

IMPROVING WOMEN'S WEIGHT PERCEPTIONS AND WEIGHT-LOSS GOALS:
AN INTERNET-BASED EDUCATIONAL APPROACH

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DENTON, TEXAS
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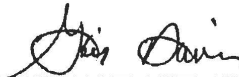
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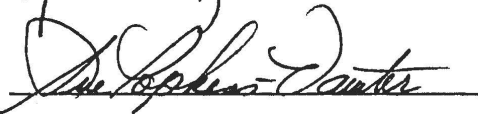
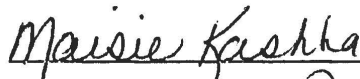
To the Associate Vice President for Research and Dean of the Graduate School:

I am submitting herewith a dissertation written by Holly J. Ford Gadd entitled "Improving women's weight perceptions and weight-loss goals: An Internet-based educational approach." I have examined the dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing.

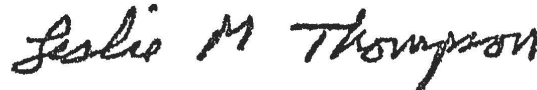


Dr. Gail Davis, Major Professor

We have read this dissertation
and recommend its acceptance:



Accepted:



Associate Vice President for Research
and Dean of the Graduate School

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Many individuals have contributed to the success of this dissertation. My dissertation committee contributed with wisdom and guidance, assuring the highest quality product. Dr. Gail Davis, chair of the committee, was readily available for editing and problem solving.

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H.J.F.G.

IMPROVING WOMEN'S WEIGHT PERCEPTIONS AND WEIGHT-LOSS GOALS:
AN INTERNET-BASED EDUCATIONAL APPROACH

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ABSTRACT

Overweight and obesity are increasing problems among women within the United States. Billions of consumer and health care dollars are spent on this problem and associated comorbidities annually. In an effort to address the problem, the National Institutes of Health issued *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* in July 1998. The guidelines (CPGs) are intended to provide a research-based approach to clinical practice.

The purpose of this study was to: (a) compare women's weight perceptions and goals with CPGs to determine the degree of discrepancy, and (b) evaluate the effects of an Internet-based educational program on women's weight perceptions, goals, and weight patterns.

The study sample consisted of 92 normal, overweight, and obese women between the ages of 20 and 50 ($M = 37.6$). The sample was predominately Caucasian (91.3%), married (69.6%), educated beyond high school (78.2%), with moderate income. Data were collected using a Weight Perceptions and Goals Questionnaire, the Marlowe-Crowne Social Desirability Scale, and an Educational Evaluation Form. An interactive Internet-based educational program designed specifically for the study included information about weight classification, weight-related health risks, NIH guidelines, and approaches to weight loss. Overweight and obese women randomized to the experimental groups participated in this education.

Analysis of the five study hypotheses revealed that women's weight perceptions and goals are significantly different from CPGs' recommendations, and that obese women have

greater discrepancy from CPGs than normal weight or overweight women. Women exhibited a moderate degree of satisfaction with the CPGs' recommendations. The Internet-based education received positive evaluation, but did not (a) decrease discrepancy scores for exercise or diet, or (b) increase ratings of importance of health-related factors in weight-loss decisions, motivation for weight loss, or satisfaction with CPGs. Over three months, the educational program made no significant difference in weight satisfaction, weight loss, or six-month weight loss goal setting.

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CHAPTER I

INTRODUCTION

Overweight and obesity are growing health problems in the United States. The problems of overweight and obesity stem from complex and varying factors that affect all cultures, socioeconomic groups and genders, with many adverse psychosocial and physical effects. The magnitude of concern for overweight and obesity problems are reflected in lay literature, media, and in an explosive diet industry. Serdula et al. (1999) report that "consumers spend \$33 billion annually for weight-loss products and services" (p. 1353). Women are major targets of lay groups, which focus on body image and social factors related to excess weight or less-than-perfect shapes.

Concern about overweight and obesity is also reflected in professional literature, national and international health conferences, research efforts (Yanovski & Yanovski, 1999). Recent medical reports call the nation's weight problems an "epidemic" and a major public health crisis (Mokdad et al., 1999). In order to most effectively deal with the problem, guidelines for clinical practice such as those published by the National Institutes of Health provide a standard for evaluation and treatment of individuals who are overweight or obese. Professionals are interested in the physiologic and psychosocial aspects of the problems of overweight and obesity, in studying etiologic factors, health outcomes, and the impacts of various interventions on the problems. Despite an expansive and growing knowledge base, the problems of overweight and obesity continue to escalate, burdening individuals, families, and the healthcare system and demanding that healthcare providers, public health professionals, and communities strive to find solutions and that research continue in documenting effectiveness of weight reduction and maintenance strategies (Mokdad et al.).

Overweight is defined by the National Institutes of Health (NIH) as a body mass index of

25 to 29.9. Body mass index (BMI) is a calculated figure that describes relative weight for height (weight in kilograms divided by height in meters squared) and is a good indicator of the amount of body fat and medical risk. Obesity is defined as a BMI greater than or equal to 30 (NIH, 1998a). The current classifications of an individual's weight status are more stringent than those previously in place. More individuals are classified as overweight according to the 1998 NIH standards (Rippe & Yanovski, 1998). This does not, however, account for the ongoing increase in the incidence of obesity in the United States (U. S.).

It is estimated that approximately 107 million adults or about 58% of adults are overweight or obese. Approximately 23% of these adults are obese (Department of Health and Human Services [DHHS], 2000). Overweight is most significant as a health risk when accompanied by other medical problems or risk factors. Coronary artery disease, hypertension, stroke, hyperlipidemia, arthritis, diabetes, gallbladder disease, sleep apnea, respiratory disorders, depression, and endometrial, breast, prostate and colon cancers increase in incidence and in severity in the presence of overweight and obesity. Overweight and obesity are responsible for significant morbidity and mortality. With their accompanying health problems, overweight and obesity constitute the "second leading cause of preventable death in the United States today" (NIH, 1998a, p. vii). The associated costs are of equal magnitude and significance, being estimated at nearly \$100 billion annually, for overweight, obesity and related illnesses (DHHS, 2000; NIH, 1998a).

Based on national health surveys and subsequent evaluation of weight trends in the United States from 1987 to 1993, it is estimated that approximately 32 million American women are overweight or obese (Galuska, Serdula, Pamuk, Siegel, & Byers, 1996; Kuczmarski, Flegal, Campbell, & Johnson, 1994). During this time period (1987-1993), the percentage of overweight women increased from 20.3 to 25.5%. In those six years, not only was there an increase in the number of overweight women, but the degree of overweight also increased. The survey showed that the percent of overweight women increased steadily from age 18 (13.7%), peaking in the 50-

59 age group at 35.4%. Women age 60 to 69 had a 34.2% incidence of overweight. The percentage of overweight women was highest for ethnic minorities and lower socioeconomic groups. Williamson (1993) notes that women experience greater variation in their weight patterns over time than do men. Given these trends, it is likely that current estimates of the problem of overweight in women are even higher.

The significance of overweight and obesity as a health risk has been recognized by healthcare professions. In *Healthy People 2000* (Center for Disease Control [CDC], 2000), obesity was addressed as a public health problem in need of serious attention. Objectives related to obesity included reducing the prevalence of overweight and obesity in women by 25% by the year 2000 (CDC; Soto, Behrens, & Rosemont, 1990). Recommendations for achieving the objectives included further research into the social, behavioral, cultural, physiological, metabolic, and genetic factors related to the development of obesity, and development and implementation of educational programs to promote weight change. Nurses have potential to be actively involved in both research and education of overweight women in an attempt to help achieve these objectives.

Analysis of achievement of the weight reduction objectives for the year 2000 revealed that the goals were not met. In fact, the incidence of overweight and obesity increased, instead, during the time period of the objectives. The *Healthy People 2010* objectives reiterate the need for reduction of the proportion of both adults and children/adolescents who are overweight or obese. The target for 2010 is to increase the proportion of the population who are at a healthy weight to 60% and to reduce the incidence of obesity to 15% (DHHS, 2000).

A number of health organizations, including the National Heart, Lung, and Blood Institute (NHLBI), the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), and the American Heart Association (AHA), have been a part of addressing the problems of overweight and obesity. In June of 1998, the NHLBI and NIDDK jointly released evidence-based clinical practice guidelines (CPGs) to guide healthcare providers in better identifying, evaluating and treating of the epidemic of overweight and obesity. These federal guidelines, entitled *Clinical*

Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, are intended to promote a more unified and scientific approach to weight management (NIH, 1998a).

Many women are concerned about their weight. Their concerns, however, often stem more from psychosocial concerns such as body image than from the health-related concerns of healthcare providers (Allan, 1988; Foster, Wadden, Vogt, & Brewer, 1997; White, 1984). Women often seek to lose weight due to social pressures. The American values of thinness, beauty, and self-control create conflict, leading to perceptions of lack of attractiveness and competence in women. This, in turn, fosters the perceived need to lose weight (Allan; Foster et al.). Women are the targets of a great deal of food, diet, and weight-related advertisements and popular journal writing. Due to such social bombardment, women easily become obsessed with their weight (Vickers, 1993).

In a large national survey, Horm and Anderson (1993) found that 52% of women considered themselves to be overweight. Forty percent of those surveyed were trying to lose weight. Of those 40%, four percent listed themselves as underweight and, yet, were trying to lose weight. Additional numbers of those trying to lose weight viewed themselves as being about the right weight. Research done by Serdula et al. (1999) supports Horm and Anderson's findings. Their findings showed that more than 43% of women in a large nationwide health survey were attempting weight loss, and 28.7% of women with a normal BMI report trying to lose weight. Of women trying to lose weight, slightly more than one third were currently normal weight, slightly more than one third were overweight, and about one-fourth were obese. Eighty-seven percent of these women set a goal weight in the normal weight category or in the BMI range of 18 to 25.

Overweight and obesity are viewed as problems by both healthcare providers and women, although from differing perspectives. Weight-loss interventions recommended by healthcare providers and individual weight-loss attempts by overweight and obese women have been largely unsuccessful. Failure rates of traditional weight-loss programs have been estimated

to be as high as 90 to 95% (Brownell & Rodin, 1994). Williamson, Serdula, Anda, Levy, and Byers (1992) reported that the average weight-loss goal for women in weight-loss programs was 31 pounds. Actual weight loss, however, averaged only eight or nine pounds. Success rates are similar over short- and long-term weight-loss efforts. Maintenance of weight-loss achievements is another problem area. Often women not only regain lost weight, but add even more, thus becoming more overweight than ever. This phenomenon, known as weight cycling, is addressed as an additional health risk (Popkess-Vawter, Wendel, Schmoll, & O'Connell, 1998).

The reasons for this documented lack of success in weight management are complex and multifaceted, just as is the problem of overweight. St. Joer (1993) noted that research has shown that weight loss is not always significantly correlated with attitudes, behaviors, psychologic factors, dietary practices or energy expenditure, though it is thought that each of these factors is contributory in some manner.

The formulation of research-based clinical practice guidelines, such as those published by the NIH, is an attempt to facilitate progress in reducing the incidence and effects of the challenging epidemic of overweight. Based on the existing literature, it appears that there may be a dichotomy of goals and approaches to weight loss between women and the healthcare providers who are attempting to implement the CPGs. Success in meeting the goals of weight reduction, weight-related morbidity and mortality reduction, and related healthcare cost containment is very likely dependent on congruence between the weight management program and the perceptions and needs of women. The CPGs recently published by NIH will provide valuable evidence-based information for both individuals and providers to use in setting and evaluating weight-loss goals and outcomes.

Problem of Study

This research first evaluated women's perspectives regarding their weight and weight loss and the discrepancy between their personal perspectives regarding weight and weight loss and the CPGs. The research then focused on the effects of an Internet-based client education

program addressing weight loss, exercise, and diet recommendations of the CPGs on weight perceptions, weight-loss goals and approaches, weight satisfaction, and actual weight loss of women. The following questions guided the study: (a) Prior to program participation, were there differences for normal weight, overweight and obese women in weight satisfaction and in discrepancy scores for six-month weight goals? (b) Did women who participated in the educational program show: (i) less discrepancy between their goals and CPGs' goals, (ii) greater satisfaction with CPGs' weight-loss goals, (iii) greater motivation for weight loss, (iv) greater valuing of health-related factors in setting weight-loss goals than women not participating in the intervention?, and (c) Were weight-loss patterns over a three-month period different for women who participated in the educational program from those who did not participate?

Rationale

Overweight and obesity are increasing problems in the U.S. (DHHS, 2000; Galuska et al., 1996; Mokdad et al., 1999). Both men and women are experiencing weight problems. These problems are primarily a result of societal and dietary factors and sedentary lifestyles (Serdula et al., 1999). Women, however, differ from men in almost every aspect, when it comes to weight issues. They differ in when, where, and at what rate they gain weight (Schultz, 1999). Factors that make overweight and obesity of significant concern to nurses and other healthcare providers include: the high incidence of overweight and obesity, links between overweight and obesity and other health problems, the resistance of overweight and obesity to treatment, the frequency of recurrent weight problems after weight loss, health related concerns regarding repeated gains and losses (i.e. weight cycling), and the massive expenditure of healthcare dollars for this problem (Allison, Fontaine, Manson, Stevens & VanItallie, 1999; Burton, Foster, Hirsch, & VanItallie, 1985; Dalton, 1997; Must et al., 1999; Perri & Fuller, 1995). Of additional concern are specific women's issues, including the negative social and psychological effects on women who struggle with weight issues. The growing incidence of eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorders, as well as other psychologic disorders such as depression in women

who attempt to attain a social norm or who experience failure from inability to attain or maintain societal weight ideals are evidence of serious psychosocial consequences of weight issues.

Physical and psychologic issues related to weight loss are further complicated by issues of relationships and communication about weight concerns with healthcare providers. Research conducted by Foster et al. (1997) found that it is not uncommon for women to have weight-related perceptions, ideals and goals that are significantly different from those of healthcare providers. This may result in women being unable to effectively communicate about or reach the goals set forth by healthcare providers, or even their own goals. Women who experience this discrepancy between their own perceptions and goals and those set forth by healthcare providers may experience additional stress and negative physical and psychological consequences. The theoretical work of King (1981) supports this premise. King notes that perceptions give meaning to situations and represent reality for an individual and that perceptual congruence is an important element of nurse-client interactions and mutual goal setting.

In research on women in an obesity treatment program, Foster et al. (1997) found that women's goals for weight loss were significantly different from clinician's goals. In this study, women set an average goal of 32% weight reduction, as compared to the 10% weight reduction recommended by NIH. Following 48 weeks of weight-loss intervention, the women in Foster's study averaged a weight loss of only about half of what they had hoped. Generally, weight-loss goals were about three times the amount of typical weight loss. Women in the study expressed dissatisfaction with their achievements though they did experience some positive physical and psychosocial benefits as a result of the weight loss. Foster suggests that the discrepancy in weight goals between patients and clinicians and the incidence of weight dissatisfaction should be addressed before treatment, with cognitive interventions initiated to reduce these problems.

Cognitive interventions might include educational and clinical approaches to helping women set more realistic goals thus making clinician and client goals more compatible. Education must be aimed at informing and empowering women, providing them with a perspective that is

different from the predominant, unrealistic weight portrayals of American society. Additionally, varying approaches to education should be evaluated for their effectiveness with women with different learning styles and needs.

Research and recommendations regarding the problems of overweight and obesity abound. The complexity of these problems leads to conflicts in information not only regarding the nature of overweight and obesity problems, but also regarding the most appropriate approaches to management of clients with these problems. Based on this and the growing demand for healthcare cost containment, the NHLBI and NIDDK convened an expert panel to examine research publications related to overweight and obesity and to draw up guidelines for healthcare providers' practice based on the research findings. These CPGs were published by NIH in the summer of 1998, and implications related to their application have not yet been examined.

To provide a beginning understanding of how the CPGs might be used in clinical practice, there is a need to examine women's personal weight-loss perceptions and goals as they relate to these guidelines. This research was based on the premise that when women have perceptions and goals that are similar to those of the healthcare provider, these women are more likely to achieve their goals. The research attempted to (a) link individual perceptions regarding weight loss with the suggested practice guidelines in order to discern the current level of discrepancy between the two, and (b) determine the effects of an Internet-based educational intervention in closing the gap that may exist between the perceptions and goals of overweight and obese women and the recommendations of the CPGs. In order to effectively address weight-loss issues with clients, determining discrepancy between their goals and those based on expert knowledge represents a critical starting point. Additionally, ways to decrease this discrepancy need to be explored.

Conceptual Framework

Imogene King's conceptual framework for nursing and her theory of goal attainment provide a framework for this study. This system's framework is relevant for the complex

interactions of genetic, social, psychologic, behavioral, and physiologic aspects of weight problems. King's theory emphasizes three interactive systems: the personal, interpersonal, and social systems, each of which are important in regards to the problems of overweight and obesity. Within these systems are sixteen major concepts. Those most relevant to this research are perception, body image, self, interaction, communication, authority, transactions, and decision making.

Perception is defined by King (1981) as an individual's unique and personal view of reality. Perception involves receipt of a broad range of stimuli and cues from the environment, personal interpretation of that input, and reaction to it. Women who are overweight and obese have perceptions about themselves and their weight upon which weight-related behaviors are based.

The concept of perception is somewhat overlapping with the concept of body image. Body image is defined as individuals' assessment of their own personal appearance and its value. It, like perception, is subjective, personal, and unique to the individual. Body image perception is not static. It develops over time and is influenced by increased personal awareness, by input from others, and by states of health and illness (King, 1981). Potts (1993) notes that most middle aged women express dissatisfaction with their body and that body image dissatisfaction may be predicted by self-esteem, body mass index, body shape, and income. Body image perceptions are vital to the consideration of weight problems in women.

Both body image and perceptions are parts of the self. King quotes Jersild (1952) in describing self: "the self is a composite of thoughts and feelings which constitute a person's awareness of his/her individual existence, his/her conception of who and what he/she is. The self includes among other things, a system of ideas, attitudes, values and commitments" (pp. 9-10). How a woman views her self underlies her acceptance of or desire to change her weight. It affects her motivations and expectations.

The concept of interaction is found within the interpersonal and social systems of King's

model. Interaction is the process of influencing, exchanging, perceiving and communicating that takes place between two individuals. Interaction involves verbal and nonverbal behaviors for the purpose of achieving a mutually agreed upon goal (King, 1981). Nurses interact with clients about health-related issues, such as overweight and obesity, with the intent of sharing information and creating positive outcomes.

Communicating is the process of information exchange. It involves the “interchange of thoughts and opinions among individuals and is a means whereby social interaction and learning take place” (King, 1981, p. 62). Communication is the basis of interaction and education processes. It forms the basis for goal setting and attainment. Communication takes place either directly or indirectly through the exchange of signs and symbols in the process of verbal and nonverbal interactions (King, 1981). It takes place through written and audio-visual materials including the modern technology of computers and the Internet. Use of technology as a means of communication may allow for increased interaction and communication processes through increased access to information.

King (1981) conceives of authority as being a position of power by virtue of one’s role or position in society. Authority enables one to dispense rewards and sanctions, to exhibit expertise based on special knowledge and skills, and to take leadership roles. Nurses and other healthcare professionals and government bodies such as the NIH have characteristics of authority. As such, they assume roles in guiding the actions of others. These individuals, groups, and organizations have the ability to guide women in weight-related goals and decision making. Individuals have the potential for rejecting authority in some circumstances. Women may reject authority if the authority is found untrustworthy or in significant conflict with women’s values.

Transactions are another part of the interpersonal and social systems. A transaction involves a tangible and definitive exchange between individuals based on perceptions and facilitated by communication and interaction. Transactions, like communication, are goal-oriented. Transactions are processes of mutuality or working together. When transactions occur between

healthcare providers and clients, goals are more likely to be achieved (King, 1981).

Decision making is a personal, ongoing, goal-oriented, planning process. Decisions result in behaviors. Participation in decision making allows an individual to experience less resistance to outcomes and to learn from the process. Decision making is generally perceived as being in control, possessing power and authority. Clients who are able to make decisions are empowered and value the process and the outcomes. Women make decisions about how much they should weigh, about whether or not to lose weight, how fast to lose weight, and how to go about losing weight. Research shows that some of these decisions are not healthy (Foster et al., 1997). Healthcare providers may facilitate better decision making regarding weight issues if they communicate healthier guidelines to women.

The concepts of perception, self, body image, communication, interactions, authority, decision making and transactions are important parts of a framework for considering women's and healthcare provider's weight-loss ideals and standards. Attitudes displayed through verbal and nonverbal means affect how clients respond to healthcare providers with whom they interact.

Weight issues are personal and sensitive, yet also very public, as weight problems are not well disguised or hidden from the public eye. Overweight and obese individuals are often subject to ridicule, discrimination and scorn. Previous negative experiences may influence clients' interpretation of messages delivered by healthcare providers and interfere with communication and mutual goal setting (Foster & Johnson, 1998). King (1981) emphasizes interpersonal interactions, noting that discrepancy between the client and the healthcare provider, in interaction and communication patterns, and in goals and approaches to achieving those goals is very common. She postulates that these issues may be resolved through open and effective communication patterns, control of the environment, purposeful interaction and education (King, 1981). This research attempted to utilize modern Internet technology to achieve effective communication regarding weight and weight loss. The Internet-based learning program was concise, visual, interactive, goal-oriented, and was identical for all learners in covering the NIH

guidelines regarding evaluation and treatment of overweight and obesity.

Assumptions

There were several assumptions underlying this research. First, it was assumed that the concepts of weight perceptions and goals represent measurable aspects of an individual's interpretation of reality. It was assumed that there are complex genetic, psychosocial, physical, cultural, and spiritual factors that comprise the complete picture of overweight and obesity. These elements form the basis of women's perceptions about their weight and underlie their goal setting. It was assumed that it would not be possible to account for all of these factors in this research study. It was assumed that perceptions and goals about weight form the basis for actions such as weight-loss endeavors. Additionally, it assumed that healthcare providers accept the recommendations for identifying, evaluating, and treating overweight and obesity as set forth by the NIH.

