207 food items were examined (Einstein and Hornstein, 1970). No vegetables were mentioned on the "most-liked" food list except french fries and tossed green salad. Dessert were very popular among students and included seven items on the list. Among the "least-liked" foods, 13 out of 20 were vegetables with no desserts showing on the list. Liver, turnips, cabbage, and squash were at the top of the "least-liked" food list. In regard to preference among food groups, bread was the most popular food category while vegetables and soups were the least popular food groups. Meat items

such as beef, pork, and chicken were well liked by students, while fish and lamb were not. Sandwiches such as hamburgers, tuna, and chicken salad were popular among students. While considering nutritive value of selected food items, good sources of vitamin A vegetables such as carrots, squash, and spinach were not popular. Liver, as a good source of vitamin A and iron, was ranked the least-liked item of all foods. Vitamin C-containing vegetables such as cabbage, cauliflower, and brussels sprouts were not popular, but students liked orange juice, lettuce and tomato salad, and cole slaw. Milk and dairy products were popular among students but not other calcium-containing vegetables. Iron-containing food items, such as beef steak, beef stew, roast beef, and roast turkey, were well liked by students (Einstein and Hornstein, 1970).

Similar findings were reported by other researchers. Food disliked by college women were: liver, cauliflower, brussels sprouts, asparagus, beets, lima beans, broccoli, and eggs (Jakobovits, et al., 1977). In another study comprised of 171 males and 223 females, tossed salad, potatoes, milk, steak, and ice tea were the five most preferred food items for lunch and dinner. Corn, green beans, peas, tomatos were also mentioned by students but with a lesser degree of preferences. For breakfast, eggs, milk, toast, bacon, and orange juice were the most common food choices. The study, however, did not show if these students actually consumed the preferred food items in their meals (Stasch, Johnson and Spangler, 1970).

Food Consumption Patterns

Meal Skipping

Meal skipping, greater use of snack foods, and fad diets, were identified as major factors which contribute to poor nutrient intake among young people (Jakobovits, et al., 1977). In a nutrition study of 122 high school seniors (Huenemann, Shapiro, Hampton, and Mitchell, 1968), it was found about one-third of the students had irregular eating practices during the time of the study. These subjects were reported snacking frequently and omitting lunch more often than any other meal (Huenemann, et al., 1968). Jakobovits, et al (1977) reported that among 195 junior and senior college women, 53% skipped at least one breakfast per week and 76% missed at least one lunch per week. Dinner was the most popular meal in the day and 70% of the women never missed it.

Other researchers found that breakfast was the most frequently missed or nutritionally inadequate meal consumed by university students (O'Leary and Lee, 1975; Gottschalk, Macaulay, Sawyer, and Miles, 1977). Haseba and Brown (1968) identified reasons for eating breakfast among university students and said that negligence, rather then ignorance of the nutritive value, was the main reason for missing the meal, while the availability and little effort involvement were the major reasons for eating breakfast.

Snacking

Between-meal eating or snacking was popular among young people. Sugar-containing snacks were among the most frequently consumed food items (Pao, 1980). Carbohydrates contributed over half of the total calories in the snacks (Myers, et al., 1963). Girls snacked more often than boys (Huenemann,

et al., 1968). One study reported that the frequency (number of times per day) of snacking at night was 1.54, 0.84 in the afternoon, and 0.45 in the morning (Jakobovits, et al. 1977). Studies showed that college students consumed a wide variety of food as snacks, such as coffee, tea, bread and bread products, fruit and fruit juices, cookies, milk, and sweets (Jakobovits, et al., 1977) and milk, carbonated or alcoholic beverages, fruits, ice cream, candy bars, cookies, doughnuts, potato chips, and popcorn (Drickell, et al., 1979). Students reported that they snack more often on soft drinks, candies, coffee, and hamburgers and less on milk, fruit, and cheese in the college than when living at home (Stasch, et al., 1970). About 60% of men and women with caloric intakes >1,200 kcal and 41% of women with energy intake <1,200 kcal reported that they usually snack at least twice a day (Hernon, et al., 1986).

Snacks contributed 34 to 51% of total caloric intake and supplied a considerable amount of nutrients for Canadian men and women (Gottschalk, et al., 1977). The common snack foods are found to be most limited in vitamin A, calcium, and iron (Story, 1984). Snacks are not necessarily all "empty calorie foods." Young people need to be taught to select foods containing various nutrients and to limit the consumption of empty caloric foods (Thomas and Call, 1973).

Nutrition Knowledge

A questionnaire concerning awareness of the United States Dietary Goals (USDG) was given to 52 men and 48 women, between ages 18 to 22. The results showed only 19% of these students had ever read or heard about USDG. Seventy-three percent were trying to decrease sugar consumption but only 24% were trying too increase consumption of complex carbohydrates; 31% were trying to decrease complex carbohydrates consumption. Fifty-two percent

of students in another study were trying to lower dietary fat, 48% by substituting vegetable oil for animal fat, and 49% to reduce dietary salt (Reek and Keith, 1984).

Nutrient Intakes of College Students

Despite common recognition of the importance of nutrition to good health, nationwide students have shown that American young people do not consistently consume adequate diets (Second National Health and Nutrition Examination Survey, 1976-80 [NHANE II], 1981; USDA Nationwide Food Consumption Survey 1977-78, [NFCS], 1980). Results from NHANES II (1981) and NFCS (1980) both indicated that U.S. young women (ages between 19 and 22) predominantly have lower dietary intakes for calories, calcium, and iron. Furthermore, inadequate intakes of magnesium and vitamin B_6 among young women (66% and 61% of RDA, respectively) might present other nutrition problems for this population (NFCS, 1980).

In review of the nutrient intake studies, college men generally have better diets than women. The high prevalence of low iron intake among women is a challenge for nutrition educators. In a recent nutrition study composed of 288 college students with men's daily caloric intakes >1,200 kcal and 51 women intakes <1,200 kcal, it was found that men had met all the nutrient intakes suggested by RDA's while low iron intake was found among all female respondents (Hernon, et al., 1986). Women with energy intakes less than 1,200 kcal also showed inadequate intakes for calcium, thiamin and niacin; these low intakes were mainly due to avoidance of milk products, meat and eggs, legumes, bread, and starchy vegetables (Hernon, et al., 1986).

In a dietary survey of 150 white college students (50 males and 100 females), it was found that mean intakes of calories, protein, thiamin, riboflavin,

niacin, and ascorbic acid for both men and women were close to 100% of RDA's; however, over one-third of the women had iron consumption less than 10 mg daily. Men, on the other hand, had iron intakes of 55% above the RDA (Driskell, et al., 1979).

Food intakes of 375 college students (90 males and 285 females, ages below 30) were analyzed in April and May of 1975 (Ostrom and Labuza, 1977). Results indicated that most of the students consumed adequate diets except the females' mean iron intake was only 56% of RDA. Sixty-one percent of women had iron intakes below 60% of RDA. Although the mean vitamin A intakes for both men and women were adequate, 23% of males and 38% of females consumed less than 60 % of RDA; this was due to infrequent consumption of dairy products. Men had higher intakes than women for all nutrients except for vitamin C consumption.

In determining the dietary adequacy of 29 men and 183 women, ages 19 to 25, Guthrie and Scheer (1981) reported that only 46 of the total subjects had met the Basic Four Food Groups guidelines. About two-thirds of the students consumed the recommended 2 servings of meat and milk; only 6% reported having 4 servings of fruits and vegetables and 44% consumed 4 servings of the cereal group. These authors also suggested that careful modifications on food choices must be done to achieve 100% of RDA's.

Mean intakes of energy, vitamin A and thiamin were also found below recommended levels among 49 male and 51 female Canadian university students (Gottschalk, et al., 1977). Over 90% of women had iron intake less than 14 mg as suggested by the Canadian Dietary Standard. The females' inadequate iron consumption was the result of low caloric intake.

Conceptions of Body Appearance and Dieting Efforts

Body Image Perceptions

Nutrition studies concerned with body attitude had shown a general dissatisfaction or misperception about body configurations among college students (Miller, et al., 1980; Vickery, Phillips and Crenshaw, 1985; Wakefield and Miller, 1971). Sixty-eight college men and women (22 males and 46 females, ages 18 to 23) were asked to identify their body image perception and ideal weight in relation to their eating practice (Miller, et al., 1980). Nearly 70% of the women perceived themselves as overweight or slightly overweight, while only 39% of the women were actually classified as overweight or slightly overweight. Only 50% of the women desired normal weight and 46% desired underweight or slightly underweight. Most of the men had more accurate body perceptions than women; however, 18% of the men perceived themselves as slightly underweight while none of them was classified in that group. In contrast to women, 77% of the men desired normal weight and 23% showed interest in being slightly overweight; none desired a body weight less than normal (Miller, et al., 1980). The contrast in wishes related to body weight between men and women were also reported by Reek and Keith (1984). Although the actual weight was 2.3 kg heavier than normal, college men still wished to gain 0.5 kg more weight. College women, on the other hand, wanted to lose 3.2 kg more even when their actual weight was already 2.1 kg less than they should.

Body weight exaggeration among women were also noted by Wakefield and Miller (1971). Results of their study with 40 college women showed that more than half of the women indicated they were overweight while only 45% were actually in this classification. The majority of underweight women tended

to think of themselves as either average or overweight. Although one-fourth of these women were identified as underweight, only 7.5% perceived themselves as underweight (Wakefield and Miller, 1971).

Teenagers were also found to be dissatisfied with their bodies. Among 446 senior high school girls, 380 reported that they desired less body weight (Dwyer, Feldman and Mayer, 1967). In the classic nutrition and physique study conducted by Huenemann, et al. (1974), nearly one thousand teenagers (about half boys and half girls from ninth grade through twelfth grade), were investigated for their perceptions on body size, build, and physical activity. Results of the study indicated that dissatisfactions with weight, fatness or leanness, height, and certain body dimensions were commonly seen among adolescents. Over 50% of the girls were concerned about being overweight, while a similar number of the boys were concerned about being underweight.