Assumptions were also made about the research process. It was assumed that the research instruments accurately measured the concepts, and that participants honestly and correctly answered the questions. It was assumed that the educational processes were able to effect perceptions and goals and that the effects of the educational process would be able to be measured accurately in a pretest-posttest and repeated measures design (Kelly & McGrath, 1998).

Theoretical assumptions were also made. King (1981) notes that perceptions are important to interaction processes and therefore to goal setting. Her theory makes the assumption that the goals set by individuals and by healthcare providers may not be congruent. The current research proposed to examine these assumptions. It was assumed that the concepts of communication, interaction, transactions, learning, and decision making that are important to King's theory can take place or be facilitated through the use of modern technology such as computers and the Internet.

Behaviors are a result of cognitive and psychosocial processes. It was assumed that the

weight-related perceptions and goals under investigation are relevant to weight-loss actions, processes, and outcomes. Short-range weight-loss outcomes and satisfaction were measured, however, long-range weight-loss outcomes (beyond three months) were beyond the scope of this research.

Hypotheses

This study investigated the following hypotheses:

1. At baseline, normal weight, overweight, and obese women will differ in their satisfaction with current weight and on the discrepancy score for the six-month weight goal.
2. At baseline, the goals of overweight and obese women will be greater than the CPGs' recommendations for (a) weekly weight loss, (b) six-month weight loss, (c) exercise duration, (d) exercise frequency, (e) daily calories for weight loss, and (f) percent of calories as fat.
3. Two weeks following intervention, women who participate in an Internet-based educational program will have lower discrepancy scores, compared to women who do not participate, on goals for (a) weekly weight loss, (b) six-month weight loss, (c) exercise duration, (d) exercise frequency, (e) daily calories for weight loss, and (f) percent of calories as fat.
4. Two weeks following intervention, women who participate in an Internet-based educational program will have more positive responses, compared to women who do not participate, on questions regarding (a) importance of health factors in weight-loss decisions, (b) motivation for weight loss, and (c) satisfaction with CPGs' weight-loss recommendations.
5. Two, 4, 8, and 12 weeks following intervention, women who participate in an Internet-based educational program will have more positive results, compared to women who do not participate, in the areas of (a) weight satisfaction, (b) pounds of weight loss, and (c) discrepancy score for six-month weight loss.

Definition of Terms

The following terms were conceptually and operationally defined:

Overweight: a state of weighing more than is considered normal and healthy. Body mass

index (BMI), a calculated value of relative weight for height (kg/m^2) that is correlated with the amount of total body fat one carries, is commonly used to define weight classifications.

Overweight is a BMI of 25.0-29.9, as compared to a normal weight BMI of 18.5-24.9 (NIH, 1998a).

In this study overweight was defined according to NIH criteria.

Obese: a more severe state of weight excess that is broken into three classes by NIH (1998), according to BMI: Class I, BMI 30.0-34.9; Class II, BMI 35.0-39.9; Class III/extreme, BMI $\geq$ 40. Obesity was operationalized according to NIH criteria.

Clinical practice guidelines: research-based practice guidelines, entitled *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*, developed by the NHLBI's Obesity Education Initiative and the NIDDK for the purpose of providing direction and support for weight loss and maintenance (NIH, 1998a). These guidelines were operationalized during data analysis as standard NIH-defined exercise and diet goals and individualized weight-loss goals for each participant.

Discrepancy: contrast or lack of agreement between two perspectives (Morris, 1971). Discrepancy was operationalized to be the difference between the participant's weight-loss, exercise, and diet goals and the respective weight-loss, exercise, and diet recommendations from the CPGs. Discrepancies were calculated by subtracting the CPGs' recommendation for an item (e.g., six-month weight goal or calories per day) from the participant's goal. Discrepancy scores were recorded in positive or negative numbers reflecting the actual variance from the guidelines of the participant's response.

Internet-based educational program: information presented through computer technology and world-wide web communication modalities for the purposes of increasing knowledge and empowering actions of the learner. Education, within the context of this study, consisted of an interactive computer-based program with four modules addressing major elements of the CPGs: (a) health risks of overweight and obesity, (b) ideal body weight, (c) rates/time frames for weight loss, and (d) common weight-loss modalities. Modules were designed to take only five to 10

minutes to complete, allowing for completion of the entire program in one session of 20 to 30 minutes.

Satisfaction: expectation of goal fulfillment (Morris, 1971; King, 1981). This concept was operationalized through three Likert-type scale items on the WPGQ that addressed satisfaction with current weight and with the weight-loss recommendations of the CPGs. Satisfaction was indicated by the higher scores on the scale.

Health factors: considerations regarding the risk of developing a disease, illness, or health problem or regarding caring for an illness or disease that is already present (NIH, 1998a). This concept was operationalized through three Likert-type scale items on the WPGQ regarding the importance of feeling good physically, emotionally, and of preventing illness or health problems.

Limitations

A limiting factor in this study was history. The researcher had no control over the past education regarding weight and weight loss and its impact on the women in this study. Some of the women who participated in the study were currently enrolled in weight programs. The education, information, and support that women received within those programs was not within the control of the researcher. Random assignment of women to control and experimental groups should have randomly distributed these effects and made them of minimal consequence. Another historical limitation was the weight history of normal weight participants. The participants in this study were not a pure sample of normal weight individuals, as individuals within the normal weight group reported histories of overweight and obesity. Normal weight participants with this type of history may have different weight perceptions and weight-related goals than normal weight individuals without a history of overweight or obesity.

Instrumentation was a threat to validity in that the instrument may not have adequately addressed the issues the researcher desired to represent. The instrument had potential for being difficult to read or understand. It may have been leading or may have asked questions perceived by the subject as being too personal. Careful selection of the instruments and questions so as to

best represent the concepts being explored was the primary step in controlling these limitations. The length of the instruments was controlled. The WPGQ included 39 questions. The Marlowe-Crowne Social Desirability Scale (Short Form C) (SDS) added another 13 questions. Readability of the instruments was assessed through use of the word-processing software analysis. While the consent form and cover letter both had higher grade levels and moderately difficult sentence structure and vocabulary, grade 11.85 and 10.92 respectively, the readability of the survey instruments was lower. The WPGQ had a much lower grade level, 6.44, with very low level vocabulary and sentence structure. The SDS had a grade level of 9.37, with slightly more difficult sentence structure and vocabulary. The pilot study helped to provide more information about these issues and limit instrumentation effects.

Maturation and mortality were both important issues that affected this study. Maturation should have had a limited effect during the education part of the study as the data was collected within a three-month period. It was assumed that little maturational difference would occur during this period of time. It was likewise thought that this time-period limited potential for historical events that could account for findings. Demographic data allowed for analysis of differences related to age groups. Mortality is always a risk in studies where there is more than one data collection point. In this study, the first two data collection points were fairly close together, which limited mortality to some degree for hypotheses that dealt only with this data (hypotheses 1 through 4). Weight satisfaction, weight loss, and six-month weight goal follow-ups were done initially and then repeated at 2, 4, 8, and 12 weeks. Mortality was expected to be more of a threat over this more extended time period. Plans to prevent mortality included scheduling follow-up visits before participants left the office, phone call follow-up and encouragement to come in when participants did not come in for scheduled visits, and if necessary, data collection via phone conversation. Additionally, subjects were promised compensation for their participation, increasing their motivation for completing the study. Compensation was in the form of registration for drawings for prizes for those who participated. Prizes included weight, diet and exercise

related books, videos and equipment. During data collection, many participants were called and reminded to come in. Survey completion via phone interview was done on three occasions (one at week 8 and two at week 12). Overall, mortality for the repeated measures was approximately 50%.

The education process itself may have been a limiting factor in the study. The education was presented via a web site on the computer. It was intended to increase learning through interactive processes and involvement of multiple senses. Some women, however, may have been unfamiliar with the computer and may have found use of the computer, even with assistance, to be intimidating and stressful. Such reactions could have limited learning and altered the outcomes of the study. This factor was addressed through pilot study and use of a comment, question and feedback section at the end of the education program. This evaluation tool allowed participants to give a brief narrative response, submitted via e-mail to the researcher, with the goal of providing insight as to whether or not the participant felt that the education was presented in an effective manner. A paper and pencil evaluation form was also used to increase the feedback, particularly in those participants for whom computer use was difficult. This feedback was the basis for determining the extent to which education by way of computer was limiting so that additional refinement could occur prior to any future study. Feedback from these tools during the pilot study indicated that participants were receptive and comfortable with Internet-based education and that it was probably not a significant limitation.

Self-selection was a threat to this study, as subjects were allowed to choose whether or not to participate. Subjects who participated may in fact be different from those who did not participate. It was impossible to avoid this threat and it must simply be acknowledged as a limiting factor in interpretation of the results.

Likewise the Hawthorne effect may have had influences on the outcomes of the study. Subjects were assured of anonymity and encouraged to answer the surveys in a manner that represented their viewpoints, not what they thought the researcher wanted to hear. While these

measures may have limited the Hawthorne effect, it remained a potentially limiting factor. As a way of accounting for this effect, the Marlowe-Crowne Social Desirability Scale was used. The short form of this true/false questionnaire is reportedly reliable and has been widely used in research.

Delimitations

The research was carried out in a family practice office in a metropolitan area of Texas. The office serves a primarily middle class socioeconomic group, though there is some representation of both lower and higher socioeconomic groups as well. Clients were primarily Caucasian; however, there were representations of other cultural groups in the study sample. A broad age range was available for sample from this office. The research findings are representative of this particular group. Ability to generalize is limited to similar groups.

Summary

The problems of overweight and obesity are increasing within the United States with women being significantly affected by the problems. These problems are of concern to women themselves, as evidenced by the voluminous attention in lay publications and the media, and the proliferation of diet programs, diet supplements, and other diet aids. Overweight and obesity are of concern to healthcare providers as well. The problems are addressed through community health efforts, such as *Healthy People 2000* and *Healthy People 2010*, through clinical research and publications, and in national policy statements. The clinical practice guidelines published by the NIH are one of the most recent documents addressing this health problem.

In spite of the concerns from both those with weight problems and those providing healthcare to them, overweight and obesity remain unsolved problems and growing threats to the health of many women. Some research, in fact, suggests that the attention that weight problems has been given, has actually worsened the health threats through the process of weight cycling and its adverse effects (Popkess-Vawter et al., 1998; Prentice, 1995).

This research focused on women's perceptions of their actual and ideal weight, and on

their weight-loss goals such as how much weight to lose and how fast. A comparison was made between women's perceptions and goals and the guidelines for clinical practice issued by the NIH. Additionally, this study provided education regarding the NIH guidelines to overweight and obese participants in experimental groups to determine the effects of the education on the participant's perceptions and goals, on discrepancy scores derived from comparison of women's goals with the NIH clinical practice guidelines, and on participants' actual weight loss.

The framework for examining these issues was based on King's theory of nursing including the concepts of self, body image, perception, interaction, authority, communication, transactions, and decision making (King, 1981). These concepts reflect the complexity of the problems of overweight and obesity in women, as well as the complexity of client education processes as they are carried out by nurses.

This chapter put forth specific, testable hypotheses addressing the identified problem. Terms for these hypotheses were conceptually and operationally defined. Additionally, underlying assumptions, limitations and delimitations of the study were discussed.

CHAPTER II

REVIEW OF LITERATURE

This chapter discusses the background and demographics of the problems of overweight and obesity in the United States (U.S.), focusing on information specific to women. It discusses the health concerns related to overweight and obesity. Research studies that address the effects of overweight and obesity on the cardiovascular, endocrine, musculoskeletal, and immune systems, and acute and chronic problems associated with overweight and obesity are reviewed. Health benefits of weight control and weight loss are discussed. Women's weight concerns, their perceptions and ideals related to weight are addressed. Finally, interventions, goals, and educational processes related to weight and weight loss are reviewed.

Background and Demographics

Overweight and obesity are major health problems in contemporary industrialized nations, secondary to work, recreation and eating patterns, and a variety of other factors. The U.S. has an ever-increasing population of overweight and obese individuals who are at risk for health problems and weight-related complications that are very costly. It is estimated that the current annual cost of treating the obese population in the U.S. is \$331 billion. This significant expenditure of healthcare dollars for care and treatment of weight-related health problems represents only part of the financial picture. Overweight and obese individuals themselves spend large amounts of their personal money on weight-loss efforts. Bouchard (1994) estimates that five percent of total healthcare costs are linked to obesity. He additionally notes that in 1992 American individuals themselves were spending about \$30 billion per year on weight-loss efforts, apart from healthcare expenditures. Even with public attention, health provider awareness and individual efforts, statistics continue to show increasing incidence and degrees of overweight (Galuska et al., 1996; Mokdad et al., 1999). Reasons for this are complex, involving a number of

genetic, physiologic, psychologic and sociocultural factors. These factors are recognized, though not completely understood, and are addressed in research and literature.

A rich source of information about overweight and obesity is the data from the Behavioral Risk Factor Surveillance System, which is a portion of the National Health and Nutrition Examination Surveys (NHANES). The NHANES' studies are nation-wide surveys carried out by state health departments in conjunction with the Centers for Disease Control. Because of their large numbers and broad sample, the surveys provide valuable information regarding the health status of Americans. Galuska et al. (1996) report on weight-related data from this survey. There are a number of findings that are relevant to the current research. In 1993, the incidence of overweight ($\text{BMI} \geq 31.1$) and severe overweight ($\text{BMI} \geq 32.3$) in women was 25.4% and 7.9% respectively. This represented an increased incidence of overweight and severe overweight of 4.8% and 2.0%, respectively, from 1987 to 1993. Translated into pounds or kilograms and BMI, there were increases in all weight categories. Increases in weight ranged from 0.8 kilograms to 3.2 kilograms. BMI increases ranged from 0.3 to 1.2 (Galuska et al.).

Increases in weight in the female population affected all age groups during the 1987 to 1993 time period. The least weight gain was in women over age 60 years. Blacks and Hispanics had greater increases in weight than whites. Increases in incidence of overweight were 6.3% for Hispanics. The least percentage weight increases were noted in women who were currently married -- 4.2% versus 5.5% increase for those previously married or never married (Galuska et al., 1996).

Educational level was examined in the study as well. Galuska et al. (1996) note that the survey showed an overall increased incidence of overweight from 1987 to 1993 in those with less than high school education (4.6%), high school diploma (5.5%), some college education (6.2%), and in those with college degrees (5.7%). This represents an interesting finding, as other studies (Jeffery & French, 1996) have shown obesity to be of higher incidence in lower socioeconomic groups. Typically individuals of lower socioeconomic status also have less education. Because of

higher overall incidence of overweight and obesity in lower socioeconomic groups, one might also expect those women in lower socioeconomic groups to have the highest increase in incidence of overweight over time. The NHANES information does not, however, support this expectation. According to the NHANES data, increases in overweight and obesity incidence are more prevalent in the groups with higher levels of education. This may be related to more sedentary employment on the part of those with more education and less time for physical activity as they balance family and career demands.

Galuska et al. (1996) also examined the NHANES data for relationships between regional location of participants and weight. The increasing incidence of overweight was higher in the Western and Southern regions. This likely represents ethnic distributions, since these are areas where greater numbers of Blacks and Hispanics reside.

Other relevant findings reported from the NHANES study were that the increase in incidence of overweight in females was greater in those who were former smokers and in those with sedentary lifestyles (Galuska et al., 1996). Neither of these findings is surprising. Both women and men tend to gain at least small amounts of weight upon quitting smoking due to changes in metabolism and behavior patterns. Sedentary lifestyles are also known contributors to overweight due to less caloric expenditure as compared to typical caloric intake (Blair, 1993).

More recent statistics (1991-1998) from this same Behavioral Risk Factor Surveillance System data base show continuing trends like those noted by Galuska et al.(1996). The prevalence of obesity in women increased steadily from 12.2% in 1991 to 18.1% in 1998. This represents a 47.4% increase in obesity for women. The most notable increases in weight for the combined groups of males and female in this study were in those age 18 to 29 (69.9% increase), in Hispanics (80% increase), and those with some college or with college education (67.5% and 62.9% increases, respectively). Trends in the increase of obesity clearly cross gender, socioeconomic, and ethnic lines (Mokdad et al., 1999).

Health Concerns

Healthcare professionals are concerned about the incidence and degrees of overweight and obesity as well as the trends that reveal the problems are continuing to increase. The concern stems primarily from knowledge of the links between overweight, obesity and other chronic, costly disease processes. Cardiovascular disease, endocrine disorders such as diabetes mellitus, degenerative joint disease, and a variety of malignancies are some of the morbid conditions associated with overweight and obesity. The NIH Consensus Development Conference on the Health Risks of Obesity concluded that "long-term health risks at the 20% overweight level were undesirable and even alarming" (Burton et al., 1985).

Cardiovascular Risks

Individuals who are overweight or obese have a higher risk for hypertension, insulin resistance, and hyperlipidemia. Decreased high-density lipoproteins, often a result of insufficient physical activity levels, are common. Elevations of the low- and very low-density lipoproteins, total cholesterol, and triglyceride levels may also occur. All of these factors contribute to increased atherogenesis, particularly in coronary and cerebral vessels, resulting in increased incidence of myocardial infarction, congestive heart failure, and cerebrovascular accident.

Numerous longitudinal studies have been carried out to examine the effects of overweight and obesity on these types of cardiovascular problems. In a recent study by Brown, Dobson, and Mishra (1998), the body weights of middle-aged Australian women, age 45 to 49 years, were compared with the prevalence of certain medical conditions. The data were obtained by survey, relying on women's self report of height and weight and their answers to the question "Have you ever been told by a doctor that you have hypertension, heart disease, . . . ?" (p. 521). The relationships between BMI and hypertension and BMI and heart disease were linear and significant. The prevalence of hypertension for BMI categories was as follows: BMI <20 (10.6%), BMI 20-25 (13.3%), BMI >25-30 (22.8%), BMI >30-40 (37.5%), and BMI >40 (61.3%). In relation to heart disease, for these same BMI categories respectively, the incidence was 2.0%, 1.7%,

2.4%, 3.2%, and 4.3%. The comparatively low incidence of heart disease as compared to hypertension in this group was not discussed. It may be that estrogen, still present in this age group, had a protective effect. It may also be related to the fact that heart disease in women is underdiagnosed; and therefore, these women might be unaware of the presence of heart disease in their lives.

Results of the NHANES III study show that hypertension is the most prevalent of overweight and obese comorbidities (Must et al., 1999). The prevalence of hypertension in women with a BMI of 30 or greater is 32.2%, compared with 16.5% in women with BMIs less than 25 (NIH, 1998b). In the morbidly obese, with BMIs of 40 or greater, the prevalence of high blood pressure was as high as 63.16% (Must et al., 1999). These results are similar to those cited by Brown et al. (1998).

A large international study about salt and hypertension, entitled INTERSALT, was carried out with more than 10,000 men and women. INTERSALT found that increases in body weight of 10 kilograms (22 pounds) were associated with increases in both systolic and diastolic blood pressure. Systolic blood pressure rose 3.0 mm Hg and diastolic pressure rose 2.3 mm Hg (Dyer & Elliot, 1989). Cutler, Psaty, MacMahon and Furberg (1995) estimate that these seemingly small increases in blood pressure translate into significant increases in risk of coronary and cerebral vascular disease. They estimate a 12% increase in coronary heart disease and a 24% increase in risk for stroke.

Manson et al. (1990) note that obesity is an independent risk factor for the development of cardiovascular disease in women. This risk is present even among middle-age women whose weights are classified as mildly or moderately overweight. Based on a prospective study of cardiovascular risk in women, the researchers concluded that as much as 70% of coronary disease in obese women and 40% of coronary disease in women overall is attributable to overweight.

The Framingham Study also substantiates the association between obesity and

cardiovascular risk. According to Kannel & Gordon (1979), there is a 6.5 mm Hg rise in blood pressure, a 12 mg/dl rise in plasma cholesterol, and a 2 mg/dl rise in fasting blood glucose for every 10% relative increase in weight. These increases may make the difference between normotension and hypertension, normal lipid levels and hyperlipidemia, and normoglycemia and hyperglycemia. While weight loss may not reduce these factors by an equivalent amount, there is evidence of beneficial reductions in all of these areas and a consequent reduction of cardiovascular risk in response to weight loss (Kanders & Blackburn, 1992).

The Framingham study additionally addresses the issue of fat distribution. Truncal obesity or central fat distribution, as measured by subscapular skinfold thickness, was found to be a good predictor of coronary heart disease. In this study subscapular skinfold was found to be a superior predictor as compared to waist circumference measures, waist-hip ratios, and BMI calculations (Pi-Sunyer, 1995).

The Nurses' Health Study provides another significant contribution to research regarding the health of women. With controls for age, smoking, family history of heart disease, menopausal status and hormone use, the risk for coronary heart disease was twice as high in women with BMI of 25 to 28.9 and three times as high in women with BMIs greater than 29, as compared to women with BMI's of 21 or less (Willett et al., 1995).

Hyperlipidemia constitutes a risk for cardiovascular disease through increases in the total cholesterol, the low-density lipoproteins (LDL), and triglycerides and through decreased levels of high-density lipoproteins (HDL). The NHANES III study shows that women have significant increases in total cholesterol corresponding with increases in BMI. The incidence of total cholesterol levels greater than or equal to 240 mg/dL was: 15.7% (BMI < 25), 27.9% (BMI 25-26), 28.2% (BMI 27-29), and 24.7% (BMI $\geq$ 30). The incidence of low HDL-cholesterol levels (< 35 mg/dL) for these same BMI categories was 16.5, 27.0, 27.2, and 41.5%, respectively. The incidence of hyperlipidemia in women is significantly greater than in men of the same BMI. Additionally, the total cholesterol levels tended to be higher in women with more central fat

distributions and high waist-to-hip ratios (NIH, 1998b).

Kuller and Meilahn (1996) report that women whose LDL levels rose above 110 mg/dL between the ages of 47 and 58 had significantly more coronary and aortic atherosclerosis, as measured by specialized computerized tomography, when compared to women with levels less than 110. The same study found significant arterial disease in 71% of women whose LDL was above 125 mg/dL, compared with 31% of women whose LDL was below 90. Findings in a longitudinal study by Siervogel et al. (1998) confirm these changes in total and LDL cholesterol with changes in adiposity. Siervogel et al. note that from 5 to 15% of the annual change in total cholesterol and LDL levels may be explained by a change in fatness. Recommendations for preventing increases in LDL include preventing weight gain and, for overweight or obese individuals, losing weight.

Congestive heart failure (CHF) and stroke are other risks associated with overweight and obesity. CHF and other cardiovascular disease are more prevalent in those who have been overweight for longer periods of time and in those who showed weight gain after younger adult years. CHF is a major cause of death in those with severe obesity (Hubert, Feinleib, McNamara, & Caselli, 1983).

A recent study by Rexrode et al. (1997) shows that the risk of ischemic stroke increases with increasing BMI. In women with BMI greater than 27, the risk was 75% higher than in women with BMI less than 21. Women with BMI greater than 32 had 137% greater risk of stroke as compared to women with BMI less than 21.

The risk for coronary heart disease is reduced by decreases in weight in overweight individuals. Eckel and Krauss (1998) note that a five percent reduction in body weight lowers blood pressure and that a 10% weight reduction significantly improves lipid profiles, reducing total cholesterol as well as LDL. This kind of information suggests that achieving ideal weight may not be the most important goal. The NIH clinical practice guidelines recommend an initial target of ten percent weight reduction to achieve these and other health benefits.

Diabetes

Diabetes mellitus is more common in those who are overweight. The greater the degree of overweight, the higher the incidence of insulin resistance and non-insulin dependent diabetes. Seventy to 80% of non-insulin dependent diabetics are overweight. As many as 60% of severely overweight individuals will develop non-insulin dependent diabetes mellitus (VanItallie & Lew, 1992).

Of particular concern are minority populations for whom the incidence of diabetes is often significantly higher. Women of black, Hispanic, American Indian and Alaskan ethnicity may have up to twice the likelihood of developing diabetes (Kumanyika, 1993). Overweight and obesity increase the incidence of diabetes beyond the genetic predispositions. Pi-Sunyer (1993) notes that the "risk for diabetes has been reported to be about twofold in mildly obese, fivefold in moderately obese, and ten-fold in severely obese persons" (p. 657). The risk for diabetes increases with the length of time one is obese and additionally with central or abdominal obesity.

In the Australian study of middle-aged women, Brown et al. (1998) note a nearly linear effect between BMI and the prevalence of diabetes. The incidence of diabetes was 1.6% for BMI less than 20, 1.4% for BMI 20 to 25, 3.2% in those with BMI over 25 to BMI of 30, 5.9% in BMI over 30 to 40, and 19.3% in those with BMI over 40.

The NHANES III study from 1988 to 1994 revealed similar findings. The prevalence of Type II diabetes mellitus by weight status jumped significantly between the normal weight and overweight groups of women, from 2.38% to 7.12%. Another significant increase in prevalence occurred in women classified in obese categories 2 or 3. The prevalence increased from 7.24% (obesity class 1) to 13.16% (class 2), and 19.89% (class 3) (Must et al., 1999).

Data from the Nurse's Health Study suggest that the risk of developing non-insulin dependent diabetes increases with any BMI greater than 22 (Colditz et al., 1990). The risk may increase as much as 25% for each BMI unit above 22kg/m² (Colditz, Willett, Rotnitzky & Manson, 1995; Sjostrom, 1993). Weight gain after age 18 is a strong determinant of risk for diabetes

(Colditz et al., 1990).

Cancer

Cancer mortality is also associated with being overweight. Women who are overweight or obese are more likely to develop endometrial, gallbladder, cervical, ovarian, and breast cancers. Additionally, mortality from these cancers is higher than for women who develop these cancers but are not overweight or obese (Pi-Sunyer, 1993).

The Nurse's Health Study is helpful in assessing the risk of cancer related to overweight and obesity. Giovannucci et al. (1996) observed that colon cancer occurred twice as often in women with BMI greater than 29 as compared to women with BMI less than 21. Additionally, women with abdominal adiposity have a higher incidence of colon polyps. Polyps are a precursor of cancer in many individuals. Giovannucci et al. also found that exercise such as brisk walking was inversely associated with adenomas of the distal colon.

Breast and endometrial cancers are also increased in women who are overweight or obese. Links between obesity and breast cancer have been difficult to establish due to differences in breast cancer occurrence at different life and hormonal stages. Breast cancers appear to be increased in postmenopausal women, particularly those who are not using hormone replacement therapy. In premenopausal women, however, there is an inverse relationship between weight and the occurrence of breast cancer (NIH, 1998b). Data from the Nurse's Health Study indicate that weight gain of more than 20 pounds from age 18 years to midlife doubles a woman's chances of having breast cancer (Huang et al., 1997).

While the absolute risk of endometrial cancer is less than that of breast cancer, the risk of endometrial cancer is increased in women who are overweight or obese. BMI's of 30 or more are associated with a risk of endometrial cancer that is three times higher than the risk for women of normal weight (NIH, 1998b).

Women who are obese are at risk for other types of cancers as well. In addition to colon, breast and endometrial cancers, women who are overweight are at increased risk for gallbladder,

cervical, and ovarian cancers (Pi-Sunyer, 1993).

Other

Other body systems are affected by overweight and obesity, potentially causing a variety of conditions. These conditions are not generally associated with the higher degrees of morbidity and mortality such as are present with concomitant diabetes, cardiovascular disease, and cancers. They are, however, a source of discomfort, disability, and expense.

Arthritis may be a particularly distressing problem, aggravated by or resulting from overweight and obesity. Joint stress and resulting pain, particularly in the lower, weight-bearing extremities is common. The NIH (1998b) report that a study of middle-aged female twins demonstrated an increased risk of osteoarthritis of about 9 to 13% for every kilogram increase in weight. The NHANES III survey demonstrates a linear increase in the prevalence of osteoarthritis in women who are overweight. Must et al. (1999) report an osteoarthritis prevalence of 5.22% in normal weight women. Overweight women have a prevalence of 8.51%. Increasing degrees of obesity further increases the prevalence to 9.74, 10.39, and 17.19% in obesity classes 1 to 3.

Another study noted that a decrease of two BMI units over a ten year period decreased the risk of arthritis by as much as 50% (Felson, Zhang, Anthony, Naimark, & Anderson, 1992). Weight loss also decreases the pain and use of pain medication and increases mobility in patients who have arthritis.

Gallstones are another problem associated with overweight and obesity. The NHANES III data indicate that gallbladder disease increases from 9.4% of women in the first quartile of BMI to 25.5% in the fourth BMI quartile (Khare, Everhart, Maurer, & Hill, 1995). Risk of gallstone formation occurs as a result of supersaturation of bile with cholesterol and as a result of biliary stasis. Women who have rapid weight loss are at higher risk for the development of gallstones than those with slower rates of weight loss (Pi-Sunyer, 1993). Brown et al. (1998) recorded the frequency of cholecystectomies in a group of middle-aged Australian women. There was a linear correlation between the rate of cholecystectomy and increasing BMI. The incidence of

cholecystectomy was: 3.7% (BMI < 20), 5.5% (BMI 20-25), 9.3% (BMI 25-30), 16.3% (BMI 30-40), and 26% (BMI > 40).

Respiratory difficulties are not uncommon in obese individuals. Problems include decreases in lung volumes and compliance, increased effort, dyspnea on exertion, ventilation-perfusion mismatches with varying degrees of hypoxemia, and sleep apnea (Pi-Sunyer, 1993). Increased chest wall and abdominal fat create these problems. Large neck girths (16 inches or more in women) also contribute to the problem of sleep apnea (NIH, 1998b). Sleep apnea was observed in more than one-third of females with a BMI of 30 or greater in one study. These women often had no complaints related to the sleep apnea but had frequent respiratory disturbances during their sleep (Richman et al., 1993). Sleep apnea, a problem observed more commonly in women with massive obesity, has negative physiologic consequences, such as pulmonary and systemic hypertension and cardiac arrhythmias (Guilleminault, Quera-Salva, Partinen, & Jamieson, 1988). Negative psychosocial consequences such as daytime somnolence, fatigue, poor task performance, and safety hazards are also a problem.

Reproductive health consequences of overweight and obesity occur in some overweight and obese women. Premenopausal women may experience menstrual irregularities and amenorrhea, ovulatory failure with resulting infertility, and polycystic ovarian syndrome. Pregnant women who are overweight have increased risk of pregnancy complications, a higher Caesarean-section rate, and more neonatal complications, including high birth weight babies and higher risk of fetal neural tube defects. Obesity increases the incidence of pregnancy induced hypertension and gestational diabetes (NIH, 1998b). Brown et al. (1998) note an increasing frequency of hysterectomy in women as BMI increases. In women age 45 to 49 with a BMI of less than 20, 16.9% had undergone a hysterectomy, compared to 31.0% of those with a BMI of 30 to 40.

Obesity associated emotional problems, such as depression, have been reported by some researchers and refuted by others (Foreyt et al., 1995; Ganley, 1989; Popkess-Vawter, Brandau, & Straub, 1998; Rumpel, Ingram, Harris, & Madans, 1994; Schwartz, 1993; Wadden &

Stunkard, 1993). The question that seems most often dealt with is whether emotions such as anxiety, loneliness, and depression are precursors of weight gain or whether they are the result of weight gain. More than likely, the answer is that negative emotions both precede and follow weight gain, and that they contribute to a vicious cycle of weight problems.

It is apparent that there are negative social stigmas that impact overweight and obese individuals. Negative attitudes toward women who are overweight, social stigmas, and self-esteem issues contribute further to low self-esteem, depression and to eating disorders. Anorexia nervosa, binge eating disorders and bulimia are frequently encountered disorders that are certainly relevant to the problems of overweight and obesity. While the health risks associated with these disorders are beyond the scope of this research, there will likely be individuals, particularly with binge eating disorders and bulimia, in the study groups.

Health Benefits of Weight Control and Weight Loss

Healthcare providers are interested in promoting higher quality of life in the overweight and obese through weight reduction and consequent reduction of disease risk. Modest weight reductions potentially achieve significant effects. Eckel and Krauss (1998) note that a five percent reduction in weight will lower the blood pressure and a 10% weight reduction will improve the lipid profile. Kuller and Meilahn (1998) found that lifestyle interventions that controlled weight in women prevented increases in their LDLs. Women who lose weight reduce their risk of diabetes. Reporting on a large sample of female nurses, Colditz et al. (1995) note that a weight reduction of five kilograms is associated with a 50% reduction in risk for diabetes. Aronne (1998) reported that in obese diabetics, the degree of improvement in blood sugar control was directly proportional to the amount of weight that they lost. These findings all support the health benefits of weight loss in women who are overweight or obese.

A large prospective study examining the effects of intentional weight loss on mortality in overweight (BMI >27), nonsmoking, Caucasian women, age 40 to 64 years was carried out by Williamson et al. (1995). This study showed that women with obesity-related health problems who

lost any weight at all had a significant (20%) reduction in overall mortality. This reduction was primarily due to a 40 to 50% reduction in obesity-related cancers and a 30 to 40% reduction in diabetes-related mortality. Women without comorbidities showed no reduction in overall mortality rates. Of additional significance was the finding that women who lost more than 20 pounds in the previous year had small increases in mortality.

Weight control is generally considered to be important for maintaining health and preventing disease. Because of the complexity of the problem of overweight and obesity, it is difficult to treat. In fact, overweight and obesity are now considered to be chronic diseases without cure and requiring life-long treatment (Rippe & Yanovski, 1998).

Women's Weight Perceptions and Issues

Many women are concerned about their weight; most of their concerns are socially and personally related, as opposed to being health related. Society has long portrayed women's bodies as imperfect and in need of refinement and realignment (Wilfley & Rodin, 1995). Being thin and physically fit is the current ideal of female attractiveness. This ideal body, achieved by only a few and usually at great effort and expense, portrays success, self-control, and acceptance. Biologic and genetic factors preclude attainment of the cultural ideal for most women.

The mismatch between cultural ideals and biologic realities is most evident in the following statistics. The current aesthetic ideal female body weight is based on actresses and models who have only a 10 to 15% body fat, compared to healthy normal body fat levels of 22 to 25%. One study notes that "the majority of *Playboy* centerfolds and Miss America contestants were 15% or more below their expected weight" (Wilfley & Rodin, 1995, p. 80). These weights are commonly achieved through severe dietary restrictions and exercise programs varying from 14 to 35 hours per week. These and other models and actresses of similar classification meet criteria for anorexia nervosa (15% or more below expected body weight). Yet women judge themselves by these standards and are likewise judged by society according to these unrealistic and most

often unattainable standards, even being judged as “self-indulgent and lacking in willpower” based on their failure to attain this social ideal. So prevalent is dieting and body shape dissatisfaction that some refer to this phenomenon as “normative discontent” regarding body shape (Wilfley & Rodin, 1995, pp. 80-81).

In a study using structured interviews to assess the prevalence of obesity and self-defined weight problems, Rand and Kuldau (1990) found that white women who classified themselves as having no weight problem or not being overweight were in low normal or underweight classifications of weight for height. These women, age 18 to 34 years, were thin and were on the average 6 to 14 pounds under weight. Black women classifying themselves as without weight problem, on the other hand, ranged from normal weight to 20 pounds overweight. The research found that women were more concerned than men about their weight. “White women had self-imposed more restrictive acceptable weight standards than any other race-sex group” (p. 341). White women in this study often erred in considering themselves overweight, when in fact they were normal weight. Twenty-eight percent of white women and 22% of black women had such judgement errors. Actual obesity was most common in women of low socioeconomic status. Rand and Kuldau summarize by noting that white women have the greatest social pressures to be thin, are the least overweight, and have the most restrictive standards for normal acceptable weight.

Brownell (1991) discusses two hidden assumptions regarding weight and the search for the perfect body. First is that “the body is infinitely malleable” (p. 2). Second, there are significant benefits to be had from achieving the thin ideal. In pursuit of the ideal, some women diet and exercise to extremes.

In one national survey, 46% of women reported currently being on a diet. Motivation for this was not entirely the anticipated benefits. A survey of women reported that 48% of women dieted because they were terrified of being fat (Brownell, 1991). Additionally, it is reported that women have become increasingly dissatisfied with all aspects of their physical appearance. Body

image and body shape estimations affect eating patterns, exercise patterns, and psychologic functioning.

Individual efforts to change body image and shape may be ineffectual due to physiologic or biologic limitations. Failure to achieve one's ideal due to such limitations is not distinguishable from failure to achieve one's ideal weight as a result of other factors such as lack of motivation, carelessness, or lack of knowledge about appropriate diet and exercise habits. Failure to achieve a personally or socially acceptable norm, particularly in those who try and fail, is therefore very demeaning and stressful. It may result in psychologic distress (Brownell, 1991). Assisting women to be more realistic in their size and shape ideals may be as important as assisting in the weight adjustment processes.

Like women of normal weight, women who are overweight or obese are affected by societal norms and may have unrealistic weight loss expectations as a result of social pressures. In a study on body image dissatisfaction and self-esteem in midlife women, Potts (1993) reported that 87% of the women studied wanted to be thinner, although only 35% of the women were overweight. The more overweight the woman, the higher her level of body dissatisfaction. Women with pear shapes, which tend to be healthier weight-related shapes, were less satisfied with their body shape than those women with apple shapes, a shape more associated with cardiovascular risk.

Foster et al. (1997) also noted significant societal influence and lack of weight-related realism on the part of women. In a study of 60 women enrolled in a weight-loss program, it was noted that women reported numerous diet attempts with varying, but generally mediocre, weight-loss results. These women commonly set weight-loss goals that were nearly three times their previous weight-loss achievements. Goal weights selected by the women were significantly related to their body image. Women with more positive body image chose higher, more realistic weight goals. Dream weight, happy weight, acceptable weight, and disappointed weights were also set at higher and more realistic levels in women with more positive body image. Women

based their weight goals primarily on motivations regarding appearance and physical comfort. Foster et al. found that when women lost weight, even if they arrived at a weight that they had anticipated as being disappointing to them and in fact still rated as being a disappointment, they experienced positive effects both physically and psychosocially. It seems in some respects however that women are robbed of satisfaction with their weight and with weight-loss outcomes by being members of a society that places excess value and emphasis on thinness. This dissatisfaction may result in feelings of failure, loss of self-esteem, and continued unsuccessful attempts at weight loss (Foster et al., 1997).

Findings from a study examining the association between weight change and psychological wellbeing in women support those of Foster et al. (1997). In a large study of women age 25 to 50 years, Rumpel, Ingram, Harris, and Madans (1994) found that non-overweight and overweight women who had experienced recent weight gain experienced feelings of poorer well-being. Well-being was defined as positive and negative psychological effects and health concerns. Of further interest was the finding that non-overweight women experienced poorer sense of well-being with weight loss, as well. These findings suggest that women may experience detrimental effects from weight gain or, in cases where weight loss is really unnecessary and based on unrealistic ideals, women may also experience detrimental effects from weight loss. Promotion of weight stability and realistic weight-loss efforts may promote psychological well-being.

Women carry out personal assessments of their weight and determine whether or not their weight is acceptable to them. This assessment is the basis for deciding whether or not to attempt to lose weight. Allan (1988) describes three different weight norms held by women: "an ideal weight, an acceptable weight, and an overweight weight" (p. 53). These are similar to the weight ideals used by Foster et al. (1997). In Allan's study, women did not view the ideal weight as a reasonable or attainable goal. Instead the acceptable weight was what was viewed as realistic and achievable. Overweight weights were outer limits that were signals to do something. All weight assessments involved consideration of appearance and of physical feelings. Most

weight assessments had little to do with actual weight charts and standards. In fact, the women in Allan's study generally rejected such standards and set their own "standards". This rejection occurred in thin and overweight women, though for different reasons. Women based their decisions to lose weight on how they looked in the mirror without clothing, how their clothing fit, and on their physical feelings.

Women who maintain their weight after losing report feeling in control of their lives. They are very self-conscious and aware of their bodies. They devise personal programs to fit their life-style, have small goals and stick to their plans. They try to avoid feeling deprived (Kayman, Bruvold, & Stern, 1990). Women who regain weight after weight loss are less aware of their bodies. Some are surprised when they notice that they have gained their weight back. Women who fail to maintain weight loss have tendencies to be less active or involved in the design of a personal diet and exercise program. Often they have experienced a negative life event that has caused them to alter their more healthy eating and exercise patterns and to thus regain weight. (Kayman et al., 1990).

Both Kayman et al. (1990) and Allan (1989) note that women engage in weight management endeavors as a result of their own ideas and motivations. Women in these two studies stated that healthcare personnel had little to do with their decisions about losing weight or with decisions about how to go about it. Healthcare providers did not even serve as a major source of information about weight reduction.

This is unfortunate and may be a result of several factors. Perhaps there is such a wealth of readily accessible information and support available from the lay public that overweight women do not feel they need to try to consult their healthcare provider. Or possibly women's past experiences with healthcare providers did not meet their needs or were unhelpful. Foster and Johnson (1998) support this latter hypothesis. In research that examined physician attitudes toward obese patients, the patient's perceptions of their encounters with physicians, and the influence of obesity on their health care, Foster and Johnson found that healthcare providers in

general tend to have negative attitudes toward obese patients and that obese patients were aware of these negative feelings, reporting the occurrence of unprofessional and derogatory remarks. Discussions about weight were frequently not viewed positively either, as a result of poor communication and inept approaches to the discussions.

Literature shows that there are a number of relevant concerns related to women's weight perceptions and issues. It also indicates that there is much room for improvement and future research in these areas.

Interventions

Weight loss is approached in a variety of manners. Most effective weight-loss interventions involve reduction of dietary intake and increase in caloric expenditure through activity and exercise. Support groups and behavior therapy that focus on weight management may be helpful interventions. Pharmacotherapy may be employed in some cases. A common element to these interventions is education.

Education is an interactive process whereby an individual is able to gain information and insights that they did not previously possess. This information makes it possible for the individual to approach life differently, more knowledgeably. Healthcare providers in general, and nurses specifically, consider education an important role in relationships with patients. Education underlies cognitive and behavioral change. Through education, healthcare providers hope to facilitate behavior changes in clients.

Nursing literature has many references to patient education. One area that is particularly relevant to the problem of overweight is the area of diabetes education. In a study of clients in a diabetes education program, Mickus and Quaile (1997) reported that, for those individuals who participated in the education program, there was significantly better knowledge about diabetes, significantly better blood glucose control, less medication use, and more weight reduction. The research concluded that education had a positive effect on behaviors. Fiala and Gaizauskas' research (1994) supports these findings. In a program of behavioral and nutritional information for

overweight diabetics, education had beneficial effects on blood glucose and weight.

Brown's (1992) meta-analysis of diabetes education noted that education was more effective in younger patients. This effectiveness was measured in self-management skills, weight loss, blood sugar control, and psychological outcomes. Brown also noted that the length of an educational intervention was insignificant in determining the outcome of educational processes. It is not known if this holds true for weight control education, nor is it known if education changes the basic framework or ideals from which overweight and obese individuals operate.

A more general meta-analysis, carried out by Mullen et al. (1997) examined the outcomes of education and counseling on preventive health behaviors. The studies included in the analysis focused on patients without diagnosed disease. The study concluded that behavior change followed patient education and counseling regarding disease prevention. An important consideration from this study is the finding that in addition to use of behavioral techniques, use of several modes of communication boosted the effects of the educational processes. Certainly this finding is logical. Education literature notes that retention of information is related to the number of senses involved in the learning process.