Perception of fatness among girls increased with age, 43% in the ninth grade and 56% in the twelfth grade. Desire for taller stature was common among boys but not among girls. More than half of the boys in the tenth and twelfth grades wanted to have larger biceps, chest, wrist, shoulders and forearms. Over half of the girls indicated that they wish to have smaller hips, thighs, and waist (Huenemann, et al., 1974).

Weight Control Efforts

The dissatisfaction about body configuration is more common in women than in men. Since food is charged with emotional connotation and symbolic meanings, it may be used as an attempt to modify diet in order to achieve a more satisfactory body physique (Story, 1984). Dietary guidelines related to weight reduction were frequently adhered to by college women (Reek and Keith, 1984).

In a study conducted by Dwyer and associates (1967), 61.4% of girls interviewed had dieted to lose weight at least once in their lives and this dieting tendency was positively related to their body fatness and weight. In response to dieting efforts, 78% of the girls reported eliminating certain foods and 43% said they skipped meals regularly. The perception of overweight was more common among dieters than nondieters. Discontent with body appearance was the most common reason for dieting efforts, with 43% of the respondents indicating beauty or good looks as the most important reason for their last dieting practice (Dwyer, et al., 1967).

Dieting was also a common practice among college women who were not satisfied with their body weight. Vickery, et al. (1985) reported that 55% of the women who were dissatisfied with body weight were on diets at the time of the survey. In the study by Miller, et al. (1980), 60% of men and women with dissatisfied body image were modifying their diets to gain or lose weight. The majority of the men and women with perceptions of overweight tended to follow reducing diets. Most of the men and women who held a normal weight image were not modifying their diets. Other weight reducing methods mentioned by students in descending order were: decreasing size of the food portion, eliminating carbohydrate sources, avoiding sweets, counting calories, reducing fat intake, eliminating snacks, and increasing physical activity (Vickery, et al., 1985). As a weight control effort, changing diet was also found more popular than changing physical activity among teenagers; and limiting food intake to lose weight was mentioned more often by girls than by boys (Huenemann, et al., 1974).

Self Concept

Attention to the concept of "self" has been noted decades ago in both the psychology and sociology areas. Theories concerning the self were concentrated on discussions about the internal nature and properties of self to the specific dimensions of self linked with external behaviors. In the literature, self has been spoken of, with minor variations, as self-feeling (Cooley, 1902/1968) the self (James, 1910/1968), self-consciousness (Mead, 1925/1968), the ego (Allport, 1955/1968), self-identity (Erikson, 1968), to name a few.

"Self" has been studied in fields such as social control, personal aspirations, interpersonal attraction, social interaction, psychological development, psychopathology, and so on. Because of the multi-dimensional aspects of self, none of the published self concept theories is universally recognized as being either "self" or "not self." Despite the various approaches implied by each usage, some of the major empirical studies of self concept are included.

One of the major arguments mentioned in the literature on the self is whether it is a subjective experience or an object of experience (Gordon and Gergen, 1968). In the late nineteenth century, William James made a clear distinction between pure experience and the contents of experience. In James' classic theory of self conception, he conceived self with tow components: a knowing self and an empirical self. He further differentiated the empirical Me into three types: the material self (e.g., the body, clothes, properties, and immediate family, etc), the social self (e.g., reputation, recognition, fame, and honor, etc), and the spiritual self (the consciousness of thinking, feeling, and

behaving). James' theory of self concept is the fundamental study for other followers in the are of exploring self-consciousness.

Cooley (1902/1968), one of the major scholars in the personality research area, centered his study on the formulation of the nature and the development of the social self. Cooley viewed the feeling of self, or the sense of appropriate, as a fundamental sign and proof of what "I" is. Self can not be described or defined without referring to that feeling. Self-feeling can be regarded as an instinct which provides energy for stimulating and unifying an individual's sense of control over physical and social realities. It is associated not only with the material body, but also opinions, purposes, desires, claims, possessions, and the like (Gordon and Gergen, 1968, p. 88). Cooley also gave though to the qualitative nature of particular self-feelings in the aspect of social self. He believed that culture, social organization, and interpersonal communication are all implicated in the shaping of oneself. Conceptions and evaluations of self are often derived from the individual's interpretation of the judgements that other people hold toward him. Cooley described an individual's social self as a reflected or looking-glass image of the imagination that he perceives in other people's mind regarding his appearance and attributes such as manners, aims, deeds, character, friends, and so on.

Mead (1925/1968) discussed self as a perceived image with the incorporation of attitudes of significant others, people whom an individual interacts with, held toward oneself. An individual can only become a total self through this process of role-taking in relation to significant others. With such perspective of self, Mead believed that an individual will tend to behave in accord with expectations received from significant others concerning "people like him" should act.

In contrast to Mead's theory of self, Alfred Schutz (1945/1968) viewed self as an experiencer whose consciousness can subjectively single out meaningful features from the perceptual field. Schutz devoted much of his study in discussing the impact of cultural expectations on an individual's perceptual stance, named natural attitude, with which he approaches the social world. The interpretation of the world of daily life, by Schutz's definition, is based on our own experiences and those handed down to us by our parents and teachers. Our natural attitudes constantly interact (e.g., modify or change, overcome or yield) with this world of everyday life. It is the person's subjectively organized knowledge gained from the world constructs the norm for his behavior and the interpretation of new information about himself.

Schilder (1950), unlike any of the theorists mentioned above, provided a different view of self concept which centered on bodily awareness then expanded to consider the social context. Schilder mentioned various aspects of body awareness that formulate one's body-image: 1) neurological sensations such as tactile, visual, muscle contraction, and visceral, 2) a self-consciousness concerning the postural image of the body, 3) the incorporations of spatial objects in and around the body, and 4) the location of stimuli in various regions of the body.

Self-concept is complex. It is the sum of perceptions and individual holds about himself and the way he relates to others and to the environment (McCandless and Coop, 1979). It is based largely on one's perception of what others think of us. The way the body is viewed is closely linked with self-concept.

Body Image

The expression "body image" is often used as a psychiatric term, but its concept was organically derived from clinical observations on patients who experienced body distortion because of the impairment in the central nervous system. Studies have been conducted by researchers to construct a solid body image theory with a reliable instrument to measure its components. However, with its multifacets in relation to physiological, sociological, and psychological factors, the concept of body image has not been fully developed.

Schilder (1950) first extended the concept beyond the neurological observations in order to integrate biological and psychiatric considerations. He defined body image as "the picture of our own body which we form in our mind" (Schilder, 1950, p. 11). Although body image originally stems from sensory experience and is formulated by mental perception, Schilder believes that one cannot get a complete picture of self without body movement. The postural image of ourselves is built by means of perpetual alternations in position and this changes constantly. In the discussion of social relations of body image, Schilder also pointed out that the spatial closeness and emotional concerns of others may increase the inter-relation between body images. Beauty is another important issue in one's body image development. Schilder concluded that "our own beauty or ugliness will not only figure in the image about ourselves, but will also figure in the images others build up about and which will be taken back again to ourselves (Schilder, 1950, p. 267).

Erikson's (1968) view of identity is based on an interaction of the biological, psychological, and sociological components of the person. He defines identity as "Conscious sense of individual uniqueness, and unconscious striving for continuity of experience [and] a solidarity with group

ideals. Similar to Schilder's body-image concept, Erikson also emphasized on the physical attributes as a source of identity and self-concept during adolescence.

Body image refers to the mental picture a person has of him- or herself and includes thoughts and feelings about the physical self (Rees, 1984). It is especially critical for adolescents in the development of self-concept. In adolescence, the rapid changes in size, body proportions, and primary and secondary sexual characteristic cause great awareness to the self (Curran and Frosch, 1942). The physical changes, the increase of introspection, the physical traits assigned by the peer group, and the comparison of one's self with social standards all contribute a new value to the self in this stage (McCandless and Coop, 1979; Schonfeld, 1969).

Body image is never isolated but is always influenced by interactions with other people. There is a continuous interchange between the body images of oneself and others. It is a view of oneself not only physically but also psychologically, physiologically, and sociologically.

Body Cathexis

A body-cathexis scale was developed by Secord and Jourard (1953) to explore the importance of an individual's attitude toward his body in relation to his self-concept. This scale was designed to measure the degree of feeling of satisfaction or dissatisfaction with various parts or processes of the body. The scale contains 46 items which identify body parts or physiological functions and are rated on a five-point scale: "have strong feelings and wish change could somehow be made; don't like, but can put up with; have not particular feelings one way or the other; am satisfied; and consider myself fortunate."

Body-cathexis (BC) scale not only can measure the degree and direction of feelings toward one's own body, but also is related to an individual's personality such as anxiety, insecurity, and feelings toward the self. Studies have shown that there is a positive correlation between body-cathexis and self-concept (Secord and Jourard, 1953; Rosen and Ross, 1968).

Because of the nature of the BC scale content, it has been used primarily as an instrument to measure the "phenomenal self" regarding more specific or limited dimensions, as opposed to other personality measurements which identify an overall or global self-regard (Wylie, 1974). The split-half reliability coefficients of the 46-item BC scale were moderately high, .78 for males and .83 for females, as indicated by Secord and Jourard (1953); whereas Johnson (1956) reported a test-retest reliability of .72. Rosen and Ross (1968) employed a 24-item modified BC scale and obtained a test-retest reliability of .84. Using the same version of 24-item BC scale, King and Manaster (1977) reported an internal consistency reliability of .83.

Although a number of researchers have used the BC scale to predict and obtain correlations with other relevant variables, the convergent validity of BC scale has never been estimated simply because no other scales claim to measure the construct as defined by Secord and Jourard (Wylie, 1974). Among those published articles which have showed a theoretically predicted direction in association with BC scale, the correlation coefficients indicated an encouraging support to the construct validity of the BC scale. Significant Pearson γs between self-cathexis and body-cathexis and Maslow's Security-Insecurity Inventory, Pearson γs ranged from -.21 to -.37 (Jourard and Remy, 1955; Secord and Jourard, 1953; Weinberg, 1960). Scores from the Cornell Medical Index Health Questionnaire (CMIHQ) correlated with BC scores were -.33 for males and -.40 for females. Pearson γs of the same CMIHQ with

indicator scores derived from BC scale were -.42 for males and .54 for females in Johnson's study (1956). Johnson also obtained γs between body-cathexis and Taylor's Manifest Anxiety Scale with γs of -.40 for males and -.53 for females (Johnson, 1956). In Jourard and Secord's 1954 study, BC ratings correlated significantly with the size of numbers of body part in an expected direction with γs ranged from -.55 to -.04. In a recent study, BC scale was found correlating, moderately, with other self-concept measurements such as Rosenberg Self-Esteem Scale, Canadian Self-Esteem Inventory for Adults, the Tennessee Self-Concept Scale, and Index of Adjustment and Values (Kernaleguen and Conrad, 1980).

It is obvious that attitudes toward the body are important in the understanding of one's self-concept. The body-cathexis scale, with its fairly good reliability and theoretically approved predicting ability in association with a number of other variables, has been used as one of the major self-concept measurements. Instruments such as Index of Adjustment and Values, Self Activity Inventory, Rosenberg's Self-Esteem Scale, Adjective Check List, Tennessee Self Concept Scale, the Semantic Differential Technique, and Interpersonal Check List had been referred to measure various aspects of self (Wylie, 1974). Due to the internal inconsistency in the self-concept theory, it has caused difficulties in constructing a wholly scientific self-concept measurement. To improve the predictive ability of self-concept construct, Wylie (1974) had suggested to use more specified self-referent attributes than overgeneralized conception. The BC scale was chosen particularly for this study as a measurement for body image satisfaction, not only because of its predictability in the relationship with overall self-regard but also because of its specific scoring content which shows a direct connection with body attitude.

Sex Differences in Physical Attractiveness and Body Attitudes

In the context of understanding body image, the effect of physical appearances on the development of body attitudes is important. The idea of physical appearance in its relation to body image was discussed in the literature of Schilder's (1950) and Schonfeld's (1969).

Physical Attractiveness

Studies have shown that physical attractiveness plays an important role in an individual's perception about himself and social interaction with other people. A physically attractive person is frequently viewed as having more positive and desirable personality traits than an unattractive individual (Miller, 1970; Dion, Berscheid and Walster, 1972). It is very likely that attractive people are treated with more positive attitudes by others than unattractive people; thus, those physically attractive people internalize more favorable personality characteristics (McCandless and Coop, 1979).

In the study conducted by Dion, et al. (1972), physically attractive individuals were expected to have more successful social lives and prestigious occupations than unattractiveness. This phenomenon of physical attractiveness and its interaction with the opposite sex is more explicit when applied to women than to men. A number of studies, both attitudinal and behavioral, had indicated that the female's physical attractiveness is considered as a more important determinant in dating activities and marriage aspirations that that of males (Berscheid, Dion, Walster, and Walster, 1971; Christensen, 1958; Hudson and Henze, 1969; Krebs and Adinolfi, 1975; and Miller and Rivenbark, 1970).

The importance of physical attractiveness in determining the image projected by females is further discussed in the study of Lerner, Karabenick, and Stuart (1973). Part of their research objective was to determine whether there were sex differences in the perception of body characteristics and in the relation between body attitudes and self-concept. One hundred eighteen male and 190 female college students were asked to rate 24 body characteristics in terms of a) the satisfaction with each of these 24 body characteristics, b) the importance of each part in determining their own physical attractiveness, and c) the importance of each part in determining the physical attractiveness of the opposite sex. The subject also responded to a self-concept scale. Results of the study shows that the satisfaction ratings with bodyparts were positively related to self-concept among both men and women. Furthermore, males and females had similar ratings in the relative importance of various body parts in determining the physical attractiveness of their own body and of the members of the opposite sex. Despite such similarities, some particular differences appeared in the ratings regarding the importance of their own as opposed to their opposite sex characteristics. Height and shoulder width were considered more important for judging the physical attractiveness of males' bodies than of females; while shape of legs, hip, and thighs were more important for females' attractiveness than for males. These differences were considered as sex-linked stereotypes. Another significant finding of this study was that males' self-concept was positively related to their ratings of opposite sex body characteristics, while the corresponding relationship was not significant for females (Lerner, Karabenick and Stuart, 1973). Results of this study suggest that men tend to perceive their sex-role as being attracted to female's physical appearance, while women do not seem as concerned with the opposite-sex attractiveness.

In a recent study conducted by Fallon and Rozin (1985), 248 male and 227 female college students were asked to indicate their current and ideal figures; i.e., the figure which they felt would be most attractive to the opposite sex, and the opposite sex figure to which they would be most attracted. Results showed that women tend to exaggerate their current figure which was perceived heavier than the most attractive figure, and the latter was heavier than the ideal figure. Men, on the other hand, had indicated current, ideal, and most attractive figures as almost identical. Both men and women had distortions about the preference figure of the opposite sex. These women believed that men desire a thinner female body than men reported they desire. Men believed that women prefer a heavier male figure than women actually reported. Findings of this study suggests that women are misinformed and tend to exaggerate their current body figures and the magnitude of thinness that men desire. Men's perceptions of their body shape serve to make them satisfied with their current figures; for women, however, women's own perceptions abut body figure place pressure on them to pursue thinness (Fallon and Rozin, 1985).

Body Attitude

Sex differences were not only found in the perception of physical attractiveness between men and women, they were also found in the variations of body attitudes for men and for women. A body attitude is defined as "an individual's general and overall global attitude or feeling about the outward form and appearance of his body" (Kurtz, 1969).

In an earlier study, Jourard and Remy (1957) studied the degree of differentiations in body attitude between 51 female and 48 male college students. The results indicated that women show greater variability than men in their responses to the body-cathexis scale. This suggests that women tend to

have a more highly differentiated body image than men. A similar conclusion was made by Secord and Jourard in their 1953 study of 45 college men and 43 college women: an independent measure of anxiety correlated with body-cathexis scale more highly among women which indicates that women are indeed more concerned about their bodies than men (Secord and Jourard, 1953). Being more concerned about the body, women could thus be expected to differentiate a fine body image than men.

The female's ability to make better distinctions about various aspects of the body was found in a group of young girls. Katcher and Kevin (1955) uses a task to construct a series of human forms by means of schematic body parts with different sizes. These authors found that girls matched body parts of forms representing self, mother, and father more accurately than body. This finding can be interpreted as girls may have a more realistic appreciation of the smallness of their own body in relation to adults than is the case with boys.

It is apparent that the differential body attitudes do exist in our society. General and specific parts of male's and female's body are highly regarded in literature, in paintings, and in various forms of art. Jourard and Secord (1954) found that a large size of body parts (such as height, weight, shoulder width, chest, and biceps) was a desired quality among 62 college men. These finding suggest that large size is associated with strong, positive feelings toward the respective body parts and small size with weak or negative feelings. Muscular strength was found to a desired quality in men, but not in women (Jones, 1947). Ideal size for women's weight, waist, and hips (except for the measurement of the bust) was significantly smaller than the actual size (Jourard and Secord, 1955). A significant decrease in female's body weight in the U.S. over 20 years--from 1959 to 1978--indicated that an evolution in this society has occurred toward a thinner ideal shape for women (Garner, Garfinkel, Schwartz,

and Thompson, 1980). Men are expected to have a strong and dominant personality, while women are weak and submissive (Kurtz, 1969). Aggressive behavior is more acceptable in males than in females (Lansky, Grandall, Kagan, and Baker, 1961).

Kurtz focused attention on the existence of sex differences in body attitudes. In his study of 89 male and 80 female college students, Kurtz (1969) made several hypotheses with regard to this notion. The first hypotheses was that women should have a more clearly differentiated or articulated body concept than men; second, men will tend to judge their bodies as more stronger or potent than women; and third, men will rate their bodies as more active than will women. All three hypotheses were confirmed in the results of the study. Kurtz's findings of the results suggest that greater awareness and concern over body appearance may be more acceptable in females than in males. The cultural expectations of masculinity in men and femininity in women may be related to sex differences found in the body attitudes (Kurtz, 1969). Lerner and his associates (1976) built a model which explains the role of various body attitudes in predicting the self-concept of adolescents. Girls' self-concepts were found based more on "interpersonal" physical attractiveness than "individual" physical effectiveness. A contract in findings was identified among boys (Lerner, Orlos and Knapp, 1976).

Sex differences were also found in the relationship of masculine and feminine traits to dieting tendencies and to the cognitive concern about weight-related physical appearance (Hawkins, Turell and Jackson, 1983). In the first part of this study (with 147 male and 175 female college students), these researchers found that concern with dieting was positively correlated with the trait of femininity, while dissatisfaction with physical appearance was negatively correlated with the trait masculinity. In their second part of the study, these

authors increased the sample size to 73 men and 288 women in order to replicate and extend findings from the first report. The positive correlation between restraint diet tendencies and the feminine trait was reconfirmed. Although such dieting tendencies were associated with socially desirable feminine attributes for women, they were apparently not socially desirable for men (Hawkins, et al., 1983).

CHAPTER III

METHODS

The formation of human food consumption on behavior is complex. Very few studies have focused on investigating the association between food intake and related factors which may have an impact on eating habits. Studies have shown that the way an individual viewed his/her body may influence eating practices. This study was designed to assess the nutrient intake of a selected group of college students and to determine the association between students' dietary intake and boy image satisfaction with regard to sex, age, and weight categories. This chapter describes research design, sample selection, collection of data and data analysis.

Research Design

This study was based on two fundamental information: a) dietary data collected from a two-day food record and b) body attitude gathered from a body image satisfaction scale. The independent variables were sex, age, and weight categories, while subject's body image satisfaction score, overall diet quality (expressed as Total Nutrient Intake Score), and individual nutrient intake (presented as % of RDA) were dependent variables

The research was analyzed by ANOVA tests. T-test was used to determine the sexual differences in the response of each dependent variables. F-test was used to determine the effect of sex, in its combinations with age and with weight, on the dependent variables.