Sousa (1995) discusses practical information about how the brain learns. He notes that the use of not only the different senses, but also different types of encounters facilitate learning and retention. Of teaching methods, lecture is the most ineffective for promoting long-range retention of information, resulting in a retention of only about five percent after 24 hours. Other methods increase retention: reading (10%), audio-visual (20%), demonstration (30%), discussion groups (50%), practice by doing (75%), and teaching others or immediate use of learning (90%).

Sousa (1995) emphasizes other important factors in learning and retention. First is the length of a teaching session. He refers to attentive learning periods as prime-time and inattentive non-learning periods as down-time. As the length of a learning session increases, the amount of down-time increases. Shorter learning sessions have proportionally less down-time and more learning time. For example, a 20 minute learning session has 18 minutes of prime-time (90%) and

only 2 minutes of down-time (10%) as compared to a 40 minute session which has 30 minutes of prime-time (75%) and 10 minutes of down-time (25%). Sessions less than 20 minutes, however, provide no additional benefit for learning, and in fact may be detrimental to learning, as the learner has insufficient time to establish learning patterns. Second, even within the prime learning times, there is variation in attention to and therefore retention of information. Information that is acquired during a learning session occurs most readily during the beginning of a session and then to a somewhat lesser degree at the end of a session.

This information about learning has important implications for patient teaching. First, it indicates that a variety of teaching modalities must be employed in order for learning to best occur. The amount of information presented, the patient's concern regarding the information, and the length of the teaching session are of particular concern.

Innovative teaching approaches are continually being implemented in patient care situations, and their effectiveness evaluated. One such innovation is the use of modern computer technology to educate patients. Khoiny (1995) has described several factors that contribute to effectiveness in the use of computer-assisted instruction. First is the quality of the program. Poorly designed programs often cause a loss of interest in learning. Programs should be well organized and easy to follow. They should be designed to give feedback and of course must provide correct information. Computer-assisted instruction must be accessible to the learner, and in an environment conducive to learning. It is highly recommended that programs be located in a setting where a knowledgeable individual is available at all times to assist in orienting the learner to the computer, and to answer questions about computer use or program content. In discussion of a computer-assisted learning program for patients on continuous ambulatory peritoneal dialysis, Luker and Caress (1991) emphasize the importance of considering readability of computer programs, as many patients have low literacy skills.

Tibbles, Courtland, Reisine, Rippey and Donald (1992) describe the implementation and effects of a preoperative and postoperative computer-assisted instruction technique for patients

undergoing joint replacement surgery. The education consisted of three lessons. The first was primarily a computer orientation, but also addressed risks and benefits of surgery. The second lesson focused on fairly traditional preoperative instructions. Both of these programs were completed prior to surgery. The third lesson was completed postoperatively on a computer brought to the patient's bedside. This lesson focused on home care, rehabilitation and safety issues. Evaluation was made of both patient learning and patient satisfaction with the mode of learning. Both of these measures demonstrated positive effects. Patients who used the computer program had better knowledge levels than controls. They also expressed satisfaction with the computerized approach to learning.

Tibbles et al. (1992) cited several advantages to the computerized form of education. First, it assured instructional consistency, as all patients received the same content. Patients were able to individualize to some degree by going at their own pace. They had privacy to learn. The feedback given was seen only by the patient. The computer instruction was time effective for nurses and was easily accessible for patients. In the case of joint replacement education, the program provided for practice in effective decision-making. Another benefit was that the learning modules were easily updated with more current information. The biggest disadvantage of computerized instruction, according to these authors, was the lack of availability of professionally designed programs. Patient discomfort in using the computer, while apparently not found to be a limitation in this study, might be considered a disadvantage by some, as well.

Use of computers and the Internet or world-wide web is another approach to patient education. Nursing is beginning to use Internet technology for a variety of purposes. Most common uses of the Internet in nursing involve distance education for nursing students and data retrieval or information-gathering functions. Literature sites use of the Internet for support groups and for discussion or consultation regarding clinical dilemmas. Currently there exists little literature regarding the formal use of web-sites for patient education. This is an area that needs to be explored through further research.

Summary

Overweight and obesity are prevalent problems in the U.S.. A number of studies reviewed in this chapter point out that these multi-factorial problems cross all genders, age groups, cultures, and socioeconomic levels. The incidence of overweight and obesity continue to climb. Along with this is a growing concern on the part of healthcare providers regarding overweight and obesity and associated health problems. Cardiovascular, cerebrovascular, endocrine, reproductive, respiratory, immune, musculoskeletal, and psychological problems associated with obesity were reviewed. Health benefits of weight loss were also discussed. Research shows that even small amounts of weight loss may be beneficial to the health status of overweight and obese individuals.

Weight guidelines have been developed that are to be applied in clinical practice in identifying, evaluating and treating overweight and obesity. These guidelines are based on morbidity and mortality statistics and other clinical research that supports weight loss or weight maintenance as a means of health promotion.

Women's concerns about their weight were also addressed in this chapter. Women's weight concerns are generally different from the concerns of healthcare providers. Average female weight and body proportions are portrayed as undesirable in the media. Women's weight ideals and perceptions have begun to reflect the increasingly unrealistic weight expectations of society. Women who are overweight or obese have unrealistic weight aspirations (Foster et al., 1997). Women are not necessarily interested in weight management for the same reason as healthcare providers, nor do they always have the same goals.

Healthcare providers therefore have a responsibility to increase their understanding of women's weight issues and to try to incorporate women's goals and ideals into weight management processes where possible. Healthcare providers must also serve as information sources and provide educational programs that will influence women's weight perceptions and goal setting in positive ways.

Currently, a variety of approaches are used in clinical management of overweight and obese individuals. Education is an important part of weight interventions. Literature shows that healthcare providers are using computers as one approach to patient education. Patient-directed education addressing weight management in women according to clinical practice guidelines, and delivered through Internet technology has not been studied.

This chapter has provided a comprehensive review of relevant research regarding overweight and obesity, health concerns related to overweight and obesity, health benefits of weight control and weight loss, and women's weight concerns and issues. Literature focusing on patient education as an important part of intervention was also reviewed. The review of literature revealed a need to increase nursing knowledge about weight problems in women, women's weight and weight-loss goals and perceptions, and the impact of an Internet-based educational intervention on these phenomena.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This chapter describes the methodology for the study. The design and rationale for selection of the design are discussed within the framework of the research problems. The setting for data collection, the sample and population, the instruments, procedures for data collection and protection of human subjects, the educational intervention used in the experimental group, and the plans for data analysis are all presented.

The research was a clinical study examining multiple groups in a pretest/posttest repeated measures quasi-experimental design for the purposes of evaluating differences in weight-related measures between the groups before and after an Internet-based educational intervention. Women who participated in the study were assigned to one of three groups: normal weight, overweight or obese. Assignment to weight groups was based on an estimate of BMI at the time of weigh-in at the office where data were being collected. Participants from the overweight and obese groups were randomized to control or experimental groups. Participants in the experimental group received an educational intervention. The pretest consisted of questionnaires that collected demographic data, descriptive data about the weight perceptions and weight-loss goals of the participants, and data about social desirability biases. Following the pretest, the experimental group participants completed an interactive Internet-based educational program. Individuals in the control group did not participate in the educational intervention. Approximately two weeks following the pretest (and education for those in the experimental group), participants from both the experimental and control groups were retested using the questions about their weight perceptions and weight-loss goals from the questionnaires. Participants were followed for a three-month period in order to monitor weight changes and any potential differences in weight loss and weight satisfaction that resulted from the educational

intervention. The study design controlled for differences at the beginning of the study, and provided a basis for explanation of group differences in both weight perceptions and weight-loss knowledge as well as actual weight-loss outcomes at the end of the three-month period.

Setting

The setting was a family practice and preventive healthcare office in a metropolitan area of Texas. The healthcare providers within this office include one physician, one nurse practitioner, and a number of ancillary personnel. A wide variety of health problems are seen and treated in the office. The practice, however, treats a number of women with weight problems who are specifically interested in weight management. The practice advertises weight-management programs and has many women enrolled in these programs.

Population and Sample

The population was women 20 to 50 years of age who were seen at the family practice site. Criteria for admission to the study were as follows: non-pregnant female, age 20 to 50 years, able to read and write in English, and able to understand and give personal consent to participate in the study. Women for whom discussion of weight loss could potentially interfere with treatment of another diagnosis, as determined by the physician or nurse practitioner, were excluded from the sample.

A convenience sample ($N = 92$) of women seen in the family practice office was used for this study. Overweight ($n = 28$) and obese ($n = 38$) women, but not normal weight women ($n = 26$), were randomized to experimental or control groups through use of a random number chart assignment until a quota for each group was reached. A sample size of 75 to 105 was desired for the study, with approximately 25 to 35 participants per group. These numbers were based on the work of Cohen (1977) who discusses the importance of significance criteria, sample size, sample variance, effect size, and power to statistical interpretations of data. Power analysis is frequently used to determine the sample size that is needed in order to appropriately reject a null hypothesis at a given level of significance with a given effect size. Cohen's work includes power

tables for t tests, ANOVA, and multiple regression, but not multivariate ANOVA. Therefore, power tables for ANOVA were used to determine sample size for this study (Portney & Watkins, 1993). A medium effect size ($d = 0.30$), significance criteria of $\alpha = 0.05$, and power of 0.70 were used. Use of a more conservative small effect size ($d = 0.10$) with more power (.80), could possibly be justified, as behavioral research often reveals only small effects, and may be characterized as demonstrating less perceptible changes, using less understood variables, and possibly having less experimental control (Portney & Watkins). It was thought, however, that the measures of cognitive, attitudinal and actual physical weight changes that would occur as a result of the educational intervention in this research, particularly over the period of three months of the research were likely to be of medium effect, and really ought to be of medium effect in order to be of practical significance. Stevens' (1996) reports on power for multivariate analyses would suggest similar or slightly larger groups (25 - 50) for obtaining reasonable power (0.66 - 0.82) for moderate effects ($D^2 = .64$) at the same alpha (0.05). Therefore, the sample size was determined based on medium effect size. Computed (i.e., observed) power for each of the multivariate analyses was examined and considered in interpreting results.

A pilot study was conducted with 14 participants. During the pilot study, the instruments as well as the research process within the clinical setting were evaluated. The Internet-based educational program, computer access, and the learning setting were evaluated. Minor changes in instruments and research process were made as necessary based on the pilot study.

Protection of Human Subjects

Approval to conduct the study was obtained from the Human Subjects Review Committee at Texas Woman's University (Appendix A). Permission to conduct the study at the family practice site was obtained from the physician practicing in the office (Appendix B). All participants were assured of their right to voluntarily participate, and to voluntarily withdraw at any time without penalty. Confidentiality was carefully protected. Each questionnaire had only the random number assigned to the participant on it. Consent forms and other identifying materials were separated

from the questionnaires.

Instruments

The research was conducted using a several instruments. The instruments included: the Weight Perceptions and Goals Questionnaire (WPGQ), the Marlowe-Crowne Social Desirability Scale (SDS), a nursing form, a researcher data sheet, and a form for evaluating the Internet-based educational program.

Weight Perceptions and Goals Questionnaire

The WPGQ was an investigator-designed tool for collecting demographic data, weight and health information, weight-related perceptions, weight-loss history and goals, goals related to exercise and diet, and information regarding the importance of health-related factors in deciding what to weigh and regarding anticipated satisfaction with recommendations of the clinical practice guidelines (CPGs) (Appendix E). The instrument was designed by the researcher after evaluating other tools currently available and finding none that would elicit the needed information for answering the research questions. The questionnaire consisted of a total of 39 questions. The types of questions included open-ended fill-in-the-blank questions, categorical yes/no questions, and questions that involved Likert-type ratings. Most of the data were continuous data. Posttests at 2, 4, 8, and 12 weeks were condensed versions of the WPGQ (Appendix F). Items that required no posttest follow-up, such as demographic data and weight history, were deleted from the WPGQ on the condensed forms, for the sake of clarity and time economy for participants. This was done based on participant recommendation during the pilot study.

The WPGQ was evaluated during the pilot study. Participants completed the questionnaire without apparent difficulty. Minimal amounts of data were missing at the time of analysis of pilot data.

Cronbach's alpha was used to measure the internal consistency of the Likert-type items of the WPGQ relating to importance of health-related concerns in deciding what to weigh, motivation for weight loss, and satisfaction with the CPGs for weight loss. The analysis revealed

a low reliability score ($\alpha = .44$). It was thought that this score was lower than desired for several reasons. First, there was a small number in the sample. Second, there were only eight items. And most importantly, the items represented very distinct and separate factors or concepts. This was verified with the larger study sample using principal component factor analysis with varimax rotation. Three separate factors resulted, with all items loading above 0.70 per factor. Common principal axis factoring confirmed the three factors and item loadings. The first factor included three items regarding to importance of health-related factors in weight-loss decision making: the importance of feeling good physically, the importance of feeling good emotionally, and the importance of preventing illness. The second factor included three items that seem to represent motivation to lose weight: satisfaction with current weight, motivation for weight loss, and willingness to attempt a 10% weight loss. The third factor included three items: the participants' anticipated satisfaction with a 10% weight loss, their anticipated satisfaction with taking up to 6 months for that weight loss, and anticipated satisfaction with a six-month weight-maintenance period prior to additional weight-loss efforts, as recommended in the CPGs. This item grouping seems to reflect satisfaction with the CPGs' recommendations for weight loss.

Marlowe-Crowne Social Desirability Scale (Form C)

Social desirability scales have been developed to deal with the methodologic issue of responses made by the participant that are what they think the researcher wants to hear as opposed to what they personally think. Labeled, the Hawthorne effect, socially desirable answers have a significant impact on the validity of a research study. In order to control for this effect, researchers often use some type of instrument to measure the Hawthorne effect. The Marlowe-Crowne Social Desirability Scale is one of several such instruments. According to Reynolds (1982), this SDS is one of the primary measures of the Hawthorne effect in use.

The Marlowe-Crowne SDS originated as a 33-item inventory with true/false answer options. Participant's responses are compared to a response key that indicates socially desirable answers. The higher the number or percentage of matching answers, the more evidence there is

that the participant is responding in a socially desirable response pattern.

Short forms of the Marlowe-Crowne SDS have been developed. Form C is a 13-item derivation of the original instrument (Appendix G). According to Reynolds (1982), this shorter form has a reliability of .76, as compared to a reliability of .82 with the original 33-item scale. The short form has a correlation of .93 with the original scale. Ballard (1992) reports similar reliability scores, .70 for the short form and .75 for the original form of the SDS. She, however, raises some questions about the scores and recommends cautious use of both the original and short forms of this instrument. Robinette (1991) examined the construct validity of the short form of the Marlowe-Crowne SDS, concluding that “notwithstanding the unresolved ambiguity of whether social desirability is a response bias or a dimension of personality, the M-C Form C offers an easily administered, reliable, and valid measure to investigate the potential confounding of self-report measures with social desirability” (p. 399). Because it has fewer items and performs comparably with the longer original version, the short form of the Marlowe-Crowne SDS was chosen for use in this study.

In the pilot study, the Marlowe-Crowne SDS scale preformed well. Internal consistency with the pilot sample, $\alpha = 0.88$, was similar to reliability scores previously reported.

Nursing Form

The nursing form was used by the office medical assistant personnel to record the participant's height, weight, and waist circumference (Appendix H). While some literature supports that self-reported measures are not significantly different from those that are recorded by researchers, there is often question in relation to weight about under reporting. By having the medical assistants in the office, who are trained to record weight and other measures accurately, the question of reporting bias was eliminated in the pretest/posttest phase of the study.

Researcher Data Form

The researcher data form was designed by the researcher for documenting the CPGs' values for six-month weight goal, activity, and diet for each individual participant (Appendix K).

This tool was found in the pilot study to be unnecessary, as the values were able to be entered directly into the statistical data base more easily, or used in calculations without having to be written down.

Educational Program Evaluation

Participants in the experimental groups were asked to complete a paper and pencil evaluation of the Internet-based educational program (Appendix J). Evaluation was primarily by Likert-type questions scored between 1 and 5. Participants evaluated the content, the presentation form, the ease of use, and their learning. Open-ended questions regarding the strengths and weaknesses of the program allowed for additional qualitative-type data collection.

All instruments were pilot tested before use in the research study. Refinements were made as necessary following the pilot.

Presentation of Educational Program

The educational program constructed by the researcher was an interactive Internet-based tutorial, covering the CPGs related to management of overweight and obesity. Guidelines were taken from NIH publications (Appendix I). The researcher organized and condensed the information to be published on a web page. Individuals with expertise in Hypertext Markup Language (HTML) format and publication and with expertise in JavaScript were paid to complete the construction of the tutorial. The researcher worked with these individuals in selecting backgrounds, pictures, and verifying the accuracy of transcription of the information. For the sake of researcher convenience, the web page was located within an institutional Internet account of one of the individuals during construction, testing, and actual implementation of the program. The web page was never posted to a general web site with unlimited access.

The design included a home page for the family practice site at which the data were being collected. The educational program was one of several options available from the home page. It was listed as a "Special Project", so was not immediately identified as a weight education program. Because access and public knowledge of the program were limited in this manner, the

program was not password protected.

Participants primarily accessed the site from a patient-accessible computer at the office. Two of the participants chose to access the site from their home, work or other setting of choice. Office personnel were available for instruction regarding web site access and computer use, for those who were not familiar with computer systems and Internet maneuvering. Participants in the experimental groups agreed, in their signing of the consent form, not to share the information with others in the study or to assist them with access to the Internet site. The participants in the study did not have scheduled encounters with others in the research study. This factor also prevented contamination of the control groups with information from the educational program. Following data collection, the program was made available to all patients who desired to use it.

The educational program consisted of four major areas: weight classification and determining if one has a weight problem, health risks related to overweight and obesity, NIH weight-loss guidelines, and approaches to weight loss. The four areas were each accessible from the initial web page. They were continuously sequenced in order to take participants through the entire program with minimal effort.

The program began with a very brief introduction and a listing of the four major content areas. Weight classification, the first section, dealt with the concept and meaning of body mass index (BMI). It outlined the NIH weight classifications based on BMI. The participant was then able to enter her own height and weight. The program calculated the participant's BMI, and classified the participant according to the NIH weight classifications. The last part of the section dealt with weight distribution and risks associated with central fat distributions.

Health risks related to overweight and obesity were addressed in the second section. Focus was on the physiologic problems and diseases that often occur as a result of excess weight, instead of on body image issues. Each of the major health problems were briefly defined. Complications and outcome of these problems were also briefly addressed. The health risks discussed were high blood pressure, high cholesterol and triglyceride levels, diabetes mellitus,

Pharmacotherapy addressed for whom the NIH recommends pharmacotherapy and the major options available currently: sibutramine (Meridia), phentermine (Adipex), and orlistat (Xenical). Surgery was recommended as a possible treatment, per guidelines, only for the most obese individuals.

The educational program originally allowed a narrative entry at the end of the program. Participants were offered the opportunity to express their feelings about the guidelines, make note of something that was new information and particularly helpful or unhelpful, and comment on the educational program, content, and approach. The evaluation could be e-mailed directly to the researcher by clicking a send button at the bottom of the evaluation page. This data provided feedback for the researcher and allowed for some informal qualitative analysis regarding the program. An alternate paper and pencil evaluation form was also available. The paper and pencil evaluation form was a more acceptable method of providing feedback for those individuals who were unfamiliar or uncomfortable with the computer. This form was used by most participants, instead of the computer form, due to an e-mail/programming problem that prevented transmission of the electronic information.

Data Collection

Following permission of the Human Subjects Review Committee and permission from the physician practicing in the office where the study was carried out, questionnaires were offered to all women who met the study criteria. Upon weigh-in at the office, the potential participant was classified as being normal weight, overweight or obese and was offered a chance to participate in the study. Those who expressed interest were given the next packet in sequence from the file of prepared packets for the appropriate weight category. Packets in the overweight and obese files had been randomly designated as experimental or control packets based on a random number chart. Packets for normal weight participants were not designated as experimental or control as they were surveyed only at baseline. Each packet contained a cover letter (Appendix C), consent form (Appendix D), and questionnaires -- the WPGQ and the SDS. Women choosing to participate

in the study completed the consent form and questionnaires. These forms were given to the medical assistant who then measured and recorded the participant's height, weight, and waist circumference. Following completion, the consent forms and the questionnaires were placed in the researcher's office. This private area prevented general access to research data. The participant's chart was flagged with a bright pink flag that would readily identify her a participant in the weight study. Follow-up WPGQ forms were dated and placed in the participant's chart for easy access on follow-up visits. Additionally, the participant was recorded in the research log. The date of initial visit and dates for subsequent visits were noted in the log. The cover letter and a copy of the consent form were given to the participant for her own reference.

Participants who received packets designated as experimental group received information about the educational program. They were encouraged to complete the interactive, Internet-based educational program during their current visit. If this was not possible, and they were unable to complete the program in some setting outside of the office, they were scheduled for a return visit, at which time they would complete the educational program. Most participants in the experimental group completed the educational program during their first visit. Participants who received packets designated as control group had no education regarding the CPGs during the study.

Two weeks following completion of the educational program, participants in the experimental group completed the posttest (the WPGQ two-week follow up). Control group participants completed the posttest approximately two weeks following the initial survey. The posttest contained the same questions as the original WPGQ, but had fewer questions due to deletion of demographic and weight history items. The completed questionnaires were placed in the researcher's office. The researcher recorded the completed follow-up in the log.