Sample

The sample group consisted of students enrolled in an introductory human nutrition class at Oklahoma State University in Spring of 1986. Students were asked to participate in this study voluntarily and received partial course credit for their participation. Students in all three class sections comprised the first sample of 184 undergraduates. Fifty students were eliminated from the study because of unusable information such as unrealistic height and weight figure and recording of food intakes either without descriptions of type and amount of food consumed or with food items for which the nutrient content was not available in any standard reference sources. The final sample included 31 males and 103 females, ages 18 to 44.

Data Collection

To collect data pertinent to this study, two instruments were used in this study: the Body Image Scale and the Body Mass Index.

Body Image Scale

This scale was adopted and modified from Body-Cathexis (Secord and Jourard, 1953) which originally contained 46 body items and was designed to measure the degree of satisfaction with various parts or processes of the body. The Body Image Scale (Appendix A) was obtained from Secord and Jourard's Body-Cathexis by a selection process to determine only those body characteristics associated with the functions of metabolism, energy intake, and noticeable physical attributes for use in this study. Twenty-four body image related factors were chosen. On the scale, every subject was asked to indicate his/her feeling about each of the 24 body characteristics. A "strong positive"

feeling received 5 points; a "moderate positive" feeling was scored 4; an answer of "no feeling one way or another" was given 3 points; a "moderate negative" feeling was scored 2; a "strong negative" feeling received 1 point. Each subject's background data such as sex, age, actual height, and present weight were also recorded on the same questionnaire.

Body Mass Index

The subject's weight categories were determined by the ratio of weight to the square of height (kilograms/meters^2) which is a superior index of relative body mass (Keys, Fidanza, Karvonen, Kimura, and Taylor, 1972). The nomograph scale (Thomas, McKay and Cutlip, 1976) expresses relative weight (overweight, desirable weight and underweight) as a continuous variable and shows the weight range given as "desirable" from life insurance data. Appendix B illustrates the nomograph diagram for Body Mass Index. The criteria of weight categories--obese, overweight, desirable weight, and underweight--for men were BMI $\geq$ 30, 25$\leq$ BMI $\leq$ 30, 20 $\leq$ BMI $\leq$ 25, and BMI $\leq$ 20, respectively. For women they were: BMI $\geq$ 28.67, 23.80 $\leq$ BMI $\leq$ 28.67, 18.67 $\leq$ BMI $\leq$ 23.80, and BMI $<$ 18.67, accordingly.

Procedures

Dietary data was collected based on the food records reported by the 134 subjects in the beginning of spring semester, 1986. Each subject was asked to keep a four-day food record for the class assignment of Basic Human Nutrition course. The value of 24-hour recall method has been established in its simplicity and comparable estimation of group means when compared with other dietary assessment methods (Block, 1982). The accuracy of one 24-hour record in its estimation of an individual's usual intake can be improved by

increasing the number of observations (Beaton, Milner, Corey, McGuire, Cousins, Stewart, de Ramos, Hewitt, Grambsch, Kassim, and Little, 1979). In order to reduce the day-to-day intake variations within the same individual, two 24-hour food records (Appendix C) for each subject were used. Two days out of the four day's food records were randomly selected as it was determined this would provide adequate data for analysis.

On each of the food records, the subject recorded everything consumed in that day which included the types and quantity of food items during various time periods (breakfast, lunch, dinner, and snacks). Each subject was also asked to indicate whether the food record represented his/her typical eating pattern. Instructions (Appendix D) for completing the food records were distributed to students and explained by instructors in the classroom. Various food models with serving sizes were demonstrated in the display case outside of room 401, Home Economics West building.

Data Analysis

A two-day average nutrient intakes were calculated for each individual by using a computerized nutrition program. The Food Processor (Geltz and Geltz, 1984) is a computer program for the analysis of nutrient intake. The data base, which contains nutritional data for 1,500 commonly used food items, was compiled from 250 reference sources including United States Department of Agriculture (USDA) publications, journal articles, textbooks, unpublished scientific data, and manufacturer's nutrition sources. The "average" nutrient intake values have been used when wide ranges of reported figures were encountered. Recommended Dietary Allowances were calculated for each individual with regard to sex, age, height, weight, and activity level. Intakes of calorie, protein, vitamin A, thiamin, riboflavin, vitamin B_6, vitamin B_{12}, folacin,

vitamin E, calcium, iron, magnesium, phosphorous, and zinc were compared with 1980 RDA's and presented in terms of percent of RDA's.

A Total Nutrient Intake Score (TNIS) was calculated for each individual to measure the overall quality of a diet. A point value of one, two, or three, was given to nutrient intake below 34% of RDA's, between 34% and 67% of RDA's, or above 67% of RDA's, respectively. The range for TNIS would be somewhere between 16 and 48. The higher the TNIS, the better the quality of the diet.

A scoring system was also developed to indicate the degree of body image satisfaction, one to five points were given, ranging from one point for strong negative feelings to five points for strong positive feelings. A totaled Body Image Satisfaction Score (BISS) for the 24 items was then calculated for each subject as a measurement of an overall attitude toward one's own body. The higher the BISS, the more satisfaction about the body.

The number of respondents for various sex, age, and body weight groups were calculated and demonstrated in frequency tables. Variations of dietary intakes (both individual nutrient intakes and Total Nutrient Intake Scores) and Body Image Satisfaction Scores were compared between groups.

The data analysis was based on the computer program Statistical Analysis System (Helwig and Council, 1985). To determine whether there were difference in the means of nutrient intakes and of body image satisfaction scores due to a) sex, b) interaction between age and sex, and c) interaction between weight category and sex, t-test was used for Hypotheses 1a, 2a and 3a, F-test was used for Hypotheses 1b, 1c, 2b, 2c, 3b, and 3c. The existence of a constant relationship between nutrient intakes and body image satisfaction for various groups (referred to Hypotheses 4, 5a, 5b, and 5c) was tested by the General Linear Model (GLM).

CHAPTER IV

RESULTS AND DISCUSSION

The results of data obtained from the respondents are presented in this chapter. This study examined the relationship between dietary quality and body image satisfaction of 134 college students in relation to sex, age, and body weight. A total nutrient intake score was obtained on the basis of the respondent's percentage of RDA's. Body image satisfaction was measured by a modified body-cathexis scale. The group means of nutrient intakes and body image satisfaction scores for men and women, for the combination of age and sex groups, and for the groups of body weight by sex were computed and analyzed by analysis of variance. The association between nutrient intake and body image satisfaction considering sex, age, and body weight were tested by linear regression analysis. Discussions included in this chapter are:

1. characteristics of respondents,
2. body image satisfaction,
3. dietary findings, and
4. linear relationships between nutrient intakes and body image satisfaction,

with regard to sex, the combination of sex and age and the combination of sex and body weight were examined.

Characteristics of Respondents

Male (n = 31) and female (n = 103) college students in a beginning level nutrition course were studied. Eighty percent of the total population were in the age group 18 to 22 years, 15% were between 23 and 29 years of age, and 5 percent were older than 29 years of age. The distribution of age group by sex is illustrated in Table I. The body weight category was determined from the reported height and weight by using the Body Mass Index (kilograms/meters^2, the division of weight by the square of height). The criteria of Body Mass Index (BMI) for men and women used in this study were derived from a nomograph of a continuous quantitative scale wit the approximate range corresponding to the life insurance tables, "desirable weights" and the points that are $\pm$20% of the outside limits of this range (Thomas, McKay and Cutlip, 1976). The weight category for men and women is illustrated in Table II.

Body Image Satisfaction and Sex, Age, and Body Weight

By Sex

Students' satisfaction of body image was indicated by a total score summed for each item over 24 body image characteristics on a 5-point Likert type body-cathexis scale. Students were asked how they felt about each of the 24 body characteristics. The average of this totaled Body Image Satisfaction Score (BISS) for 134 subjects was 85.27 with a standard deviation (SD) of 12.75. The mean BISS for 31 males was 87.84 with a SD of 11.90 and for 103 females was 84.50 with a SD of 12.96.

As indicated in Table III, men were shown to have higher means for body build, shoulder width, chest, waist, hips, legs, weight, profile, posture, face,

TABLE I

AGE AND SEX OF RESPONDENTS

Age	Number of Subjects- Male	Female	Total
18-22	21	86	107
23-29	9	11	20
≥30	1	6	7
Total	31	103	134

TABLE II

WEIGHT CATEGORIES AND SEX OF RESPONDENTS

Weight Category[a]	Number of Subjects- Male	Female	Total
Obese (OB)	4	3	7
Overweight (OV)	5	12	17
Desirable Weight (DW)	19	71	90
Under Weight (UW)	3	17	20
Total	31	103	134

[a]The criteria of weight classifications = OB men, BMI ≥ 30; OB women, BMI ≥ 28.67; OV men, 25 ≤ BMI < 30; OV women, 23.8 ≤ BMI ≤ 28.67; DW men, 20 ≤ BMI < 25; DW women, 18.67 ≤ BMI ≤ 23.80; UW men, BMI < 20; UW women, BMI < 18.67.

TABLE III

MEAN SATISFACTION SCORES FOR 24
BODY CHARACTERISTICS BY SEX

Body Characteristics		Men (n = 31)	Women (n = 103)
1.	Age	3.42	3.95
2.	Overall Health	4.35	3.90
3.	Appetite	3.65	3.10
4.	Digestion	3.61	3.53
5.	Elimination	3.45	3.41
6.	Sleep	3.65	3.55
7.	Energy Level	3.77	3.66
8.	Exercise	3.90	3.49
9.	Eyes	3.71	3.94
10.	Teeth	3.77	4.01
11.	Face	3.94	3.83
12.	Facial Complexion	3.77	3.66
13.	Health of Hair	3.94	4.15
14.	Skin Texture	3.81	4.03
15.	Height	3.58	3.76
16.	Body Build	3.58	3.34
17.	Shoulder Width	3.87	3.61
18.	Chest	3.68	3.49
19.	Waist	3.19	3.15
20.	Hips	3.35	2.86
21.	Legs	3.52	3.02
22.	Weight	3.30	2.80
23.	Profile	3.71	3.37
24.	Posture	3.55	3.47

facial complexion, overall health, appetite, digestion, elimination, sleep, energy level, and exercise. Among the 24 body characteristics, most of the mean scores were between 3.00 and 4.00 for both sexes which indicated that these college students, as a group, have a body attitude close to "moderate positive." The mean scores of men's overall health and women's health in regard to hair, skin texture and teeth were higher than 4.00 showing a definite tendency toward the "strong positive" direction. The only mean scores below 3.00 were women's weight (2.80) and hips (2.86) which demonstrated greater dissatisfaction about these two body characteristics. The higher mean Body Image Satisfaction Scores for men, both totaled and itemized, suggested that men are generally more content with with body image than are women.

By Age and Sex

The mean Body Image Satisfaction Scores for men and women by age was indicated in Table IV. Men below age 23 showed a higher degree of satisfaction with body image than men older than 23 while younger women tended to be less satisfied with their body image than the older women. Women between age 23 and 29 had the highest mean BISS compared with women in other age groups.

By Weight Classification and Sex

The differences in mean Body Image Satisfaction Scores within body weight categories for men and women were observed (Table V). Men had a higher mean score than women for each category with the exception for underweight men. In general, women tended to show more satisfaction with body image as their weight declined. Overweight women had the least satisfied body image score (77.08) among all the weight groups. Obese women had

TABLE IV

MEAN BODY IMAGE SATISFACTION SCORES BY AGE AND SEX

Age Group	Male	S.D.	Female	S.D.
18-22	89.19 (n=21)	11.78	83.61 (n=86)	12.85
23-29	84.00 (n=9)	12.55	90.00 (n=11)	13.54
≥ 30	94.00[a] (n=1)	-----	87.17 (n=6)	12.67

[a]Male over age 30 (n=1) was excluded from comparison.

TABLE V

MEAN BODY IMAGE SATISFACTION SCORES BY WEIGHT AND SEX

	Mean BIS Score			
Weight Category	Male (n=31)	S.D.	Female (n=103)	S.D.
Obese	80.50	17.94	77.33	13.58
Overweight	91.60	9.56	77.08	11.07
Desirable Weight	89.95	10.35	84.06	12.36
Under Weight	78.00	12.77	92.82	13.02

body image satisfaction score of 77.33 which was very close to overweight women's score (77.08). Desirable weight women showed a mean score of 84.06 which was next to the highest of 92.82 obtained by the underweight women. It was apparent these college women were more contented with their body image as their weight declined. College women have been reported, as a group, to be dissatisfied with body image and desired less weight than their present body weight (Miller, Coffman and Linke, 1980).

Men, on the other hand, demonstrated a different concept of body image satisfaction as related to body weight. Overweight males had the highest BISS of 91.60 among all the male weight groups. Men in the desirable weight category showed a second highest BISS of 89.95. Obese and underweight males showed BISS (80.50 and 78.00, respectively) much lower than males in overweight and desirable weight groups.

Testing of Hypothesis I

Table VI demonstrated the results of t-test for individual nutrient intakes, diet quality, and body image satisfaction due to sex. Although men as a group had higher mean body image satisfaction scores than women, this difference was not significant (P = .2018). Hypothesis 1a, therefore, was not rejected.

Although sex or age alone did not appear to be a significant factor to account for the differences in Body Image Satisfaction Score (Table VII), the interaction between sex and age showed influence on body image satisfaction at .1 level (P = .0771). Hypothesis 1b was not rejected at the .05 level.

Body weight, on the other hand, was an important factor in determining the satisfaction of body image for men and women. Significant differences in the Body Image Satisfaction Scores (P = .0330) were found among various weight groups for men and women (Table VIII). Hypothesis 1c was rejected.

TABLE VI

T-TEST OF MEAN RESPONSES (% OF RDA FOR EACH NUTRIENT, TOTAL NUTRIENT INTAKE SCORE, AND BODY IMAGE SATISFACTION SCORE) DUE TO SEX

	T-VALUE	PR > |t|
CALORIE	-3.3425	.0011**
PROTEIN	-3.3189	.0012**
VITAMIN A	-0.6211	.5356
THIAMIN	-2.9073	.0063**
RIBOFLAVIN	-2.2458	.0308*
VITAMIN B_6	-4.2119	.0002**
VITAMIN B_{12}	-4.7972	.0001***
FOLACIN	-2.4713	.0188*
NIACIN	-3.7447	.0006**
VITAMIN C	-2.1469	.0380*
VITAMIN E	-1.5521	.1230
CALCIUM	-3.3816	.0017**
IRON	-7.2509	.0001***
MAGNESIUM	-2.5918	.0106*
PHOSPHOROUS	-6.1391	.0001***
ZINC	-7.3801	.0001***
TNIS	-3.7031	.0003**
BISS	-1.2829	.2018

* $P \leq .05$
** $P \leq .001$
*** $P \leq .0001$

TABLE VII

F-TEST OF MEAN RESPONSES (% OF RDA FOR EACH NUTRIENT, TOTAL NUTRIENT INTAKE SCORE, AND BODY IMAGE SATISFACTION SCORE) DUE TO INTERACTION BETWEEN SEX AND AGE

	F-VALUE			PR > F		
	Sex	Age	Sex*Age	Sex	Age	Sex*Age
CALORIE	12.08	.85	.55	.0007**	.4319	.4589
PROTEIN	11.34	.34	4.28	.0010**	.7157	.0407*
VITAMIN A	.35	.24	.71	.5530	.7879	.4002
THIAMIN	18.94	2.49	3.46	.0001***	.0871	.0653
RIBOFLAVIN	9.23	.31	.58	.0029**	.7335	.4464
VITAMIN B_6	36.77	3.08	3.37	.0001***	.0493*	.0688
VITAMIN B_{12}	53.71	1.12	5.92	.0001***	.3292	.0163*
FOLACIN	15.04	.74	2.06	.0002**	.4814	.1535
NIACIN	20.58	1.34	3.93	.0001***	.2660	.0495*
VITAMIN C	7.09	.87	.48	.0087**	.4212	.4910
VITAMIN E	3.17	1.69	.41	.0772	.1883	.5209
CALCIUM	20.59	.02	.00	.0001***	.9793	.9771
IRON	138.54	1.43	5.42	.0001***	.2435	.0215*
MAGNESIUM	7.48	.40	.01	.0071**	.6694	.9038
PHOSPHOROUS	59.29	.71	.83	.0001***	.4940	.3649
ZINC	53.27	1.89	1.26	.0001***	.1554	.2646
TNIS	13.90	1.89	1.45	.0003**	.1560	.2303
BISS	1.41	.31	3.18	.2366	.7340	.0771

* $P \leq .05$
** $P \leq .001$
*** $P \leq .0001$

TABLE VIII

F-TEST OF MEAN RESPONSES (% OF RDA FOR EACH NUTRIENT, TOTAL NUTRIENT INTAKE SCORE, AND BODY IMAGE SATISFACTION SCORE) DUE TO INTERACTION BETWEEN SEX AND WEIGHT

	F-VALUE			PR > F		
	Sex	Weight	Sex*Weight	Sex	Weight	Sex*Weight
CALORIE	11.37	2.29	.50	.0010**	.0817	.6859
PROTEIN	12.44	7.41	.28	.0006**	.0001**	.8387
VITAMIN A	.40	.39	3.74	.5260	.7606	.0129*
THIAMIN	16.70	1.82	1.74	.0001***	.1469	.1629
RIBOFLAVIN	8.41	.74	1.59	.0044**	.5319	.1945
VITAMIN B_6	32.87	.66	1.72	.0001***	.5770	.1654
VITAMIN B_{12}	51.50	1.16	2.31	.0001***	.3268	.0797
FOLACIN	14.98	1.27	4.07	.0002**	.2881	.0085**
NIACIN	18.77	1.30	.72	.0001***	.2784	.5404
VITAMIN C	6.54	.75	1.11	.0117*	.5222	.3489
VITAMIN E	2.34	.19	.51	.1288	.9006	.6795
CALCIUM	20.58	.59	3.09	.0001***	.6205	.0294
IRON	145.96	1.69	3.93	.0001***	.1725	.0101*
MAGNESIUM	6.70	.38	1.52	.0108*	.7695	.2121
PHOSPHOROUS	61.05	1.66	3.17	.0001***	.1797	.0267*
ZINC	53.22	.40	.59	.0001***	.7500	.6240
TNIS	13.53	.88	.52	.0003**	.4512	.6710
BISS	1.80	2.99	3.00	.1827	.0337*	.0330*

* $P \leq .05$
** $P \leq .001$
*** $P \leq .0001$

Dietary Findings

Nutrient Intakes

Another objective for this study was to assess the adequacy of the nutritional intake of college men and women. The nutrient intake data were calculated and compared with the appropriate RDA's for each individual by sex and age. Sedentary activity was used as the norm of physical activity in the calculation of caloric allowance with the consideration of each subject's weight for height. Results of nutrient intakes for men and women in comparison with RDA's were demonstrated in Table IX.