Participants were followed through office visits for a total of three months. Most participants were seen at the office for scheduled weigh-ins. At each follow-up visit, the participant was weighed and completed the WPGQ follow-up questionnaire. Completed

questionnaires were placed in the researcher's office for logging, filing, and to protect confidentiality. Participants who did not show up on the date noted in the log were called and encouraged to continue with the weight program and research. Several participants were unable to come to the office for a scheduled follow-up, so follow-up was completed by phone interview and self-report of weight. Four participants expressed a desire to withdraw from the study. All such requests were honored. These participants were encouraged to continue with routine or other scheduled health care and weight-management endeavors without concern about having withdrawn from the study.

Upon completion of or withdrawal from the study, flags and any remaining questionnaires were removed from participants' charts. Participants were able, at the time of enrollment in the study, to request study results by returning a separate card with their name and the address to which the study results should be mailed.

Treatment of the Data

Descriptive data analysis was carried out initially. Statistical assumptions were tested. Internal consistency of the WPGQ's importance and satisfaction items were estimated using Cronbach's alpha. Reliability of the SDS was determined. The intervention and control groups were examined for any differences at baseline using *t* tests or non-parametric tests as appropriate to the level of data. One-sample *t* tests, paired *t* tests, multivariate analysis of variance (MANOVA), multivariate analysis of covariance (MANCOVA), and repeated measures MANOVA were used for testing the hypotheses. Additional exploratory data analysis was used to answer other questions of interest.

Pilot Study

Prior to data collection a pilot study was carried out as planned in order to test the instruments, the educational program, and the data collection process within the office setting. Data for the pilot study were collected over a period of approximately two months. During this time, 14 participants were enrolled. Of these, two participants were normal weight, two were

assigned to the overweight control group, four to the obese control group, one to the overweight experimental group, and five to the obese experimental group.

Eighty-six percent were Caucasian/white, 79% were married, and 64% were employed outside of the home. The mean age of the participants was 39 years, with a range of 23 to 50 years. Comorbidities of hyperlipidemia, hypertension, and gall bladder problems were evident in this small group. Approximately 86% reported attempts at weight loss within the last year, with an average of 22.4 weeks spent in such endeavors. A variety of mechanisms for weight loss were reported, with prescription medications being listed as the most effective means by 41.7% of participants. The next most helpful means of weight loss reported by these women were fat and calorie reduction. All of the participants considered themselves to be overweight and in need of losing weight, including the normal weight participants. The mean satisfaction score for current weight was 1.57 on a scale of 0 to 10.

Overall, the instruments seemed to perform well. There was infrequent missing data, which may indicate that the questions were easy to understand and clear enough to answer. Analysis of the internal consistency of the importance and satisfaction items on the WPGQ revealed an alpha of .4437. This low score is likely a reflection of the small number of questions ($n = 9$), the conceptual divergence (three different concepts), and of the few participants ($n = 13$) on which the analysis was based. Means for the satisfaction and importance items reflect the trends noted in literature, which supports the validity of the questions.

The SDS revealed a mean score of 7.7 out of 13. This was higher than the mean of 5.67 reported in instrument testing by Reynolds (1982) and 5.39 reported by Ballard (1992). This may indicate that socially desirable responses are somewhat operative in the research. Reliability of the instrument was higher ($\alpha = .86$) than the reports by Reynolds (1982) and Ballard (1992), .76 and .70, respectively.

The nursing form had only measures of height, weight, and waist circumference. On at least one occasion during the pilot, the nursing staff forgot to do the actual measures of the

participant. In this case, the patient's report of height and weight was substituted, instead of discarding the data. Because most of the participants had already been weighed before filling out the questionnaires, they had a current weight measurement, and seemed to write that in on their questionnaire, making self-reported weight quite accurate.

The pilot study and analysis revealed that the researcher form really could be eliminated, as the only CPG that was different between participants was the six-month weight goal, which was calculated as a 10% reduction from current weight. The rest of the data to be recorded on the researcher data sheet were CPGs for initial exercise frequency and duration, ultimate exercise frequency and duration, number of calories per day for weight reduction, and the percentage of calories as fat. All of this data were identical for each participant. It seemed unnecessary to record this data for each participant. Instead the guideline for each of these items was entered into the statistical calculator for computation of individual discrepancy scores. BMI calculations were done using the Internet-based education program BMI calculator and were also entered directly into the statistical data files.

The educational program went quite well during the pilot study. Some participants needed guidance in computer use, but most were able to function somewhat independently. The average length of time spent on the program by the 3 educational group participants who completed the education program evaluation form was 15 minutes. Participants overall selected "strongly agree" in response to statements that the web-site was easy to access, the presentation was interesting, it was understandable, easy to use, a good way to learn, and contained helpful information. They noted in the comments on the form, that it was "very informative", that they were "interested to see personal BMI and amount of time needed to achieve first goal". No problems were noted in the section where comments were solicited regarding what they liked least about the program. During the times when the program was used in the office setting during the pilot study, there were no Internet access problems. It was, however, discovered that the Internet feedback form at the end of the educational program that could be sent by way of email

was working improperly from the office site. The alternate paper and pencil evaluation forms were used for the study.

The data collection process itself was the most difficult part of the pilot study, as the site for data collection, a family practice office, is busy and the research tended to be viewed by staff as a low priority. The log that was used to track patients during the pilot study was expanded and refined to make it more clear for the office personnel. Additionally, a need to mark the client office files so that office personnel could clearly identify what part of the research process is next for a given participant at any time, was identified. All participant's charts were flagged with a bright pink sticker, that was clearly identifiable and that was used only for the purposes of identifying research participants. Follow up forms were placed in the left side of the chart with due-dates noted on each form, so office staff would know when to have the participant complete each form. Finally, special inservice education programs were done at intervals to keep staff apprized of research procedures and progress. The researcher was very involved in recruiting participants to the study, placing their name and the due dates for follow-up on the participant tracking log and in tracking participants on a regular basis through phone call reminders of appointments.

Summary

This chapter described the research design. The setting for data collection, population and sample were also described. Standard procedures for protection of human subjects were utilized. The instruments were discussed, with information about the validity and reliability of instruments given where possible. The research was an experimental design with an educational intervention. This intervention was provided by way of the Internet. The content of the program was outlined, and descriptions of the major concepts in each of the four sections of the program were provided.

The chapter ended with a detailed description of the procedures for data collection in the clinical setting. Plans for data analysis were described. Finally, the pilot study was discussed. Plans for change based on the pilot study were outlined.

CHAPTER IV

ANALYSIS OF DATA

This chapter describes the sample, research findings, and statistical analysis of the data. Selected data and the related statistical analyses are presented for each hypothesis. Additional findings are also reported.

Description of the Sample

The study included a total of 92 normal weight, overweight and obese women, age 20 to 50 years. The mean age of the total group was 37.63 years ($SD = 8.45$). Participants classified as overweight or obese were randomized to experimental or control groups using a random number chart. Effort was made to obtain equal numbers of normal weight, overweight, and obese participants as well as equal numbers of control and experimental participants. The groups were of approximately equal size. The experimental and control groups were of equal size (control $n = 33$, experimental $n = 33$). The numbers of participants per group are summarized in Table 1.

Table 1

Groups and Frequencies of Participants (N = 92)

Group	Frequency	Percent
Normal weight	26	28
Overweight control	15	16
Overweight experimental	13	14
Obese control	18	20
Obese experimental	20	22

The participants were primarily Caucasian (91.3%). Most were married (69.6%), though a number were single (14.1%) or divorced (12%). The number of children ranged from one to seven, with two being the average. Participants were generally well educated. Nearly 80% had

advanced education ranging from some college courses to graduate degrees. Sixty-seven percent of participants worked full-time outside of the home. Annual household income ranged widely, from less than \$20,000 per year to greater than \$100,000 per year. The majority of participants had incomes in the \$20,001 to 80,000 per year range. Demographic data are summarized in Table 2.

Table 2

Demographic Characteristics of the Sample (N = 92)

Characteristic	Frequency	Percent
<u>Ethnicity</u>		
Caucasian	84	91.3
African-American/Black	4	4.3
Hispanic-American/Latino	1	1.1
Native American/American Indian	2	2.2
Other	1	1.1
<u>Marital Status</u>		
Single	13	14.1
Living with Significant Other	4	4.3
Married	64	69.6
Divorced	11	12.0
<u>Education</u>		
Grammar school	1	1.1
High school or GED	19	20.7
Some college courses	31	33.7
Vocational school	8	8.7

Table 2 continues next page

Table 2 Continued

Characteristic	Frequency	Percent
<u>Education (continued)</u>		
College degree	28	30.4
Graduate degree	5	5.4
<u>Employment</u>		
Unemployed	2	2.2
Homemaker	13	14.1
Employed outside home: part-time	8	8.7
Employed outside home: full-time	62	67.4
Retired	2	2.2
Other	5	5.4
<u>Annual Household Income</u>		
Less than \$20,000	8	8.8
\$20,001 to 40,000	20	22.0
\$40,001 to 60,000	25	27.5
\$60,001 to 80,000	24	26.4
\$80,001 to 100,000	4	4.4
Greater than \$100,000	10	11.0

Groups were analyzed for significant differences based on demographic factors in order to eliminate such differences as confounding variables. Use of Chi-Square analysis to examine group differences for race, marital status, education, employment, number of children, and annual household income, and use of and ANOVA to examine group differences for age revealed that there were no significant differences between either normal weight, overweight, and obese groups, or the control and experimental groups in these areas.

Table 3

Physical Measures and Weight History Information for Normal Weight, Overweight, and ObeseWomen

	Normal Weight	Overweight	Obese
Mean weight (pounds)	132.8	167.7	220.4
Mean height (inches)	64.5	64.9	64.6
Mean BMI	22.4	28.2	36.8
Mean waist circumference (inches)	28.7	34.5	41.0
Weight range since age 20 (pounds): low high	87 220	98 240	102 348
Mean pounds gained in past year	20.3	14.6	20.2
Mean pounds lost in past year	13.9	19.9	16.7
Mean number of weeks engaged in weight loss in past year	18.1	18.5	21.8
Satisfaction with current weight	5.88	1.54	0.97

Weight characteristics were examined for each group (Table 3). The normal weight group had an average weight of 132.82 pounds with an average height of 64.51 inches. BMI ranged from 18.88 to 24.69 ($\underline{M}$ = 22.36; $\underline{SD}$ = 1.54). Waist circumference ranged from 24 to 34 inches ($\underline{M}$ = 28.73; $\underline{SD}$ = 2.62). Normal weight participants reported non-pregnant weight ranges since age 20 from 87 pounds (lowest) to 220 pounds (highest). Seven of the normal weight participants reported either intentional or unintentional weight gain within the last year. Weight gain ranged from 7 to 35 pounds ($\underline{M}$ = 20.28). Weight loss in the past year was reported by 13 participants. Weight loss was as high as 30 pounds with 13.92 pounds being average. Three of the normal weight participants reported weight cycling. Seventy-six percent of normal weight participants reported weight-loss attempts within the past year. The number of weeks during which weight loss was attempted ranged from 0 to 52 weeks ($\underline{M}$ = 18.12; $\underline{SD}$ = 19.32). Overall, the normal weight participants reported moderate satisfaction with their current weight status. Satisfaction

was measured on a Likert-type scale ranging from 0, “not at all satisfied” with current weight, to 10, “very satisfied” with current weight. The range of satisfaction for normal weight participants covered the entire scale, with a mean of 5.88 ($SD = 3.05$).

Overweight participants had an average weight of 167.70 pounds and average height of 64.92 inches. BMI ranged from 25.33 to 29.86 ($M = 28.24$; $SD = 1.75$). Waist circumference ranged from 30 to 39 inches ($M = 34.48$; $SD = 2.42$). Overweight participants reported non-pregnant weight ranges since age 20, of 98 pounds (lowest) to 240 pounds (highest). Thirteen of the 28 overweight participants reported weight increases in the past year. Weight increases ranged from 1 to 30 pounds ($M = 14.62$). Nine of the group reported weight loss within the past year. Weight losses ranged from 2 to 43 pounds ($M = 19.89$). Seven reported weight cycling. Like the normal weight group, 75% of overweight participants reported weight-loss attempts in the past year. The number of weeks in which weight loss was attempted, ranged from 0 to 52 weeks ($M = 18.52$). Ratings of satisfaction with current weight, on the 0 to 10 scale, ranged from 0 to 6, with a mean of 1.54 ($SD = 1.77$).

The obese participants averaged 220.37 pounds in weight and 64.57 inches in height. BMI ranged from 30.38 to 49.43 ($M = 36.75$; $SD = 4.92$). Waist circumference ranged from 31 to 51.1 inches ($M = 40.95$; $SD = 4.62$). Obese participants reported ranges of non-pregnant weight since age 20, of 102 pounds (lowest) to 347.5 pounds (highest). Nineteen of the 38 obese participants reported weight increases in the past year. Weight increases ranged from 6.5 to 50 pounds ($M = 20.21$). Weight loss in the past year was reported by 15 of this group. Losses ranged from 6 to 60 pounds ($M = 16.73$). Fourteen of the participants in this group reported weight cycles in the past year. Seventy-nine percent of participants reported weight-loss attempts in the past year, a percent which was not significantly different from normal and overweight participants. The number of weeks engaged in weight loss ranged from none to 52 weeks ($M = 21.84$). Satisfaction with current weight was less than for both normal weight and overweight participants, averaging 0.97, on the 10-point Likert-type scale.

The reported incidence of comorbid disease in the sample was generally low. The number of comorbidities per individual within groups was generally less than one (normal weight group, $\underline{M} = 0.43$, $\underline{SD} = 0.66$; overweight/obese, $\underline{M} = 0.90$, $\underline{SD} = 0.96$). Analysis of group differences for number of comorbid conditions, using ANOVA, revealed a significant difference between normal weight and overweight/obese groups ($F(1, 84) = 4.66$, $p = .034$). The most frequently reported diseases were hypertension and high cholesterol or triglycerides. Smoking was reported by nearly one-fourth of participants. Chi-Square analysis of group differences, revealed significant differences between groups for high cholesterol and triglycerides. Difference in weight-related group incidence of hypertension approached significance. Table 4 shows the frequency and Chi-Square analysis for these conditions.

Table 4

Frequency of and Group Differences for Selected Comorbid Conditions

Condition	Group Incidence ($\underline{N} = 90$)		χ^2	p
	Normal	Overweight/ Obese		
Diabetes	0	2	0.787	.375
High Cholesterol or Triglycerides	1	14	3.999	.046
Stroke	0	0	n/a	n/a
Gall bladder disease	2	5	0.002	.961
Cancer	0	2	0.755	.385
Hypertension	1	15	3.775	.052
Heart disease (angina, MI)	0	0	n/a	n/a
Arthritis	2	2	1.030	.310
Sleep apnea	0	3	1.194	.275
Smoker	5	16	0.287	.592

Correlation of group frequencies related to comorbid conditions revealed one significant correlation. Hypertension was inversely correlated with groups ($r_s = -.211$, $p < .05$). In other

words, women in the obese or overweight groups were more likely to have high blood pressure than women in the normal weight group.

Data were collected regarding approaches taken to weight loss in the past. Participants generally acknowledged use of several of these approaches. Comparison of normal, overweight, and obese groups revealed no significant differences in approaches to managing or losing weight. The frequencies and Chi-Square analysis of group differences related to approaches to weight loss are reported in Table 5.

Table 5

Frequencies of Use and Group Differences for Weight-loss Approaches

Approach	Group Incidence ($N = 90$)			χ^2	p
	Normal ($n = 25$)	Overwt. ($n = 27$)	Obese ($n = 38$)		
Calorie Reduction	13	19	26	2.366	.306
Fat reduction	11	16	26	3.717	.156
Regular exercise	16	17	20	1.069	.586
Weight monitoring/Support groups	3	4	13	5.528	.063
Non-prescription herbs or medications	11	13	20	0.458	.795
Prescription medications	6	10	18	3.512	.173
Laxative, diuretics, or vomiting	2	0	3	2.364	.307
Other alternatives (eg. yoga, acupuncture)	2	2	5	.734	.693

Of these methods of weight loss, participants rated regular exercise and prescription medications as being equally the most helpful means of weight loss. Both of these were selected by 25.7% of participants. The second most helpful means of weight loss was fat reduction, selected by 26.5% of participants. This was followed closely by regular exercise (selected by 23.5% of participants) as again a very helpful means of weight reduction. Calorie reduction was

selected by 38.2% of participants as the third most helpful means of weight reduction.

In spite of having ranked regular exercise as a most helpful approach to weight loss, 48.4% of participants stated that their current activity level was sedentary, 46.2% claimed moderate regular exercise, and only 5.5% reported regular intense activity. Regular intense activity was reported primarily by those in the normal weight group (four of the five; the other being in the overweight group). Chi-Square analysis was carried out after collapsing data into two categories: sedentary and active (representing both moderate regular and regular intense activity). This reclassification revealed that 13.3% of normal weight, 12.2% of overweight, and 22.2% of obese participants were sedentary, and that 15.6%, 17.8%, and 18.9% of the respective groups were active. Chi-Square test of differences was not significant, ($\chi^2(2, N = 90) = 1.148, p > .05$), for activity differences between groups. Additional exploration in this area revealed that there was a significant correlation between having selected exercise as a helpful weight-loss approach and having higher levels of activity at the time of the survey ($r_s = .336, p = .001$).

All participants answered questions about whether or not they considered themselves overweight and whether or not they felt they needed to lose weight. As was anticipated, there were significant group differences for both of these questions. Within the normal weight group, some, but not all participants, answered "no" to the questions, indicating that they did not consider themselves overweight or in need of weight loss. Fourteen of 26 (53.8%) normal weight participants considered themselves overweight; 17 of those 26 (65.4%) stated they needed to lose weight. Within the overweight and obese groups, all participants (100%) acknowledged both being overweight and in need of weight loss. Chi-Square analysis regarding the consideration of oneself as overweight revealed a significant difference between the normal and overweight/obese groups ($\chi^2(2, N = 90) = 34.083, p = .000$). Chi-Square analysis for the question regarding need for weight loss was also significant for differences between these groups ($\chi^2(N = 91) = 24.97, p = .000$).

Many of the participants were enrolled in a weight loss program: 16.7% of normal weight,

22.2% of overweight, and 38.9% of obese participants. Chi-Square analysis of group differences revealed no significant differences in enrollment between groups ($\chi^2(2, N = 87) = 4.124, p > .05$). Weight-loss program enrollment in control and experimental groups, 32.3% and 31.3% respectively, also revealed no significant difference ($\chi^2(1, N = 63) = .007, p > .05$).

Instruments

Weight Perceptions and Goals Questionnaire

The Weight Perceptions and Goals Questionnaire (WPGQ) was designed to obtain demographic data, information regarding participants' weight history, information regarding the presence of weight-related comorbidities, and information related to weight-loss approaches. These data are reported in the description of the sample, previously reported in this chapter. Additionally, the WPGQ was used to obtain data regarding participants' weight and weight-loss goals in order to test the study hypotheses. Questions were asked regarding weight loss, exercise, and diet. The participants' answers were compared to the National Institutes of Health (NIH) CPGs. Additionally, questions were asked about motivation for weight loss, motivating factors, willingness to lose weight according to the CPGs' recommendations, and satisfaction or anticipated satisfaction with those guidelines.

Internal consistency of the WPGQ items overall is not expected due to the number of different levels of data being obtained, as well as the diversity of the various factors being tested. Internal consistency for the three factors that utilized Likert-type scales was checked. The first factor included the three importance items: the importance of feeling good physically to weight-loss decisions, the importance of feeling good emotionally to weight-loss decisions, and the importance of preventing illness to weight-loss decisions. Reliability (Cronbach's alpha) for this group of importance items was .70 ($N = 89$). The second factor included three items: satisfaction with current weight, motivation for weight loss, and willingness to attempt a 10% weight loss. Satisfaction with current weight was inversely related to the other two items with a standardized alpha of .98 ($N = 86$). The third factor included three satisfaction items that addressed:

participants' anticipated satisfaction with a 10% weight loss, their anticipated satisfaction with taking up to 6 months for that weight loss, and anticipated satisfaction with a six-month weight-maintenance period prior to additional weight-loss efforts, as recommended in the CPGs. The standardized alpha for these three items was .87 ($N = 83$).

Items also relating to the CPGs are those in which the participant (a) sets a six-month weight goal, (b) estimates the number of pounds per week of weight loss to achieve the six-month weight goal, (c) sets goals for exercise duration and frequency, both initially and long-range that would facilitate achievement of the six-month weight goal, and (d) sets dietary goals, calories per day and percent of calories at fat that would also be appropriate for goal achievement. This section of the WPGQ performed less well than other sections during the study. Missing data were extensive, particularly on items relating to calories and fat. Many participants placed question marks in the answer blanks for these items. Some asked the researcher what to write for an answer, stating they did not know how to respond. Based on these observations, it could be proposed that missing data were primarily related to lack of knowledge or confidence in how to respond to these items. Hypotheses 2 and 3 deal particularly with these data. These hypotheses examine the data from the overweight and obese groups at baseline and again at two weeks. Table 6 shows the pervasiveness of missing data for these groups.

Social Desirability Scale

The Marlowe-Crowne Social Desirability Scale (SDS) was used to account for socially desirable responses and the Hawthorne effect. Because of the sensitive nature and social implications of weight, it was thought that the participants might be particularly likely to respond in socially desirable manners.

The SDS demonstrated adequate internal consistency/reliability with this sample, similar to that reported by Ballard (1992) and Reynold (1982). Reynold reported reliability of .76 for this particular form; Ballard reported .70. The internal consistency of the instrument with this sample was .75.