Diets of 31 men had mean intakes either above or slightly below one hundred per cent of RDA's for all 16 nutrients while women's intakes were less adequate in comparison with men's. Mean intakes of the women's diets did not meet the RDA's for calories, vitamin B_6, folacin, calcium, iron , magnesium, and zinc. When frequencies of nutrient intakes by the percentage of RDA's were computed, intakes of many individuals were well below recommended levels (Tables X-XI). The majority of the males (>80%) had intakes for protein, vitamin B_{12}, niacin, iron, and phosphorous at or above 100% of RDA's. Fifty to seventy-five percent of men had intakes of calories, thiamin, riboflavin, vitamin E, vitamin C, and calcium which met the recommended levels. More than half of the male population did not meet the RDA's for vitamin A, B_6, folacin, magnesium, and zinc. However, a higher incidence of inadequate nutrient intakes among women was observed. Among the 16 nutrients studied, protein was the only nutrient in which more than three-fourths of female population (n = 80) met the recommended level. About half of the 103 females had intakes which reached the suggested allowances for thiamin, riboflavin, vitamin, B_{12}, niacin, vitamin C, vitamin E, and phosphorous. Less than one-third of the females met the RDA's

TABLE IX

MEAN NUTRIENT INTAKES OF OSU MEN AND WOMEN IN COMPARISON WITH THE 1980 RECOMMENDED DIETARY ALLOWANCES

	MEN			WOMEN		
	1980 RDA's (15-50 yr. of age)	Actual Intakes	% of RDA's	1980 RDA's (15-50 yr. of age)	Actual Intakes	% of RDA's
CALORIE, Kcal	2700-2900	2591.9	99[a]	2000-2100	1608.8	80[b]
PROTEIN, gm	56	103.8	171[a]	44-46	61.4	136[b]
VITAMIN A, IU	5000	5998.8	120[a]	4000	4249.3	106[a]
THIAMIN, mg	1.4-1.5	2.0	157[a]	1.0-1.1	1.1	108[b]
RIBOFLAVIN, mg	1.6-1.7	2.4	154[a]	1.2-1.3	1.4	117[b]
VITAMIN B_6, mg	2.0-2.2	2.4	108[a]	2.0	1.3	63[b]
VITAMIN B_{12}, µg	3.0	7.4	248[a]	3.0	3.6	119[b]
FOLACIN, µg	400	352.1	88[a]	400	202.7	51[b]
NIACIN, mg	18-19	27.8	161[a]	13-14	15.8	116[b]
VITAMIN C, mg	60	115.6	193[a]	60	79.2	132[b]
VITAMIN E, mg	10	14.5	146[a]	8	9.8	122[a]
CALCIUM, mg	800-1,200	1148.6	137[a]	800-1200	735.3	85[b]
IRON, mg	10-18	17.3	167[a]	18	10.9	61[b]
MAGNESIUM, mg	350-400	306.4	86[a]	300	199.0	66[b]
PHOSPHOROUS, mg	800-1200	1703.5	205[a]	800-1200	1010.7	118[b]
ZINC, mg	15	14.5	97[a]	15	8.5	57[b]

[a,b]Means with the same letter are not significantly different.

TABLE X

DISTRIBUTION OF NUTRIENT INTAKES FOR 31 MALES AS PERCENTAGES OF RECOMMENDED DIETARY ALLOWANCES

	Number of Respondents			
	0-33% RDAs	34-66% RDAs	67-99% RDAs	≥100 RDAs
Kcal	0	4	9	18
Protein	0	2	1	28
Vitamin A	4	9	4	14
Thiamin	o	4	4	23
Riboflavin	0	3	9	19
Vitamin B_6	1	6	9	15
Vitamin B_{12}	0	1	3	27
Folacin	5	11	7	8
Niacin	0	1	5	25
Vitamin C	0	4	6	21
Vitamin E	1	5	2	23
Calcium	3	2	8	18
Iron	0	2	3	26
Magnesium	1	9	11	10
Phosphorous	0	1	1	29
Zinc	0	3	15	13

TABLE XI

DISTRIBUTION OF NUTRIENT INTAKES FOR 103 FEMALES AS PERCENTAGES OF RECOMMENDED DIETARY ALLOWANCES

	Number of Respondents			
	0-33% RDAs	34-66% RDAs	67-99% RDAs	≥100 RDAs
Kcal	3	33	44	23
Protein	1	6	16	80
Vitamin A	15	31	23	34
Thiamin	2	19	29	53
Riboflavin	2	16	31	54
Vitamin B_6	11	57	20	15
Vitamin B_{12}	7	12	29	55
Folacin	38	40	16	9
Niacin	0	13	34	56
Vitamin C	12	26	11	54
Vitamin E	6	14	24	59
Calcium	12	28	31	32
Iron	11	57	27	8
Magnesium	8	52	31	12
Phosphorous	2	10	30	61
Zinc	10	68	19	6

for calories, vitamin A, and calcium. Vitamin B_6, folacin, iron, magnesium, and zinc were the most neglected nutrients in women's diet; more than 80% of women population did not meet RDA's for these five nutrients. The results suggest that the diets of Oklahoma State University students are highly variable. Men, as a group, tend to consume a more balanced diet than women.

Quality of Diet and Sex, Age, and Body Weight

The measure of diet quality was based on the respondent;s percentage of RDA for the sixteen nutrients calculated. A three-point scoring system was used for each nutrient: one point was given to the intake less than or equal to 33% of RDA; intake between 34% and 66% of RDA was scored two points; intake equal to or above 67% of RDA received three points. A Total Nutrient Intake Score (TNIS) was obtained for the 16 nutrients to indicate the overall quality of a diet. The higher the TNIS, the better the quality of a diet. The Total Nutrient Intake Score was generated in an attempt to facilitate the comparison of overall dietary quality in terms of percentage of RDA among population groups. Therefore, it only serves as a indicator to show whether a diet was better or worse than others in a relative sense.

Table XII demonstrated the mean Total Nutrient Intake Scores for men and women by age and weight categories. Men showed higher scores than women in all age and weight groups except that obese men had a lower score than obese women. As observed in the previous comparison in Table IV, younger men not only showed a more satisfied body image than men aged 23 and above, they also obtained a higher nutrient intake score than older men did. Women, on the other hand, demonstrated a higher dietary score as their age increased.

TABLE XII

MEAN TOTAL NUTRIENT INTAKE SCORES FOR MEN AND WOMEN BY AGE AND BY WEIGHT CATEGORIES

	Men		Women	
	TNIS	S.D.	TNIS	S.D.
AGE				
18-22	45.71	3.10	40.24	6.02
23-29	43.11	6.79	41.09	5.54
≥ 30	----	----	**44.83**	3.54
WEIGHT				
Obese	43.50	5.20	44.33	3.06
Overweight	46.40	3.58	41.00	4.22
Desirable Weight	44.47	4.96	40.03	6.44
Underweight	46.67	0.58	42.06	4.70

The group means of Total Nutrient Intake Score varied with weight categories. Males in the underweight and overweight groups shared the similar mean TNIS's (46.67 and 46.40, respectively), which were also the two highest scores among all the weight groups. Obese men showed the lowest TNIS (43.50) in comparison with men in other weight groups. Not like obese men, three obese women had the most adequate diet (TNIS = 44.33) among the whole female population. Women in the underweight category (n = 17) demonstrated a TNIS of 42.06 right next to the obese women, while overweight women (n = 12) held the third place with the TNIS of 41.00. Sixty-nine percent of female subjects (n = 71) with desirable weight showed a lowest TNIS of 40.03 among both men and women weight groups.

Testing of Hypothesis 2

Significant difference in the Total Nutrient Intake Scores between men and women (P = .0003) was observed (Table VI). Therefore, Hypothesis 2a was rejected.

Age and weight did not appear to be important factors to account for the variances in the Total Nutrient Intake Scores. No significant differences in the TNIS were observed with regard to the interactions between sex and age (P = .2303 of Table VII) and between sex and weight (P = .6710 of Table VIII). Hypotheses 2b and 2c were not rejected.

Testing of Hypothesis 3

Not only the overall diet quality was significantly different between men and women, the intakes of the following nutrients were also found different for men and women at .05 level: calories, protein, thiamin, riboflavin, vitamin B_6,

B_{12}, folacin, niacin, vitamin C, calcium, iron, magnesium, phosphorous, and zinc (Table VI). Hypothesis 3a was rejected for the above nutrient intakes.

While sex accounted for the significant differences both in overall diet quality and in single nutrient intakes, neither age nor body weight has as much influence on the variations of intakes for the majority nutrients studied. When considering the interaction between sex and age, intakes of protein, vitamin B_{12}, niacin, and iron differed significantly at .05 level while thiamin and vitamin B_6 intakes varied significantly at .1 level (Table VII). Mean intakes such as calories, riboflavin, folacin, vitamin C, vitamin E, calcium, magnesium, phosphorous, and zinc, though did not appear under the influence of sex and age interaction ($P>.1$), showed significant differences between sexes ($P<.05$). Intakes of vitamins A and E were not influenced either by sex or by age at .05 level (Table VII). Hypothesis 3b was rejected for intakes of protein, vitamin B_{12}, niacin, and iron.

As shown in Table VIII, the interaction between sex and weight also changed mean intakes of vitamin A, folacin, calcium, iron, and phosphorous ($P<.05$). Although such interaction effect did not change intakes of calorie, protein, thiamin, riboflavin, vitamin B_6, vitamin B_{12}, niacin, vitamin C, magnesium, and zinc, these nutrients showed significant differences under the influence of sex ($P<.05$). The intake of vitamin E was the only nutrient which did not vary significantly either by sex or by body weight. Hypothesis 3c was rejected for the intakes of vitamin A, folacin, calcium, iron, and phosphorous.

As the results show in Tables VI, VII, and VIII, one conclusion is that sex may be the exclusive factor which contributes the most variations in nutrient intakes for men and women with regard to age and weight.

Linear Relationships Between Body Image Satisfaction and Nutrient Intakes

One of the main objectives of this study was to determine whether a relationship did exist between body image satisfaction and each of the 16 nutrient intakes analyzed. Although not every nutrient intake had a linear relationship with Body Image Satisfaction Score, results in Table XIII indicated that there was a relationship existing between body image satisfaction and intakes of protein, thiamin, riboflavin, vitamin B_6, B_{12}, folacin, and calcium ($P<.05$). None of the following nutrient intakes had shown linear relationship with body image satisfaction at .05 level: calories, vitamin A, niacin, vitamin C, vitamin E, iron, magnesium, phosphorous, and zinc.

Testing of Hypothesis 4

Since Hypothesis 4 actually contained sixteen F tests for all 16 nutrients, the Hypothesis was rejected for intakes of protein, thiamin, riboflavin, vitamin B_6, B_{12}, folacin, and calcium, but it was not rejected for intakes of calories, vitamin A, niacin, vitamin C, vitamin E, iron, magnesium, phosphorous, and zinc. For those nutrient intakes which showed linear relationship with Body Image Satisfaction Score, a further examination was done to determine whether this relationship would remain constant with changes in sex, in the combination of sex and age, and in the combination of sex and body weight.

Testing of Hypothesis 5

Result of Table XIII suggested that not all the linear relationships between these nutrients and that body image satisfaction remained constant in association with sex. Significant differences were found in the slopes of

TABLE XIII

F-TEST FOR DIFFERENCES IN THE LINEAR RELATIONSHIP BETWEEN BODY IMAGE SATISFACTION SCORE AND NUTRIENT INTAKES WITH REGARD TO SEX, THE INTERACTION BETWEEN AGE AND SEX, AND THE INTERACTION BETWEEN WEIGHT AND SEX

	------Calories----		------Protein-----		----Vitamin A----		-----Thiamin-----		----Riboflavin----		---Vitamin B_6---	
	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F
BISS	3.68	.0571	9.88	.0021	.00	.9841	5.97	.0159	8.05	.0053	2.10	.1497
BISS & Sex	.65	.4205	.05	.8309	.96	.3285	2.43	.1218	5.41	.0215	6.83	.0100
BISS	3.45	.0656	8.03	.0054	.00	.9460	5.13	.0253	7.54	.0069	1.46	.2287
BISS & Sex	.38	.5385	.15	.6951	1.42	.2356	1.21	.2740	4.75	.0313	5.14	.0251
BISS & Age	2.83	.0628	1.57	.2117	.81	.4468	.20	.8208	1.21	.3021	1.02	.3626
BISS	1.85	.1762	4.75	.0312	.05	.8181	4.27	.0410	6.62	.0113	1.63	.2039
BISS & Sex	.59	.4435	.06	.8006	.21	.6456	1.21	.2727	4.30	.0403	4.09	.0453
BISS & Wgt	.78	.5098	.67	.5727	.27	.8463	1.70	.1698	2.74	.0461	1.13	.3393

TABLE XIII (Continued)

	--Vitamin B_{12}---		------Folacin-----		------Niacin------		----Vitamin C---		----Vitamin E----		-----Calcium----	
	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F
BISS	9.81	.0021	2.40	.1241	4.00	.0476	.00	.9464	.99	.3220	2.52	.1149
BISS & Sex	5.80	.0175	8.06	.0053	.27	.6072	.37	.5417	.02	.8802	4.41	.0377
BISS	7.78	.0061	1.90	.1704	2.85	.0940	.00	.9812	1.28	.2601	2.48	.1180
BISS & Sex	4.89	.0288	6.45	.0123	.07	.7873	.11	.7399	.16	.6871	4.65	.0330
BISS & Age	2.11	.1253	.83	.4399	.49	.6143	.48	.6183	2.70	.0708	.83	.4367
BISS	7.95	.0056	2.05	.1548	1.98	.1618	.34	.5612	.58	.4479	2.67	.1046
BISS & Sex	4.40	.0380	6.04	.0154	.01	.9064	.50	.4805	.02	.8900	2.64	.1066
BISS & Wgt	.73	.5345	.69	.5620	.85	.4718	3.45	.0189	.67	.5698	2.42	.0695

TABLE XIII (Continued)

	Iron		Magnesium		Phosphorous		Zinc	
	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F	F-Value	PR>F
BISS	1.76	.1876	.06	.8086	1.30	.2571	1.09	.2980
BISS & Sex	3.20	.0760	1.47	.2271	3.46	.0653	1.22	.2713
BISS	1.05	.3083	.09	.7647	.88	.3513	.69	.4075
BISS & Sex	1.90	.1705	1.48	.2264	3.40	.0677	.92	.3405
BISS & Age	.09	.9117	.39	.6776	.17	.8419	.29	.7513
BISS	1.18	.2792	.08	.7782	1.26	.2639	.59	.4456
BISS & Sex	1.53	.2190	.74	.3913	1.67	.1984	1.00	.3195
BISS & Wgt	.41	.7480	.71	.5459	1.52	.2116	.35	.7919

regression lines of BISS and intakes of riboflavin, vitamin B_6, B_{12}, folacin, and calcium with regard to sex ($P<.05$). Although linear relationships did exist between BISS and intakes of protein and thiamin, our study showed no evidence that these relationships were significantly different from men to women ($P>.10$). Therefore, Hypothesis 5a was rejected for intakes of riboflavin, vitamin B_6, B_{12}, folacin, and calcium, but was failed to reject for the intakes of protein and thiamin.

In review of the relationships between BISS and nutrient intakes in association with sex and age, sex was once again found as an important factor in determining the linear relationship between BISS and intakes of riboflavin, vitamin B_6, vitamin B_{12}, folacin, and calcium regardless of age factor. In other words, these relationships changed from men to women but remained constant among age groups. However, for the intakes of protein and thiamin, there were no significant differences in their relationships with BISS for all the combinations of sex and age groups.

Hypothesis 5b was rejected for the intakes of riboflavin, vitamin B_6, vitamin B_{12}, folacin, and calcium because of the significant differences in their linear relationships with BISS due to sex. Nonetheless, our findings failed to reject hypothesis 5b for the intakes of protein and thiamin.

Among those nutrient intakes that had a linear relationship with body image satisfaction, only riboflavin demonstrated significant variations in the relationship as sex and body weight changed. Other nutrient intakes such as vitamin B_6, vitamin B_{12}, and folacin, in their relationships with BISS, had different regression slopes for men and for women ($P<.05$), but the slopes remained unchanged with regard to body weight ($P>.10$). The relationship between body image satisfaction and calcium intake had become insignificant ($P>.10$) under the interaction of sex and body weight. The relationships

between BISS and intakes of protein and thiamin remained constant for all sex and body weight groups.

Based on the findings in Table XIII, Hypothesis 5c was rejected for intakes of riboflavin, vitamin B_6, vitamin B_{12}, and folacin, but was not rejected for protein, thiamin, and calcium intakes.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

College student's eating practices have been scrutinized by many for their nutritional adequacy and dieting tendencies. College students have been shown to hold views of dissatisfaction or misperception about their body configurations. Very few studies have been done however, for college students with regard to their food intake and body attitudes. Eating behaviors are complex and closely related to mentality, therefore, how people feel about themselves may influence their food selections. The purpose of this study was to determine college students' nutrient intakes and body image satisfaction.

The Sample

Thirty-one make and 103 female college students, ages 18 to 44, participated voluntarily in this study. Each student was asked to complete a 2-day food record and a body image scale. Each individual's daily nutrient intakes were compared to 1980 RDA's according to sex, age, height, weight, and activity level. A Total Nutrient Intake Score was calculated for each subject to indicate his or her overall diet quality. The feeling about one's body was measured by a totaled Body Image Satisfaction Score over 24 body image associated characteristics. Students were classified by sex, age, and weight group. Eighty percent of the students were between 18 to 22 years, 15% of ages between 23 and 29, and 5% were older than 29. Weight categories--obese, overweight, desirable weight, and underweight--were based on Body

Mass Index (kilograms/meters^2). The percentage for each weight category was: 5% for obese, 13% for overweight, 67% for desirable weight, and 15% for underweight.

Results

The group means of Body Image Satisfaction Score indicated that college men (87.84 $\pm$ 11.90) were more satisfied with their overall body appearance than college women (84.50 $\pm$ 12.96). The mean BISS for each body characteristic indicated that college students, both men and women, felt less than moderate-positive about most of the body characteristics measured. Men had a higher BISS than women for most of the 24 body items except for age, eyes, teeth, health of hair, skin texture, and height. Among all 24 body items, men felt the most satisfied with their overall health and the least with their waist and weight; for women, health of hair, skin texture, and teeth were the most satisfactory of the body parts but weight and hips were the least satisfactory. Other body parts of lesser satisfaction among females were legs, waist and appetite.

Body weight was an important factor in determining body image satisfaction. An analysis of variance test showed significant differences in BISS among weight groups ($P = .0337$) and sex by weight groups ($P = .0330$). Women showed a more satisfactory body image as their weight decreased, while overweight and desirable weight men demonstrated higher body image satisfactions than obese and underweight men. Despite the noticeable differences in the Body Image Satisfaction Score between men and women, sex alone did not appear to be an important factor account for such variance ($P = .2018$); neither did age ($P = .7340$).

Generally, men had more adequate diets than women. Mean intakes of 16 nutrients calculated for men were very close to recommended levels of intake, while women's intakes were not. Intakes of vitamin B_6, folacin, iron, magnesium, and zinc for women were well below RDA's. Nutrient intakes for men and women were highly variable. Only one-third of women met RDA's for calories, vitamin A, and calcium and over 80% of the females had vitamin B_6, folacin, iron, magnesium, and zinc intakes below RDA's. Significant differences in the overall diet quality ($P = .0003$) and in most of the nutrient intakes ($P<.05$) were observed between men and women. Age and weight categories alone showed no influence on the overall diet quality as indicated by AOV test ($P = .1560$ and $.4512$, respectively). However, when sex was taken into consideration with age, the differences in the intakes of protein, vitamin B_{12}, niacin, and iron became significant ($P<.05$). With the interaction of sex and weight, intakes of vitamin A, folacin, calcium, iron, and phosphorous were also significantly different ($P<.05$).

According to the General Linear Model test, a relationship existed between body image satisfaction and the individual intakes of protein, thiamin, riboflavin, vitamin B_6, vitamin B_{12}, folacin, and calcium ($P<.05$). Such relationships remained constant for protein and thiamin intakes even when sex, age, and weight category changed. For the intakes of riboflavin, vitamin B_6, vitamin B_{12}, folacin, and calcium, their linear relationships with body image satisfaction varied significantly ($P<.05$) by sex but not by age or weight group. However, the influence of sex on the linear relationship for calcium was insignificant when sex interacted with weight group ($P>.05$).

Implications

Our dietary findings suggested that college men eat more nutritionally adequate diets than college women. The majority of women surveyed in this study at Oklahoma State University are at the risk of deficiencies of vitamin B_6, folacin, iron, magnesium, and zinc. The findings of body image dissatisfaction along with inadequate nutrient intakes among women indicated that those who are maintaining a satisfactory body weight need to be aware of the importance of nutrition in weight management.

Body weight was of the most concern among body attributes of college students. Both sexes showed dissatisfaction about their body weight. Although men demonstrated a more satisfactory body image than women, such a difference was not significant as indicated by AOV test. This is probably due to the narrow range of itemized body image satisfaction scores, mostly from 3.00 to 4.00, between men and women (Table III).