For the purposes of this research, the SDS gives two important pieces of information. First, the degree of social desirability in the responses, and second, significant differences in the degree of socially desirable responses between groups. In order to determine the degree of social desirability in the responses, the 13-item SDS was scored, with a value of zero given to

Table 6

Extent of Missing Data on Selected WPGQ Items

Item	Combined groups (N = 66)		Overweight group (N = 28)		Obese group (N = 38)	
	Missing		Missing		Missing	
	<u>n</u>	%	<u>n</u>	%	<u>n</u>	%
Six-month weight goal	1	1.5	1	3.6	0	0
Pounds/week weight-loss goal	5	7.6	2	7.1	3	7.9
Initial exercise duration	6	9.1	1	3.6	5	13.2
Initial exercise frequency	6	9.1	1	3.6	5	13.2
Ultimate exercise duration	9	13.6	3	10.7	6	15.8
Ultimate exercise frequency	9	13.6	3	10.7	6	15.8
Calories/day goal	24	36.4	12	42.9	12	31.6
Percent of calories as fat	37	56.1	21	75.0	16	42.1

items not socially desirable and a value of one given to socially desirable responses. A total score was determined for the SDS by adding the values (i.e., responses) for each item. All of the groups (normal, overweight, and obese) demonstrated more tendency toward socially desirable response, than the tendencies reported by both Reynolds (1982) and Ballard (1992). Reynolds reported a mean of 5.67 socially desirable responses out of 13 questions during instrument testing; Ballard reported a mean of 5.39 for the same instrument. Normal weight participants in this study averaged 6.69 socially desirable responses out of 13 (51.48%); overweight participants averaged 6.67 socially desirable responses (51.28%); and obese participants averaged 7.45

socially desirable responses (57.29%). When ANOVA was performed to determine if these group differences related to social desirability were significant, no significant differences between groups were found ($F(2, 87) = 0.575, p > .05$). Specific effects of social desirability bias were not evident for WPGQ importance, motivation, and satisfaction factors. Correlations were less than 0.14 ($p > .05$)

Internet Education Evaluation

The Internet education program was evaluated with an education evaluation form (see Appendix J). Participants were able to optionally evaluate the Internet educational program by Likert-type ratings from 1, "strongly disagree" to 5, "strongly agree". Items included in the evaluation were: (a) easy access to web site, (b) interesting presentation, (c) understandable [program], (d) easy to use, (e) a good way to learn, (f) helpful information, and (g) time consuming. Participants were asked to document the length of time spent on the program. Additional narrative comments regarding what was liked most and least about the program were also solicited.

Ten (33%) of the participants completed the evaluation forms. Overall, participants rated the program very satisfactorily, with scores of 4 or 5. The means for items one, three, four, five, and six were all 4.9 ($SD = .32$). Item number two had a mean of 4.7 ($SD = .48$). Item seven had a mean of 2.2 ($SD = 1.14$) indicating that participants did not consider the program time consuming. The length of time spent on the program ranged from 10 to 20 minutes ($M = 14, SD = 4.59$).

Narrative comments were positive. Participants expressed satisfaction with the information received, the calculations that were interactive and personalized, the health risk information, the short length of time required to complete the learning activities, the simplicity and ease of use, and new information on time for weight loss. Most participants had no comments in response to what they liked least about the program. One participant listed time as a factor that was least liked about the program, and one commented on the "calorie reduction chart". Probably the caloric need for basal metabolism were not clear to that particular participant. The take-home

information/work-sheet that accompanied the educational program was not evaluated.

Findings

Hypothesis 1

Hypothesis 1 states: At baseline, normal weight, overweight, and obese women will differ in their satisfaction with current weight and on the discrepancy score for the six-month weight goal. Analysis of the hypothesis required that the three groups within the sample be examined on the two variables: (a) satisfaction with current weight and (b) the discrepancy score for six-month weight goal. Participants rated their satisfaction with current weight on the WPGQ using a Likert-type scale with ranges from 0, "not at all satisfied" with current weight, to 10, "very satisfied" with current weight. Participants also indicated, on the WPGQ, what they would like to weigh in six months. This six-month weight goal was compared to the CPGs' recommendation for weight loss. For individuals of normal weight, no weight loss was indicated according to CPGs, therefore the individual's current weight was used as the CPGs' recommended weight goal. For individuals in overweight and obese categories, the CPGs' recommendation of a ten percent loss in up to six months was applied. Therefore, the CPGs' recommended weight goal was calculated as the participant's weight minus ten percent. The discrepancy score for the six-month weight goal was calculated by subtracting the calculated CPGs' recommended weight goal from the participant's stated six-month weight goal. The resulting possibilities would be a discrepancy score of zero, indicating the participant's six-month weight goal was in perfect agreement with the CPGs' recommended weight goal; a positive number, indicating that the participant's six-month weight goal was set higher than the CPGs' recommended weight goal and that the participant had a goal of less than ten percent weight loss within the six-month time period; or, a negative number, indicating that the participant's six-month weight goal was set lower than the CPGs' recommended weight goal and that the participant had a goal of losing more than ten percent of her weight during that time. The greater the positive or negative number, the greater the amount of discrepancy that was evident between the participant's goal and the CPGs'.

Eighty-eight participants were included in the analysis: 26 normal weight, 27 overweight, and 35 obese participants. Prior to analysis, assumptions of MANOVA were checked. Significant departures from normality were evident for overweight and obese groups for satisfaction with current weight. Homogeneity of variance was not evident, probably secondary to non-normality of some of the variables. Elimination of outliers failed to correct these problems. Stevens (1996) notes that MANOVA is robust to violations of normal distribution with respect to Type I error. Hair, Anderson, Tatham, and Black (1992) state that violation of the assumption of homogeneity of variance “has minimal impact if the groups are of approximately equal size (if the largest group size divided by smallest group size is less than 1.5)” (p. 159). This is the case with the sample size for this hypothesis. Polit (1996) additionally states that Pillai’s criterion is most likely to be correct in situations of violation of assumptions such as this. Therefore, the more conservative and more robust Pillai’s Trace was used for the multivariate test statistic.

Findings revealed the greatest level of satisfaction with weight in normal weight participants. Overweight participants were less satisfied with their weight, and obese participants were the least satisfied. Normal weight participants had the least discrepancy from CPGs regarding six-month weight goals. Overweight participants were more discrepant, and obese the most discrepant. All groups set weight goals that exceeded the ten percent loss recommended in the CPGs. Means and standard deviations for the groups are presented in Table 7.

The MANOVA revealed a significant difference between groups regarding satisfaction with current weight and discrepancy score for six-month weight goal ($Pillai(4, 170) = 18.81, p < .001$). The degree of significance is great enough, additionally, to protect from violations of assumptions. The multivariate test results are presented in Table 8.

Follow-up univariate ANOVAs indicated that both satisfaction with current weight ($F(2, 85) = 40.284, p < .001$) and discrepancy score for six-month weight goal ($F(2, 85) = 12.239, p < .001$) were significantly different between groups. Post-hoc analysis of group differences for satisfaction with current weight showed that normal weight participants were significantly different

Table 7

Means and Standard Deviations by Group for Satisfaction with Current Weight and Discrepancy Scores for Six-month Weight Goals

	<u>M</u>	<u>SD</u>
Satisfaction with current weight		
Normal weight group	5.8846	3.0506
Overweight group	1.4444	1.7394
Obese group	0.9429	1.9088
Discrepancy score for six-month weight goals		
Normal weight group	- 9.6154	8.6247
Overweight group	-13.2222	8.8474
Obese group	-24.7143	16.7829

from both overweight participants ($p < .001$) and obese participants ($p < .001$). There was not a significant difference in satisfaction between overweight and obese groups of participants.

Discrepancy scores for six-month weight goal were significantly different between normal weight and obese participants ($p < .001$) and between overweight and obese participants ($p < .01$), but were not significantly different between normal weight and overweight participants.

Table 8

Multivariate Test of Significance for Satisfaction with Current Weight and Discrepancy Scores for Six-month Weight Goals by Group

Effect	Value	<u>F</u>	Hypothesis df	Error df	<u>p</u>	Observed Power ^a
Groups: Normal, Overweight, Obese						
Pillai's Trace	.614	18.810	4.000	170.000	.000	1.000

a Computed using alpha = .05

Hypothesis 2

Hypothesis 2 states: At baseline, the goals of overweight and obese women will be greater than the CPGs' recommendations for : (a) weekly weight loss, (b) six-month weight goal, (c) exercise duration, (d) exercise frequency, (e) daily calories for weight loss, and (f) percent calories as fat. The hypothesis implies that the goals of these women will be compared to CPGs' recommendations in order to determine if the differences are significant. This was done using one-sample *t* tests for seven of the variables and a paired *t* test for the remaining variable (six-month weight goal). The one-sample *t* test is used to compare a sample mean to a standard such as the CPGs. The researcher enters the test value to which the sample mean is to be compared (SPSS, 1999). In this case, the test value was determined by the CPGs. The paired *t* test was necessary to compare individual six-month weight goals with individualized CPGs-based six-month weight recommendations. Findings are presented under the subheading Hypothesis 2a.

Originally, Hypothesis 2 had been intended to test whether or not there are differences in weight-loss goal setting and variance of these goals from CPGs between the groups of overweight and obese women. This might have been better stated as a separate hypothesis such as: At baseline, overweight and obese women will demonstrate differences in discrepancy scores for: (a) weekly weight loss, (b) six-month weight loss, (c) exercise duration, (d) exercise frequency, (e) daily calories for weight loss, and (f) percent calories as fat. This hypothesis is presented here as a sub-hypothesis of Hypothesis 2 and is labeled Hypothesis 2b. Analysis was done using MANOVA for six of the eight variables and independent-samples *t* tests for the other two. The two variables that were analyzed separately were the diet variables: anticipated calories per day to achieve the six-month weight goal, and the percent of calories as fat. As noted in the section on instruments, both of these variables had large amounts of missing data. Their inclusion in the multivariate analysis caused elimination of a number of participants, making group sizes too small for statistical analysis.

Hypothesis 2a

One-sample *t* tests were run for seven of the variables in the hypothesis in order to determine if the goals for pounds per week weight loss, initial exercise frequency and duration, ultimate exercise frequency and duration, calories per day, and percent of calories as fat, as set by overweight and obese women, were statistically significantly different from the recommendations of the CPGs. The six-month weight goal was analyzed using a paired *t* test, so that each participant's weight goal could be compared to an individualized weight goal based on CPGs. Bonferroni correction for multiple tests was used to prevent type I error. The correction was made by multiplying each probability score (1-tailed) by the number of tests executed (eight) (SPSS, 1999). There were significant differences from CPGs for seven of the eight variables (Table 9 and 10).

The CPGs recommend one to two pounds per week of weight loss. The goals of overweight and obese women were greater than this, averaging 2.69 pounds per week.

The CPGs recommend that exercise be a part of both weight-loss and weight-maintenance programs. Exercise frequency should start at three days per week, with an ultimate goal of daily exercise. Exercise duration should begin at 10 minutes with the ultimate goal of 30 to 45 minutes of exercise per day. Participants were asked about initial and ultimate exercise and about frequency and duration. The goals of overweight and obese women were greater than the CPGs for initial exercise frequency ($M = 3.63$ days/week) and for initial exercise duration ($M = 28.75$ minutes). Participants set goals that were significantly lower than the CPGs' recommendations for ultimate exercise frequency ($M = 4.36$ days/week). The mean ultimate exercise duration goal was 41.18 minutes for these participants. This goal was not significantly different from the upper range of CPGs' recommendations (45 minutes); it was, however, significantly greater than the lower range of CPGs' recommendations (30 minutes).

Diet goals recommended in the CPGs are 1000-1200 calories per day as a low-calorie weight-loss diet appropriate for women, with limitation of fat to approximately 30% of the caloric

intake. Women who participated in this study set their calorie goals higher than the CPGs' recommendations, averaging 1404.76 calories per day as a goal. The goal relating to the percent of calories as fat varied widely among the participants, but was not significantly greater than the recommendations:

Table 9

One-sample *t* test Statistics for Difference from CPGs' Recommendations of Overweight and Obese Women's Weight-loss, Exercise, and Diet Goals

Goal	<u>N</u>	<u>M</u>	<u>SD</u>	<u>t</u>	df	<u>p</u> 2- tailed	test value (CPG)	mean differ- ence	<u>p</u> 1- tailed	Bonf- erroni <u>p</u>
Pounds/ wk weight loss	61	2.70	1.87	2.91	60	.005	2 lb/ wk	.70	.0025	0.02
Initial exercise frequency	60	3.63	1.43	3.38	59	.001	3 d/ wk	.63	.0005	0.004
Initial exercise duration	60	28.75	16.89	8.60	59	.000	10 min	18.75	.000	0.004
Ultimate exercise frequency	57	4.36	1.66	-12.05	56	.000	7 d/ wk	-2.64	.000	0.004
Ultimate exercise duration	57	41.18	20.25	4.17	56	.000	30 min	11.18	.000	0.004
				-1.42	56	.160	45 min	-3.82	.08	ns
Calories/ day	42	1404.7	294.2	4.51	41	.000	1200 cal/d	204.76	.000	0.004
Percent of calories as fat	29	27.59	14.61	-0.89	28	.381	30%	-2.41	.19	ns

The six-month weight goal was compared to CPGs' recommendation using a paired-samples *t* test. The participant's stated goal was paired with the CPGs' recommendation which was different for each individual. Participants, overall, set goals that were approximately 20

pounds greater than the CPGs' recommendation. Statistical values are found in Table 10.

Table 10

Paired *t* test Statistics for Difference from CPGs' Recommendations of Overweight and Obese Women's Six-month Weight-loss Goals (N=65)

Goal	<u>M</u>	<u>SD</u>	<u>t</u>	df	<u>p</u> 2- tailed	test value	mean differ- ence	<u>p</u> 1- tailed	Bonf- erroni <u>p</u>
Six-month weight goal / CPGs' six-month weight recommendation	159.17	32.86	-10.95	64	.000	n/a	-19.839	.000	0.004
	179.02	36.51							

Hypothesis 2b

This hypothesis examines differences between overweight and obese women in respect to discrepancy scores for weight-loss, exercise, and diet goals. MANOVA was carried for six of the eight variables of the hypothesis, the weight-loss and exercise goals. Complete data were analyzed for 21 overweight and 28 obese participants. Prior to analysis, assumptions were tested. Shapiro-Wilk test of normality revealed that departure from normality was significant for several of the variables. Examination of data revealed several extreme outliers which were then eliminated from analysis with improvement in normality. Homogeneity of variance was also not initially evident, secondary to non-normality. This was corrected with the adjustments for normality (Stevens, 1996).

The multivariate descriptive analysis revealed differences in the means for each of the six variables between the groups of overweight and obese women. Overweight women selected six-month weight goals that were less discrepant from CPGs than obese women. Goals for pounds per week weight loss, initial exercise duration and frequency, and ultimate exercise duration were slightly more discrepant from the CPGs for overweight women, as compared to obese women.

Discrepancy score means and standard deviations for each of the variables by group are listed in Table 11.

Table 11

Descriptive Statistics for Weight-loss and Exercise Goals for Overweight and Obese Women (N = 49)

Item	Mean	SD
Discrepancy score: Six-month weight goal		
Overweight	-13.0476	9.1473
Obese	-21.1429	12.8314
Discrepancy score: Pounds per week weight loss		
Overweight	1.0476	.9341
Obese	0.8214	1.0089
Discrepancy score: Initial exercise duration		
Overweight	19.2857	12.6773
Obese	13.7500	10.2402
Discrepancy score: Initial exercise frequency		
Overweight	0.7381	1.5134
Obese	0.4286	1.3032
Discrepancy score: Ultimate exercise duration		
Overweight	12.8571	17.5051
Obese	6.1607	17.6315
Discrepancy score: Ultimate exercise frequency		
Overweight	-2.6190	1.6576
Obese	-2.6964	1.7445

Table 12

Multivariate Test Statistics for Weight-loss and Exercise Discrepancy Scores for Overweight and Obese Women (N = 49)

Effect	Value	F	Hypothesis df	Error df	p	Power ^a
Wilks' Lambda	.760	2.210	6.00	42.00	.061	.715

a Computed using alpha = .05

Multivariate analysis of the variables revealed that there was not a significant difference in discrepancy scores for weight-loss and exercise variables between overweight and obese women

($\Lambda(6, 42) = 2.21, p > .05$). Univariate analysis of the variables revealed that the six-month weight goal was the only variable to have a significant difference between groups ($F(1, 47) = 6.04, p = .018$). (See Table 12).

The remaining two variables with lower response rates, calorie goal for weight loss and percent of calories as fat, were analyzed using independent-samples t tests. See Table 13. Neither of these tests showed a significant difference between overweight and obese women's diet goals

Table 13

Descriptive Data and t tests for Diet-related Discrepancy Scores for Overweight and Obese

Women

Item	<u>N</u>	Mean	<u>SD</u>	<u>t</u>	df	<u>p</u> (2-tailed)
Discrepancy score: calories/day						
Overweight	16	134.375	237.149	-1.071	39	.291
Obese	25	234.000	319.414			
Discrepancy score: % of calories as fat						
Overweight	7	.000	23.094	.506	26	.617
Obese	21	-3.333	11.655			

The hypothesis that there are differences in discrepancy scores for weight loss, exercise, and diet for overweight and obese women was not supported. In this sample, overweight and obese women were similar in how they set goals.

Hypothesis 3

Hypothesis 3 states: Two weeks following intervention, women who participate in an Internet-based educational program will have lower discrepancy scores, compared to women who do not participate, on goals for (a) exercise duration, (b) exercise frequency, (c) daily calories, and (d) percent of calories as fat. The hypothesis was analyzed using MANCOVA and MANOVA.

Because of the amount of missing data for diet-related questions, the discrepancy scores

for exercise variables were analyzed separately using MANCOVA. Discrepancy scores for initial exercise frequency and duration and ultimate exercise frequency and duration at the two-week retest were analyzed for the control and experimental groups. To control for initial exercise frequency and duration, the baseline discrepancy scores were used as covariates. Baseline discrepancy scores for ultimate exercise frequency and duration were not used as covariates due to their high correlation with the scores for initial exercise frequency and duration. Covariates that are not strongly correlated limit error variance better than strongly correlated covariates that weaken analysis of covariance (Stevens, 1996); thus, the use of a covariate is appropriate when there is a significant relationship between that covariate and the dependent variable but not between that covariate and another covariate.

The groups had approximately equal numbers for this analysis. The control group had 23 participants; the experimental group had 22. Test assumptions of independent observations, normality, homogeneity of variance, linearity between dependent variables and covariates, homogeneity of regression hyperplanes, and measurement of the covariate without error for MANCOVA were examined. There was evidence of non-normality of distribution for some of the dependent variables, a situation against which multivariate analysis is robust. All other assumptions were met. Results of the analysis for this part of the hypothesis showed that there were no significant differences between the control and experimental groups for exercise goal discrepancy scores ($F(4, 38) = .962, p > .05$). Computed power is low, supporting cautious interpretation of these findings. The results of the MANCOVA are found in Table 14.

Table 14

Multivariate Test Statistics for Exercise Goals of Control and Experimental Groups (N = 45)

Effect	Value	F	Hypothesis df	Error df	p	Power ^a
Wilks' Lambda	.908	.962	4.00	38.00	.439	.275

a Computed using alpha = .05

The second part of the hypothesis dealing with diet was analyzed separately from exercise due to large amounts of missing data for diet items. MANOVA was used in the analysis of these variables instead of MANCOVA because pretest scores for calories per day for reaching the six-month weight goal and pretest scores for percent of calories as fat were both poorly correlated with posttest scores for these variables and likely had measurement error (Stevens, 1996). The MANOVA was carried out on a sample of 27, with 12 in the control group and 15 in the experimental group. Discrepancy scores for anticipated calories per day for reaching the six-month weight goal and for the percent of calories as fat at the two-week retest were the dependent variables. Test assumptions of independence and homogeneity of variance were met. Analysis revealed that there was not a significant difference between the control and experimental groups for these diet-related goals ($F(2, 24) = 2.391, p > .05$). Table 15 shows the multivariate analysis for this part of the hypothesis.

Table 15

Multivariate Test Statistics for Diet Goals of Control and Experimental Groups (N = 25)

Effect	Value	F	Hypothesis df	Error df	p	Power ^a
Wilks' Lambda	.834	2.391	2.00	24.00	.113	.435

a Computed using alpha = .05

The hypothesis that the educational intervention would make a difference in discrepancy scores for goals related to exercise and diet was not supported. Women who participated in the educational program did not have lower discrepancy scores than women who did not participate.

Hypothesis 4

Hypothesis 4 states that two weeks following the intervention, women who participate in an Internet-based educational program will have more positive responses, compared to women who do not participate, on questions regarding: (a) importance of health factors in weight-loss decisions, (b) motivation for weight loss, and (c) satisfaction with CPGs' weight-loss recommendations. This hypothesis was analyzed using MANCOVA.

Table 16

Means and Standard Deviations for Importance, Motivation, and Satisfaction Items of WPGQ at Two-week Retest (N = 46)

Item	Mean	<u>SD</u>
Importance of feeling good physically in weight-loss decisions		
Control	8.667	1.713
Experimental	8.760	1.422
Importance of feeling good emotionally in weight-loss decisions		
Control	9.191	1.167
Experimental	9.160	0.943
Importance of preventing illness in weight-loss decisions		
Control	9.095	1.546
Experimental	9.000	1.354
Satisfaction with current weight		
Control	1.454	1.214
Experimental	0.900	0.994
Motivation for weight loss		
Control	8.000	2.550
Experimental	7.640	2.196
Willingness to lose 10% of weight in six months		
Control	8.905	1.610
Experimental	8.720	1.768
Satisfaction with 10% weight loss		
Control	6.571	2.379
Experimental	6.600	2.814
Satisfaction with six months for 10% weight loss		
Control	6.429	2.461
Experimental	5.440	3.056
Satisfaction with maintaining 10% loss for six months before losing more weight		
Control	5.619	3.008
Experimental	5.000	3.109

Forty-six participants were included in the analysis of this hypothesis. Groups were basically equal in size: control ($n = 21$), experimental ($n = 25$). Nine variables (three factors of three Likert-type items each) from the WPGQ 2 week posttest were analyzed with three pretest

variables used as covariates. Covariates used were, importance of preventing illness in weight-loss decisions, willingness to lose 10% of weight in six months, and anticipated satisfaction with 10% weight loss, as these were the pretest variables with the highest covariate-dependent variable correlation from each of the three factors (Stevens, 1996). Assumptions were tested with evidence of some univariate non-normality, but with all other multivariate and covariance assumptions met. Descriptive statistics for the variables are found in Table 16.