The linear relationship between body image and nutrient intake suggested that the view of one's own body is associated with food intake. The significant influence of sex on such relationships indicated that body image plays a different role between men and women. it was not clear whether the impact of sex on such relationships is more so for women or for men.

Psychological consequences of weight concerns and body dissatisfaction may result in decreased self-esteem, distorted body image, feelings of helplessness and frustration, the development of eating disorders, and damages in physiological health (Redin, Silberstein and Moore, 1985). The need for keeping body image in perspective with regard to weight management can thus be achieved by increasing self-esteem, decreasing

anxieties and stress from unsuccessful dieting efforts, and a realistic understanding in regard to psychological and physiological aspects of the body.

Recommendations

Based on the findings of the result, the following recommendations for future research were suggested:

1. Study concerning the relationship between body image and nutrient intake should focus on finding:
   a) whether this relationship is positive or negative;
   b) other factors, such as race, socio-economic status, and nutrition knowledge, which may be associated with such relationships; and
   c) the impact of different sex on this relationship.
2. Nutrition education efforts in planning effective weight-management programs should recognize:
   a) the social impact of an individual's body attitude;
   b) the psychological aspect of an individual's body weight; and
   c) nutrition knowledge to meet his/her physical need while reaching a realistic goal of weight control.
3. The concept of nutrient density, expressed as the concentration of nutrients per 1,000 kcal, can be used to reduce the effects of variation in intakes when comparing nutritive quality between two diets.
4. A comparison of adequacy in intakes by both methods, i.e., nutrient density and RDA of individual food item would provide further information.

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APPENDIXES

APPENDIX A

SCALE OF BODY IMAGE SATISFACTION

Oklahoma State University
Department of Food, Nutrition and Institution Administration

Questionnaire on Body Perception

Sex_____ (M or F) Actual Height_____inches Date_____
Age_____yr. Present Weight_____lb. Roll Number_____

Instructions:

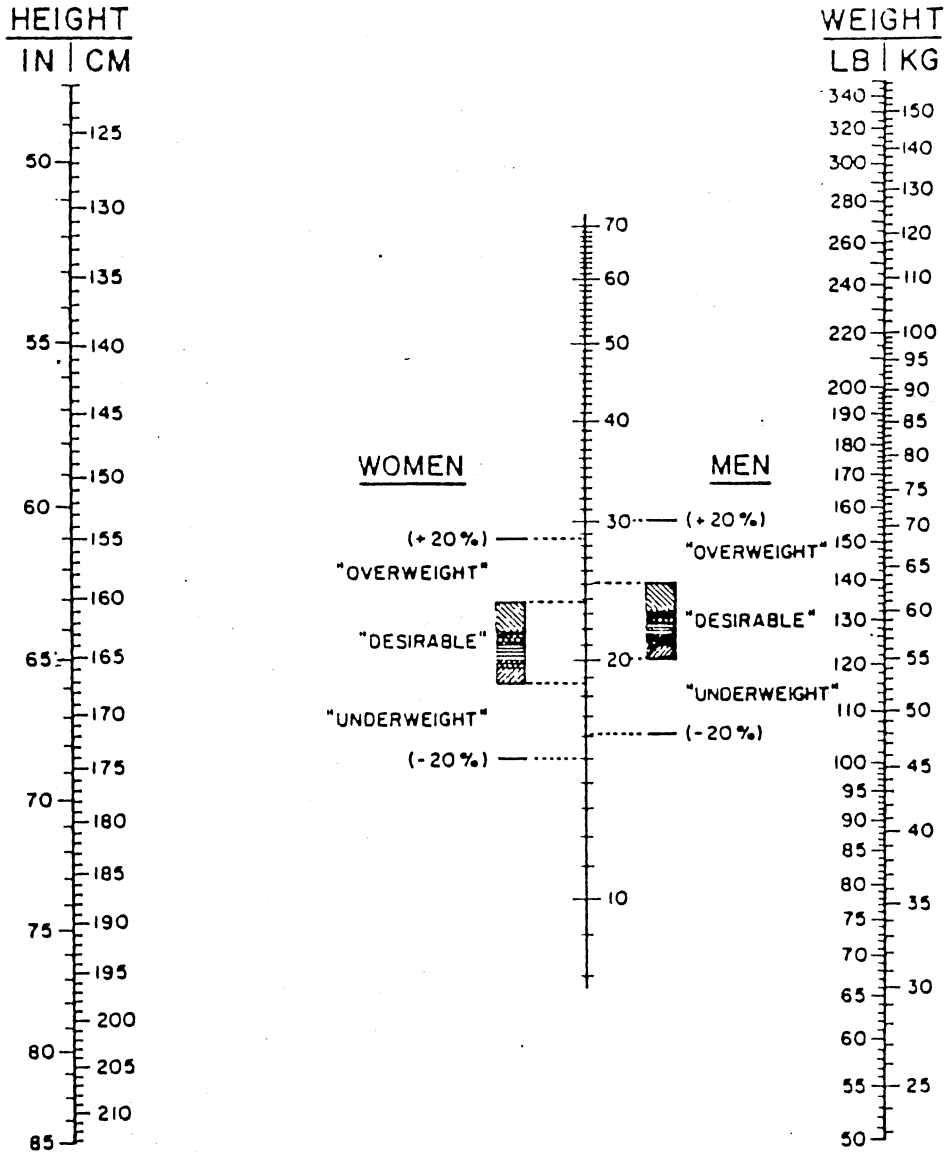
The following questionnaire is designed for a nutrition study with regard to the effect of body image and college students' dietary intakes. Please respond to each item with a (✓) checkmark in the column of the appropriate statement which best describes your feeling toward your own body characteristics.

	Have Strong Negative Feelings	Have Moderate Negative Feelings	Have No Feelings One Way or The Other	Have Moderate Positive Feelings	Have Strong Positive Feelings
1. age					
2. overall health					
3. appetite					
4. digestion					
5. elimination					
6. sleep					
7. energy level					
8. exercise					
9. eyes					
10. teeth					
11. face					
12. facial complexion					
13. health of hair					
14. skin texture					
15. height					
16. body build					
17. shoulder width					
18. chest					
19. waist					
20. hips					
21. legs					
22. weight					
23. profile					
24. posture					

APPENDIX B

THE NOMOGRAPH DIAGRAM FOR BODY MASS INDEX

NOMOGRAPH FOR BODY MASS INDEX (KG/M^2)



The ratio weight/height^2(metric units) can be read from the central scale after a straight edge has been placed between height and weight.

Source: Thomas, A.E., McKay, D.A., and Cutlip, M.B. A nomograph method for assessing body weight. The American Journal of Clinical Nutrition, 29(3): 302, 1976.

APPENDIX C

FORMS OF FOOD RECORD

FOOD RECORD SHEET

NAME_____

Day_____Date_____

Roll No._____

FOOD	AMOUNT	BASIC FOUR FOOD GROUP
Breakfast		
Lunch		
Dinner		
Snacks		

Typical?

FOOD RECORD SHEET

NAME_____

Day_____Date_____

Roll No._____

FOOD	AMOUNT	BASIC FOUR FOOD GROUP
Breakfast		
Lunch		
Dinner		
Snacks		

Typical?

APPENDIX D

INSTRUCTION SHEET FOR COMPLETING FOOD RECORDS

INSTRUCTIONS FOR FOOD RECORD SHEETS

Date due:_____

1. Keep a record of all the foods you put into your mouth and swallow for four days. Keep food record on the following 4 pages D3 through D6).

2. List the food as soon as it is eaten, perhaps at the table. DO NOT TRUST YOUR MEMORY!!!!!!

3. Include all extras as butter and jelly for bread; butter or sauce on vegetables; dressing on salads and spreads on sandwiches.

4. Give the full description of the food:

   Example: Milk, whole; or milk, 2%; or milk, skim.

5. Observe and estimate the size of the serving in common household measures (tablespoons, cups, slices, etc.). List the amount you actually ate in the column headed "Amount". Review the display outside room HEW 401. Refer to page D-2 for standard portions commonly served in restaurants and residence halls.

   Indicate at the end of each day if you feel that this was a typical day for you, and IF NOT, WHY?

6. This Dietary is a semester long project. Work carefully, neatly, and promptly on all parts of it to maximize the learning you can gain from it to maximize the learning you can gain from it. (This will also maximize the score you receive for it!)

D-2

DEMONSTRATION

Observe serving sizes in display case outside Room 401

Dishes of various sizes

1 c measuring cup
1 c cereal dish
1/2 c sauce dish
4 oz = sv glass (juice)
8 oz = 1 c glass (milk)
12 oz = 1, sv glass (iced tea)

Equivalent by weights

1 lb = 16 oz = 4.53.6 gm
1 oz = 28.35 gm (weight)
3 1/2 oz = 100 gm

Equivalent by volume

1 qt = 4 cups
1 cup = 8 fl oz = 1/2 pt = 16 Tbsp
2 Tbsp = 1 fl oz
1 Tbsp = 3 tsp

Food is commonly served in the following portion sizes:

Milk - 1 c = 8 oz glass
cottage cheese 1/2 c
ice cream = 1/2 c
yogurt = 6 oz (.75 c) or 1 c

MEAT - 3 oz portion

FRUIT - 1/2 c or in hand (banana, apple, etc.)

VEGETABLES - 1/2 c
Lettuce wedge - 1/8 large head or 1/4 small head

GRAINS - 1 slice of bread or 1 roll
dry cereal - 1 c = 1 oz
cooked cereal - 1/2 c
macaroni & cheese - 1 c (main entre) or
1/2 c (side dish)

DESSERTS
cake - 2 x 2-inch piece
pie - 1/7 of pie
gelatin - 1/2 c
MISCELLANEOUS ITEMS
jelly, cream - 1 Tbsp
butter, margarine - 1 pat = 1 tsp
sugar, 1 packet = 1 tsp

VITA 2

Chen Whei Tina Ju

Candidate for the Degree of

Master of Science

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