Pillai's Trace, being most robust, was used as the multivariate statistic. Results of the multivariate test revealed that there were no significant differences between the control and experimental groups on questions regarding: (a) importance of health factors in weight-loss decisions, (b) motivation for weight loss, and (c) satisfaction with CPGs' weight-loss recommendations. Results are presented in Table 17.

For interest, the nine importance, satisfaction, and motivation items were combined to make three subscale scores respectively. Analysis was done using MANCOVA with the three subscale scores as dependent variables and corresponding pretest subscale scores as covariates. Multivariate assumptions were met. There were no differences in the outcomes as compared to analysis using nine individual item scores; the hypothesis was not supported (*Pillai* ($F(3,34) = .171, p = .915$). Power was not improved with this subscale analysis (0.078).

Table 17

Multivariate Test Statistics for Importance of Health Factors in Weight-loss Decisions, Motivation for Weight Loss, and Satisfaction with CPGs' Weight-loss Recommendations (N = 46)

Effect	Value	<i>F</i>	Hypothesis df	Error df	<i>p</i>	Power ^a
Pillai's Trace	.110	.413	9.00	30.00	.918	.167

a Computed using alpha = .05

Hypothesis 5

Hypothesis 5 states that at 2, 4, 8, and 12 weeks following intervention, women who participate in an Internet-based educational program will have more positive results, compared to

women who do not participate, in the areas of (a) weight satisfaction, (b) pounds of weight loss, and (c) discrepancy score for six-month weight loss. This hypothesis was analyzed with repeated measures MANOVA instead of the repeated measures MANCOVA that was originally planned. With the use of the repeated measures, participants serve as their own controls, powerfully reducing error variance and eliminating the need for a covariate (Stevens, 1996).

The analysis was done by creating three new variables (a weight variable for pounds lost, a weight satisfaction variable, and a six-month weight goal variable), each with measures at five different times (beginning of the study and at 2, 4, 8, and 12 weeks). The control and experimental groups were compared. Although 30 participants completed all repeated measures of the study, only 20 of the participants had sufficient data for inclusion in the analysis: 11 from the control group and 9 from the experimental group. Fortunately, repeated measures design is very powerful even with small numbers. Estimation of sample size based on power of .80, $\alpha = .05$, five repeated measures, average correlation among the repeated measures of .50, and an effect size of .57 indicated that 13 participants would be sufficient for statistical analysis (Stevens, 1996). The current sample size approximates this number. The assumption of independence of observations was met. Multivariate normality was analyzed by univariate normality tests (Kolmogorov-Smirnov, and Shapiro-Wilk) and by bivariate scatterplots, revealing some variation from normality. Correction for this was made by elimination of outliers and use of the Pillai's test statistic. Sphericity assumptions were not required due to use of multivariate, as opposed to univariate, analysis.

The multivariate analysis revealed that there was not a significant difference between the control and experimental groups on the variables of weight loss, weight satisfaction, and discrepancy scores for six-month weight goal over time ($\Lambda(3, 16) = .899, p > .05$). Within subjects effects were evident, however, indicating that there was significance ($\Lambda(12, 185.5) = 3.186, p \leq .000$) for changes over time within the groups (Table 18). Univariate tests indicated that the within group changes were significant for both weight/weight loss ($F = 6.63, p = .005$) and

satisfaction with weight ($F = 5.966$, $p = .001$). Pairwise comparisons indicated that initial weight was significantly different from all other weight measures. Weight at 2 weeks and 4 weeks was significantly different from weight at 12 weeks, but was not significantly different from the weight at 8 weeks. Weight at 8 weeks did not differ significantly from weight at 12 weeks. Weight satisfaction at the initial measure was significantly different from the third (4-week), fourth (8-week), and fifth (12-week) measures. The second measure (2-week) was significantly different from only the fifth measure. Third and fourth measures of weight satisfaction did not show significant change at 12-weeks. There were no significant changes within groups for the discrepancy score for six-month weight-loss goal.

The hypothesis that the educational intervention would make a difference in actual weight-loss patterns, in satisfaction with current weight, and in the discrepancy scores for six-month weight loss goals over a three-month period was not supported. Women who participated in the educational program did not have significantly different weight-loss patterns, greater satisfaction, or lower discrepancy scores over time as compared to women who did not participate.

Table 18

Between-Subjects and Within-Subjects Repeated Measures MANOVA Results for Weight Loss, Weight Satisfaction, and Discrepancy Score for Six-month Weight Loss (n = 20)

Effect	Value	F	Hypothesis df	Error df	p	Power ^a
Between Subjects						
Pillai's Trace	.144	0.899	3.00	16.00	.463	.203
Within Subjects						
TIME						
Pillai's Trace	.403	2.796	12.00	216.00	.001	.984

a Computed using alpha = .05

Additional Findings

The outcome variables of weight loss and satisfaction with current weight were analyzed using linear regression in order to determine what variables might be the best predictors. Weight

loss at 12 weeks was used for the dependent variable in the first analysis. Independent variables were two-week weight loss, current activity level, and the number of weeks in the last year in which weight loss was attempted. A significant model was obtained ($F(3, 22) = 4.631, p = .012$), with adjusted $R^2 = .303$. Weight loss at two weeks, however, was the only significant predictor of the 12-week weight loss ($t = 2.511, p = .01$).

Satisfaction with current weight was analyzed as a separate model, with waist circumference, marital status, number of children, and age as independent variables. Again a significant model was created ($F(4, 72) = 16.075, p = .000$), with adjusted $R^2 = .442$. In this model, age was a significant predictor variable ($t = -2.594, p = .011$) being inversely correlated with weight satisfaction ($r = -.413, p < .000$). Waist circumference was another significant predictor variable ($t = -6.235, p < .000$), again being inversely correlated with weight satisfaction ($r = -.625, p < .000$).

Satisfaction with weight was moderately and inversely related to motivation for weight loss ($r = -.35, p = .001$). Motivation for weight loss was not, however, significantly correlated with weight loss at 12 weeks ($r = -.061, p > .05$).

Summary

This chapter has described the characteristics of the study sample. Sample size was adequate. Demographic data revealed a fairly homogeneous group without significant differences between subgroups. The weight-related subgroups within this sample that were described and analyzed included normal weight, overweight, and obese participants. The latter two were assigned to experimental and control groups.

The instruments used for data collection were analyzed, revealing good internal consistency. Missing data represented a problem with some sections of the WPGQ. Diet-related questions that required some knowledge and confidence in goal-setting presented the greatest problems. Some social desirability bias was evident equally for all groups within the sample, based on analysis of the SDS.

Five hypotheses were analyzed. Hypothesis 2 was divided into two parts (2a and 2b) for examination. Hypothesis 1 was supported, indicating that there were significant differences between normal weight, overweight, and obese groups regarding satisfaction with current weight and the discrepancy score for six-month weight goal. Hypothesis 2a was also supported. Overall, the goals set by overweight and obese women were significantly discrepant from CPGs. The only goals that were not significantly discrepant from the CPGs were those set for ultimate exercise duration (45 minutes) and for the percent of calories as fat. Analysis of hypothesis 2b revealed that overweight and obese women were not significantly different in their goal setting related to weight loss. Hypothesis 3, which examined the effects of the Internet-based educational program on overweight and obese women's goal setting, was not supported. The educational program did not seem to make a difference in what women set as goals for exercise frequency and duration or for daily calorie intake or percent of calories as fat. Hypothesis 4 tested change in perceptions as a result of the educational intervention. The analysis revealed no significant change in perceptions for importance of health factors in weight-loss decisions, for motivation for weight loss, or for satisfaction with CPGs' weight-loss recommendations for the group that received the education. Hypothesis 5 was analyzed using repeated measures that compared actual weight outcome, weight satisfaction, and six-month weight goal setting for experimental and control groups. Participants were followed for a period of three months, with measures at baseline, 2, 4, 8 and 12 weeks. Both experimental and control groups demonstrated linear patterns of weight loss and increase in weight satisfaction. There were not differences in six-month weight goal setting over time for either group, and there were no between group differences for any of the variables. The data did not support that the educational program fostered different weight-loss patterns, increased weight satisfaction, or differences in six-month weight goal setting for those who participated.

CHAPTER V

SUMMARY OF THE STUDY

This chapter presents a summary of the study findings. The results for each of the hypotheses are discussed and possible conclusions drawn from the data. Attention is given to the significance of the findings for women, healthcare providers, and society in general. Finally, recommendations for future research are made.

Summary

This was an experimental study involving use of pretest-posttest and repeated measures to determine women's goals and perspectives regarding their weight and weight loss, and the discrepancy between women's goals regarding their weight and weight loss and the goals recommended in the Clinical Practice Guidelines (CPGs). The research focused on the effects of an Internet-based client education program addressing weight-loss, exercise, and diet recommendations of the National Institutes of Health (NIH) CPGs on the weight-loss goals and approaches, weight satisfaction, and actual weight loss of women. The following questions guided the study: (a) Prior to program participation, were there differences for normal weight, overweight and obese women in weight satisfaction and in discrepancy scores for six-month weight goals? (b) Did women who participated in the educational program show: (i) less discrepancy between their goals and CPGs' goals, (ii) greater satisfaction with CPGs' weight-loss goals, (iii) greater motivation for weight loss, (iv) greater valuing of health-related factors in setting weight-loss goals than women not participating in the intervention?, and (c) Were weight-loss patterns over a three-month period different for women who participated in the educational program from those who did not participate? Five hypotheses were derived from these questions.

Review of literature revealed that the problems of overweight and obesity are growing in the United States. Overweight and obesity are accompanied by increased morbidity and

mortality. Additionally, there are numerous emotional and social issues that accompany overweight and obesity, particularly for women. King's (1982) concepts of interactive systems, body image, perceptions, communication, and decision making provide a framework for examining the NIH guidelines for clinical practice and the recommendations for evaluation and intervention with individuals who are overweight and obese. The literature review revealed a lack of information about the practical applicability of these guidelines to women in clinical settings.

The setting of the study was a family practice physician's office in a metropolitan area of Texas. Weight-loss assistance and supervision represented services offered from this office. Ninety-two women agreed to participate in the study. These women were assigned to normal, overweight, and obese groups based on BMI and were then randomized to control or experimental groups.

Participants randomized to the experimental group received education about the NIH CPGs' recommendations for weight loss. The education was delivered at the office, usually at the time of enrollment in the study, and was delivered by way of the Internet. The Internet-based educational program consisted of text and interactive program components addressing weight classification, health risks associated with overweight and obesity, NIH recommendations for weight loss, and approaches to weight loss. A one-page summary of the program's educational points, with places for personal notations and information from the interactive parts of the program, was given to all participants who completed the education (Appendix L). The control group received standard care and no Internet education about NIH CPGs' recommendations. They were, however, offered the opportunity for Internet education after the study was completed.

Two primary data collection tools were used. The Weight Perceptions and Goals Questionnaire (WPGQ) was developed for this study and used to collect demographic data, weight and weight-loss history, weight-loss goals, and weight-related perceptions. The Marlowe-Crowne Social Desirability Scale (SDS) was used to evaluate the degree of social desirability in participants' responses. An evaluation tool to gather data about the effectiveness of the Internet

education was also completed by some participants ($n = 10$).

Data were analyzed and hypotheses evaluated. The first hypothesis stated that at baseline there would be a difference between normal weight, overweight, and obese women's satisfactions with their current weight and on the discrepancy score for their six-month weight goal. This hypothesis was supported by the data. The second hypothesis stating that overweight and obese women's weight-loss goals were greater than corresponding recommendations from the CPGs was also supported, with the exception of the percent of calories from fat, and ultimate exercise duration at the 45-minute level. Participant's responses on these two items were not significantly greater than the CPGs' recommendations. There was not a significant difference between overweight and obese women in regard to exercise and diet plans and goals.

The third, fourth, and fifth hypotheses dealt with differences between the experimental and control groups on various weight-loss goals and perceptions and on specific weight outcomes over time. The results did not demonstrate significant differences between the experimental and control groups.

Discussion of Findings

In this section, the results of the study will be discussed. Findings related to the sample will be reviewed, instrument performance analyzed, and each hypothesis discussed. Additional findings will also be discussed.

Sample

The sample of 92 women was divided into normal weight ($n = 26$) overweight ($n = 28$) and obese groups ($n = 38$); members of the latter two groups were assigned to experimental ($n = 33$) and control ($n = 33$) groups. Analysis indicated that there were no significant differences between the groups in age, race, marital status, education, employment, number of children, or annual household income. Overall, the groups represented a middle-class status, with most participants being Caucasian (91.3%), married (69.6%), with education beyond high school (78.2%), employed outside of the home (76.1%), and with moderate income (i.e., \$20,000-80,000 per year)

(75.9%).

The normal weight group was included in the study for baseline comparison of discrepancy from CPGs and to evaluate whether weight dissatisfaction with and discrepancy from CPGs was unique to women with weight problems. The normal weight group indicated a range of weights that included a history of overweight and obesity among some individuals. Twenty-seven percent of the normal weight participants reported intentional or unintentional weight gain within the past year; although the instrument did not differentiate between intentional or unintentional gain or discern if this weight gain was considered acceptable or unacceptable to the participant. Such data would have enhanced the findings. Weight loss was reported by 50% of the normal weight individuals. Again, the instrument did not solicit information as to whether this was moving these individuals from an overweight classification to normal weight, or just decreasing their weight within the normal weight class. The highest weight loss reported was 30 pounds, which would not fall within the CPGs' weight-loss recommendations of 10% of the body weight. The average weight loss of 13.92 pounds within the last year, for this group, probably comes close to the 10% recommendation.

Normal weight individuals in this sample reflected trends noted by other researchers (Rand & Kulda, 1990) in that many of them (53.8%) considered themselves overweight and even more (65.4%) believed they needed to lose weight. While the normal weight group was not the primary focus of this study, findings within this group reflect the societal value and pressure to be thin. Normal weight individuals seem to engage in weight-loss activities such as calorie and fat restriction, exercise, and use of herbal weight-loss products at about the same rate and frequency as overweight and obese individuals. Normal weight individuals engaged in weight-loss activities on an average of 18.12 weeks out of the year; overweight, 18.52; and obese, 21.84 weeks. Regular exercise was the most frequently reported weight-loss approach in normal weight participants. This group reported their current activity level as including regular activity or intense regular activity more often than those in the overweight and obese groups. None of these

findings, however, were statistically significant. Other approaches to weight loss varied somewhat between groups, but without significant differences. Prior research has shown that exercise is an effective means of weight maintenance and may be helpful in weight loss as well (Blair, 1993). This trend is evident to a small degree among the participants in this study.

In the overweight and obese groups, weight increases over the past year were reported. While the items related to weight gain and loss within the last year did not allow for differentiation regarding whether the weight gain was intentional or unintentional, it could be assumed that the weight gain was unintentional, as the satisfaction with current weight was very low and weight goals were set lower than the current weight. Likewise, weight loss was likely intentional. Weight loss in the overweight group was reportedly as much as 43 pounds. For obese women, maximum weight loss in the past year was reported as 60 pounds. Again, it is notable that weight loss at this level is not within the recommended guidelines for 10% loss in up to six months. Within this study, over a three month period, weight-loss efforts for the 30 overweight and obese participants who remained in the study resulted in a mean loss of 3.62% ($SD = 3.87$) with a range from 12.99%, the maximum loss, to actual weight gain of 4.25% during the three months. The weight loss of 12.9% represented an actual loss of 31.5 pounds. The weight-loss histories, self-reported on the WPGQ, noted losses of 43 and 60 pounds. While these are obviously not impossible, they may in fact represent weight cycling with repeated weight loss of the same pounds. The WPGQ did not determine this.

Comorbid disease related to weight was present in the participants of this study, but not to the degree reported in some studies (Brown, Dobson, & Mishra, 1998; Must, et al., 1999; VanItallie & Lew, 1992). This may be due to the age range limitation of 20 to 50 years. These women, who are generally premenopausal, would not experience conditions such as osteoarthritis, coronary heart disease, and strokes as often as postmenopausal women. Hyperlipidemia and hypertension were the most common of the conditions reported, and they approached significance in distribution among the groups. Normal weight individuals had less risk

of both of these conditions than the overweight and obese individuals.

Approaches to weight loss centered around traditional means such as exercise and calorie and fat reduction in the diet. Weight monitoring and support groups were used more frequently by those in the obese group. Use of prescription medications such as phentermine (Adipex) and orlistat (Xenical) was fairly popular in this sample. Many participants were actively enrolled in a weight-loss program and were being treated with such prescription medications as those just noted. The correlation between use of prescription medications and being actively enrolled in a weight program was strong ($r_s = .480$, $p = .000$). Individuals who were taking or had used prescription medications also seemed more likely to have used nonprescription medications or herbs ($r_s = .309$, $p = .003$). There was also a significant correlation ($r = .245$, $p = .021$) between taking nonprescription medications or herbs and using anorexic/bulimic-type behaviors such as laxatives, diuretics, and vomiting. It is likely that there was under-reporting of the use of laxatives, diuretics, and vomiting, as this is less socially acceptable behavior, especially since it was evident from the SDS that participants in this study tended to answer in a more socially desirable manner than comparison groups in the literature (Ballard, 1992; Reynolds, 1982). Use of other weight-loss alternatives, such as yoga and acupuncture, was reported less frequently. Several participants indicated use of diet plans such as “Adkins” and “Sugar Busters” as other alternatives. These would probably have best fit under calorie reduction, as these diets limit carbohydrate intake and, thereby, calorie intake.

Instruments

Weight Perceptions and Goals Questionnaire. Because this instrument was designed specifically for this study, comparison of its use with other groups is not possible. The instrument did exhibit reasonable levels of reliability for the Likert-type scale items on three dimensions: importance ($\alpha = .70$), weight satisfaction and weight-loss motivation ($\alpha = .98$), and satisfaction with CPGs ($\alpha = .87$). A major difficulty related to the use of the WPGQ was the series of items about goals. Participants were asked to formulate goals for weight, weight-loss, exercise, and

diet. The ability to respond to these items required a basic knowledge level. As noted in Chapter IV, the participants often left these items blank. The two items related to diet (calories per day and percent of calories as fat) were the most often skipped. For all of these items, the percentage of missing data was less on the repeat questionnaire at two weeks. This is probably best explained by the fact that some of the participants were in the experimental group and completed the Internet educational program which included information about weight-loss approaches, including exercise and diet. All participants enrolled in the weight-loss program at the study site additionally received a written diet plan and exercise information. This information should have been helpful in educating all participants.

Social Desirability Scale. The SDS was used to screen for socially desirable response patterns. Such response patterns were evident in this sample. Although there was not a statistically significant difference between the responses of normal weight, overweight, and obese participants, an increasing tendency to socially desirable responses was evident with increasing weight. Normal weight participants had the lowest SDS score, overweight participants had the next highest, and obese participants the highest SDS scores. This may represent a manifestation of the social impact of overweight and obesity on women and the desire to respond to other questions in more socially desirable ways. No specific correlations were made between social desirability scores and other WPGQ factors. Conclusions drawn from the research must be considered carefully, since these data demonstrate a moderate general tendency toward socially desirable responses.

Educational Evaluation Form. The educational program evaluation form was completed by approximately one-third ($n = 10$) of the participants who did the education. The evaluation process was optional and was done immediately following completion of the educational program. It might have been helpful to have the evaluation mandatory and to have additional evaluation of the accompanying worksheet that contained take-home points from the educational program to see if the information was used as a reference at later dates. The educational program evaluation

form did not solicit any information about how participants envisioned that the information had increased their knowledge, changed their thinking, or affected their goals. That information would have provided answers of a qualitative nature that would have helped in drawing conclusions about research findings. Even stronger would be an evaluation process that involved discussion of the program and these questions with the researcher. This element could be added to similar future research: evaluation of the effects of a personal follow-up discussion/interaction to see if the interaction process increases the impact of the program on women's weight-loss perceptions and goals.

Hypothesis 1

Hypothesis 1 stated that at baseline there would be a difference in satisfaction with weight and in discrepancy from CPGs for six-month weight goals for groups of normal weight, overweight, and obese women. The multivariate analysis supported the hypothesis. Normal weight participants were more satisfied with their weight and set goals that were closer to CPGs regarding what to weigh in six months than overweight and obese participants.

Overall, there was a low-moderate and significant correlation ($r = .312$, $p = .003$) between the two variables in the hypothesis. There was also a significant positive correlation between BMI and six-month weight goal ($r = .823$, $p = .000$), inverse correlation between BMI and satisfaction with current weight ($r = -.537$, $p = .000$), and inverse correlation between BMI and discrepancy score for six-month weight goal ($r = -.610$, $p = .000$). Figures 1a and 1b illustrate these relationships, demonstrating a fairly linear relationship between these variables.

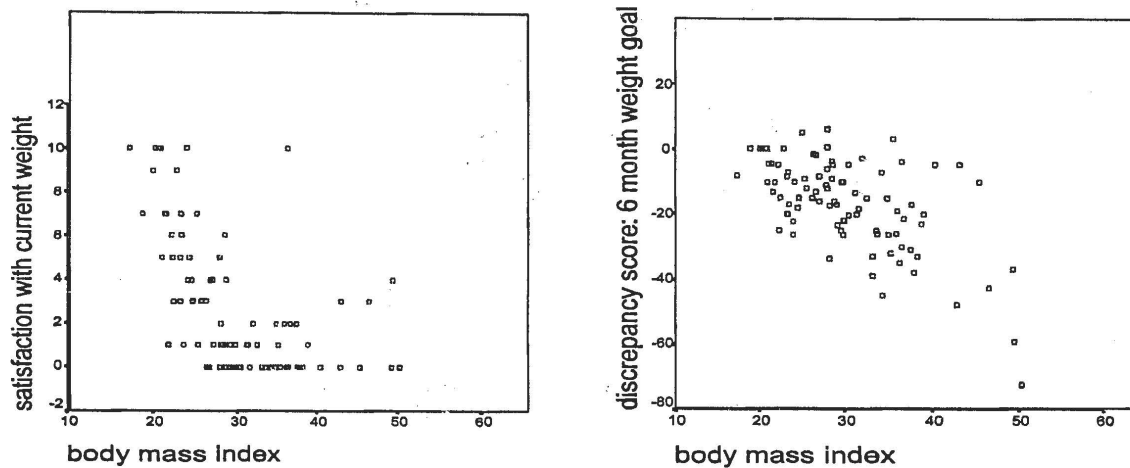


Figure 1a & 1b. Scatterplots of the relationship between BMI and satisfaction with current weight (1a) and between BMI and discrepancy scores for six-month weight goal (1b)

It is typical, according to other research (Brownell, 1991; Rand & Kulda, 1990), to find that some normal weight women are not satisfied with their weight and desire to lose weight. Women become less satisfied with their weight as it increases. Additionally, women set goals that are increasingly discrepant from the CPGs as weight and BMI increase. These findings support previous findings such as those of Foster et al. (1997).

While there was a significant difference in the discrepancy scores for six-month weight goal between groups, it should be noted that this measure reflects only the number of pounds difference between the participant's goal and CPGs' recommendations and is not a proportional measure. It does not reflect a percent of body weight loss. The WPGQ did not ask participants what percent of their body weight they desired to lose in the next six months. When percent of body weight was calculated from the data, the desired losses of women in the normal weight group ($n = 26$) ranged from 0 to 19.41% ($M = 7.655$, $SD = 5.9007$); overweight ($n = 27$) ranged from 5.95 to 31.03% ($M = 17.5446$, $SD = 5.5437$), and obese ($n = 37$) ranged from 8.45 to 33.88

($M = 21.1294$, $SD = 6.5167$). Normal weight participants, according to the CPGs' recommendations, needed no weight loss; overweight and obese participants should have been targeting a 10% loss. The percent of weight loss desired by the participants in this study was less than the average of 32% desired weight loss reported by Foster et al. (1997). The difference between these studies might be explained by the fact that the CPGs had not yet been published at the time of Foster's study. These data, while less discrepant than Foster's findings, were supportive of the hypothesis that there were significant differences between groups ($F(2, 87) = 38.28$, $p < .000$). Table 19 reports the results of ANOVA for the percent of desired weight loss by groups.

Table 19

ANOVA for Percent of Desired Weight Loss in Six Months by Groups (N = 90)

Effect	Sum of Squares	df	Mean Square	F	p
Between Groups	2851.245	2	1425.623	38.275	.000
Within Groups	3240.504	87	37.247		
Total	6091.749	89			

Post hoc tests (Tukey HSD) revealed that there were significant differences between both the normal weight and overweight groups ($M_{diff} = -9.8891$, $SE = 1.6769$, $p = .000$) and the normal weight and obese groups ($M_{diff} = -13.4883$, $SE = 1.5618$, $p = .000$) for desired percentage of weight loss within six months. The difference between the overweight and obese groups approached significance ($p = .057$). While this sample of overweight and obese women were similar in how they set weight-loss goals, the obese group desired the greatest weight loss.

Hypothesis 2

The second hypothesis compared the goals of overweight and obese women for weight loss, exercise, and diet to the CPGs' recommendations in each of these areas. The hypothesis was supported for most of the variables. The goals for pounds per week of weight loss, for

exercise duration and frequency (except for the upper limits of ultimate exercise duration – 45 minutes), calories per day, and the six-month weight goal were all significantly different from the CPGs. Goals that were not significantly different from the CPGs were those set for ultimate exercise duration and percent of diet as fat.

Most of these differences can probably be explained as a lack of knowledge. As noted in Chapter IV, there was a significant amount of missing data on items for this hypothesis. Some respondents' verbal comments about items and written question marks placed beside the items suggest that participants lacked the knowledge needed to respond. Since these items represent pre-education scores, the discrepancy from the CPGs, as well as the amount of missing data, indicate that there was a significant need for education and information. Many of the participants reported previous weight-loss attempts, most were well educated and likely to have read materials related to weight loss; yet there remains a significant gap in knowledge. Possible explanations include that the repetition of information has been insufficient or that information presented has been confusing. There was a smaller percentage of missing data for all variables on the two-week retest. Education was not a good predictor of response for the retest at two weeks, as the experimental group did not have less missing data than the control group.

Beyond education, these data probably also reflect social and emotional factors which are not as subject to reason. The weight-loss, exercise and diet items on the WPGQ that were examined in analysis of this hypothesis asked what the participant wanted or thought, not necessarily what they may have known they should do. This would make for additional interesting study, contrasting specifically what the participant wants at an emotional or social level with what they should know or think from a cognitive standpoint should be done.

Analysis of differences between overweight and obese women on these same items revealed that there were not significant differences between the overweight and obese groups on these variables. Variation in the degree of weight excess did not, for participants in this study, affect goal setting related to six-month weight goal, pounds per week weight-loss, exercise, or diet

goals. This finding supports consideration of these two groups together for the rest of study.

Hypothesis 3

Hypothesis 3 examined the effects of the Internet education using a pretest-posttest approach. Overweight and obese participants completed the WPGQ a second time approximately two weeks following the first survey completed at the time of enrollment in the study. This hypothesis examines posttest differences between the control and experimental groups for items related to participant's exercise and diet goals.

This hypothesis was difficult to analyze as originally planned because of missing data, a problem which has already been thoroughly discussed. A workable solution to the problem was to analyze this hypothesis in two separate multivariate analyses. MANCOVA was used for analysis of the discrepancy scores for exercise related goals with pretest items as covariates. MANOVA was used for analysis of discrepancy scores for the two diet items having a large amount of missing data.

The hypothesis was not supported. There were no significant decreases in discrepancy scores from CPGs' recommendations for either exercise or diet goals for control or experimental (i.e., Internet-based education) groups. There were, however, non-significant changes and trends that are worthy of discussion. At the 2-week posttest, both the control and experimental groups were more discrepant from CPGs in goals for initial exercise duration. Groups means revealed that the control group was less discrepant from CPGs at the posttest for initial exercise frequency, while the experimental group was more discrepant for this variable. The same finding was true for ultimate exercise duration. Both groups were less discrepant for ultimate exercise frequency, with the experimental group having more improvement. The same was true for calories per day. The percent of calories as fat was less discrepant from CPGs on the posttest for both groups, also. As previously noted, there were wide ranges in discrepancy scores and no consistent trends for most of the variables, although less discrepant scores at the posttest were more common for both groups than were more discrepant scores. There is not statistical support for crediting the Internet

educational program for improvements in the discrepancy scores, as improvements were equal or more common in the control group, as compared to the experimental group. Instead it could be suggested that the weight-loss information that is provided as a standard within the framework of patient care in the clinic might have been responsible. It is equally possible that participants' interest was sparked by the initial research, and that reading or other independent learning outside of the clinic setting was responsible for improvements in the discrepancy scores. The somewhat inconsistent trends and wide variance may, as well, indicate that the trends reflect chance, guessing, or error.

Information regarding exercise and diet was covered in the Internet educational program within the section related to weight-loss approaches. Benefits of exercise were listed, and it was recommended that exercise be gradually increased. This was followed by two statements of recommendation for initial and ultimate exercise program duration and frequency. The information related to exercise was brief with no interactive component.

The information on diet was more extensive, though it too was fairly brief. It had an interactive component where the participant could calculate a basic caloric allotment per day that would be necessary for weight maintenance without consideration of exercise and activities. Calorie reduction and calorie expenditure through exercise were both recommended. This interactive approach was projected to provide a more interesting and individualized approach than just stating that the calorie recommendation for weight loss in women according to the CPGs is 1000 to 1200 calories per day. Participants commented on the evaluation forms that they liked the interactive components of the educational program.

Participants were given a take-home work sheet (Appendix L) on which they could write down information from the interactive components of the Internet educational program; it also included a summary of the main points of the program. It was hoped that writing down some of the information and having the written information available as a reference would serve as reinforcement of learning from the program.

Most participants spent only about 15 minutes with the educational program. The program was intentionally designed to be concise, taking advantage of prime-time learning and minimizing down-time (Sousa, 1995). It may have been too brief, however, not allowing participants to establish a learning pattern. Additionally, it did not allow for repetition and did not encourage recall. Approaches that are known to increase retention of information include practice of skills (75% retention rate) and teaching others or some other immediate use of learning (90% retention rate) (Sousa, 1995). Material that is learned early in a teaching session is also retained better.

Future use of the program might employ interactive elements, in which the participant and the researcher or office staff discuss and apply, in a meaningful way, the concepts presented in the educational program. This should be done immediately following the educational session and at selected intervals during follow-up for repetition. Practical application of the information could be analyzed and supported. Skills acquisition related to diet and exercise planning could be assessed and nurtured in such structured manners. Interactional elements of King's (1982) theory suggest this type of approach as being most effective in facilitating goal attainment. Reordering the content of the educational program might also be helpful for future use.

The research does not support the sole use of the Internet-based educational program as used in this study as being effective in modifying goals for exercise and diet in overweight and obese women. The complexity of weight issues themselves combined with different learning styles likely contributed to the lack of success. While a short educational program that brings women's goals into line with CPGs' recommendations would provide an efficient solution to the problem, it is apparent that the Internet educational approach used here did not adequately address the complexities of the weight issues or meaningfully decrease the discrepancy in weight-related goals.

In addition to possible educational program weakness, other methodologic weaknesses may account for the lack of support for the hypothesis. The analyses revealed low power. This

indicates a possibility of having been unable to demonstrate group differences that were in fact present. It could be that the number of participants was insufficient to reveal significant decreases in discrepancy scores for the variables.

Hypothesis 4

Hypothesis 4 also dealt with pretest-posttest evaluation of educational effects. In this hypothesis, the items of concern were questions about the importance of health factors in weight-loss decisions, motivation for weight loss, and satisfaction with CPGs' recommendations. Experimental and control groups were compared on these items approximately two weeks after the pretest. MANCOVA was used for statistical analysis. Because these items did not suffer the same problems of missing data, all variables were analyzed together. The hypothesis of group differences was not supported.

The Internet educational program emphasized health and prevention of disease as important factors for making weight-loss decisions. These items were rated quite high on the pretest (8.8 - 9.4). Women generally ranked these slightly lower at the time of the posttest (8.6 - 9.2). The degree of change was not significant. It would appear that the educational information actually made the participants less favorable toward the CPGs. This would not be a surprising finding, considering that women's weight-loss goals and perceptions are significantly different from the CPGs. The process of educating women and exposing them to ideas that are drastically different from their own creates conflict. As suggested by King (1981), such discrepancies in goals may interfere with goal attainment. In this instance, it appears that there is resistance to the concepts and guidelines suggested by NIH.

Motivation for weight loss increased slightly, though not significantly in the experimental group in the two weeks following completion of initial questionnaires. This minor increase in motivation may or may not have been related to education; rather, it may have been related to factors such as being excited about having lost the first pound or first few pounds. This may be a common reaction early in a weight-loss program. Willingness to attempt a 10% weight loss

declined slightly, though also insignificantly during this time. This may not represent an unwillingness to lose weight. Instead it may represent a lack of satisfaction with losing only 10%.

Satisfaction with the weight-loss guidelines of a 10% weight loss in a time period of up to six months, followed by a six-month maintenance period before attempting further weight loss met with moderate anticipated satisfaction levels at baseline. These items met with less satisfaction at the time of the two-week retest. With the exception of satisfaction with the 10% loss, a decline in anticipated satisfaction with the guidelines was present in both the control and experimental groups, so was not likely linked to the education.

Again, it is notable that the observed power in the analysis was very low. Increased numbers of participants might have increased the power and therefore the potential ability to demonstrate measurable educational program effects.

Based on findings for this hypothesis and this sample, however, it could be said that women are only moderately favorable toward the weight-loss guidelines. The level of satisfaction was not affected by the form of education used in this study.

Hypothesis 5

Hypothesis 5 stated that at 2, 4, 8, and 12 weeks following the educational intervention, women who had participated in the Internet educational program would have more positive results in the areas of weight satisfaction, weight loss, and in discrepancy scores for six-month weight loss, as compared to women who did not participate in the educational program. The hypothesis was analyzed using repeated measures MANOVA. Findings revealed no significant differences between groups for the variables.

Within group change was significant. Both the control and experimental groups had significant weight loss and significant increase in weight satisfaction during the three-month time period of the study. Figures 2 through 4 illustrate the changes in BMI (a reflection of weight loss), in weight satisfaction, and in the discrepancy score for the six-month weight goal for the control and experimental groups over three months.

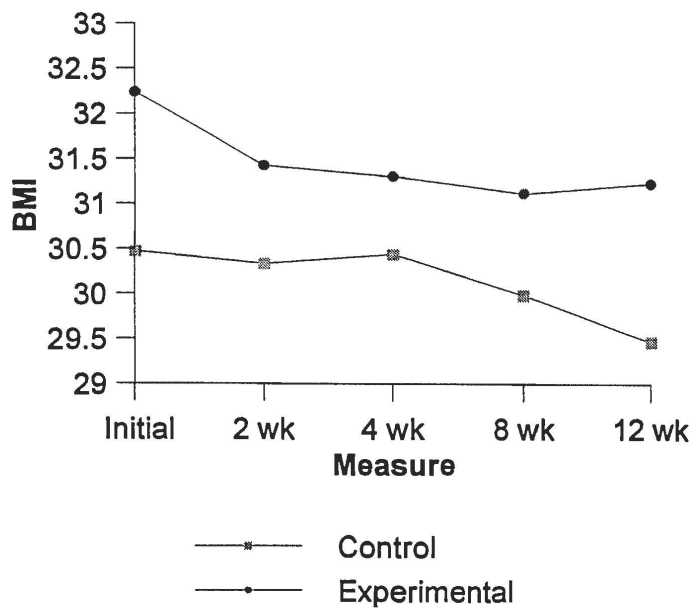


Figure 2. Changes in group means for BMI over three months: A comparison of experimental and control groups

Within group changes in the discrepancy scores for six-month weight goal (Figure 4) were not significant for either the control or experimental groups. While not statistically significant, discrepancy scores for the six-month weight goals of those who participated in the educational intervention were less discrepant from CPGs at all measurement times except for week 12 as compared to those in the control group. The experimental group, however, exhibited worsening trends in discrepancy scores while the control group exhibited improving trends, overall, in discrepancy from CPGs.

The information about weight loss and weight satisfaction is important, as it shows that the weight programs and weight-loss approaches that participants are using are effective. To varying degrees, participants are progressing toward their goals; yet the fact remains that the goals and perceptions were not significantly changed. The women who participated in the

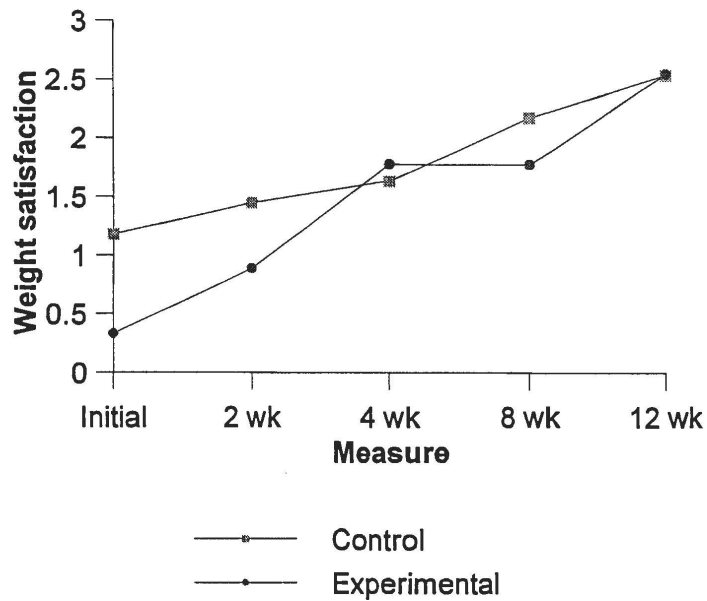


Figure 3. Changes in group means for satisfaction with weight over three months: A comparison of experimental and control groups

educational intervention did not close the gap between their goals and the CPGs' recommendations as a result of being a part of that educational process.

Suggestions have previously been made for reaching to a deeper cognitive and, even more importantly, to a deeper social/emotional level by follow-up interaction, discussions, and personal application processes. Addressing perceptions, concepts of self, and body image, elements of what King (1981) calls the personal system, appears to be an essential part of weight intervention. Perceptions, self-concept, and body image are not sufficiently addressed through computerized or Internet educational programs. The elements of interpersonal systems such as stress, coping, human roles and interactions, and communication, and elements of the social systems, such as power, authority, decision-making, and goal attainment are probably insufficiently addressed by computer as well (King, 1981). Repeated interactions that examine

these elements in relation to weight, weight perceptions, and weight loss and that facilitate mutual goal setting may be more supportive of weight-related goal attainment.

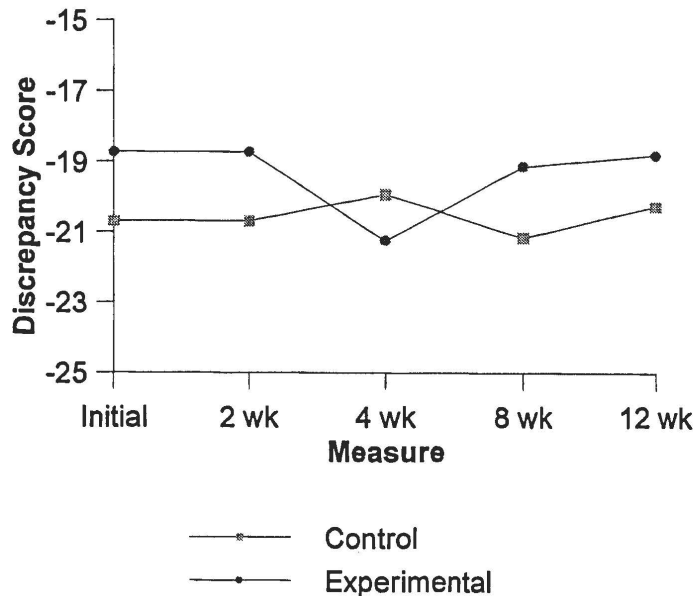


Figure 4. Changes in group means for discrepancy scores for six-month weight goal over three months: A comparison of experimental and control groups.

Additional Findings

The regression analyses for weight loss and weight satisfaction (Chapter IV) are findings of additional interest. Psychosocial and demographic variables that were measured in this study did not predict weight loss. Only the progress made in initial weight-loss efforts was significantly predictive. For weight-loss programs this information should provide helpful direction, for this suggests that women who do not demonstrate early weight loss may be at risk within the program for not achieving weight-loss goals. Early intervention in the form of education and emotional assessment and support may be indicated if desired outcomes are to be achieved.

The findings in the weight satisfaction regression analysis are also noteworthy. Most

demographic and psychosocial variables did not predict weight satisfaction. Two variables, waist circumference and age were predictors of weight satisfaction. Of these, waist circumference was the strongest. Women with larger waists have less satisfaction with body image than those with smaller waists (Potts, 1993). Waist size reflects body size. Analysis with BMI in the model increased the value of R^2 slightly, but waist and BMI are so highly correlated that they basically claim the same variance; essentially this means that the model is not as meaningful. Age was a second significant predictor of weight satisfaction. Within this sample, it appeared that older women were less satisfied with their weight than younger women. This is surprising, as it seems that youthfulness is associated more strongly in our society with thinness and beauty. Maybe that in fact is the reason why the older women were less satisfied with weight, because they associate their weight with loss of youth, making the psychologic reaction to weight gain even stronger.

Within this study, satisfaction with current weight and motivation for weight loss were correlated. But motivation did not translate into weight loss, as evidenced by a non-significant correlation between the two variables. Again this shows the complexity of weight issues. One factor alone does not determine success in weight-loss endeavors.

Conclusions and Implications

This section summarizes conclusions which may be drawn from the study, based on the findings. Implications for clinical practice and recommendations for future research are also discussed.

Conclusions

The following conclusions may be drawn from the research, with the understanding that they cannot be generalized beyond this sample:

1. Groups of normal weight, overweight, and obese women are all able to relate to weight issues. Weight gains and losses, weight cycling, and ongoing attempts to lose or maintain weight are characteristic of all groups and weights of women. Women use a variety of approaches to weight loss, most commonly including calorie and fat reduction, regular exercise, and non-

prescription herbs or medications.

2. Women in general are not very satisfied with their weight. As compared to normal weight women, weight satisfaction is lower in overweight women and lowest in obese women. Weight satisfaction decreases as weight and waist size increase.

3. Overweight and obese women are aware of their overweight state and without exception acknowledge a need to lose weight.

4. Women rate regular exercise and prescription medications as the most helpful means of losing weight. Dietary fat reduction was rated as the second most helpful approach to weight loss. Calorie reduction was the third most helpful approach to weight loss.

5. Women have a lack of knowledge about ideal guidelines for weight loss, and ideal approaches to weight loss, such as those presented in the CPGs. In particular, women have a knowledge deficit about dietary management for weight loss.

6. Women set weight-loss goals that are significantly discrepant from CPGs. Discrepancies involve six-month weight-loss goals, goals for exercise and for dietary caloric intake. While discrepancy increases with increasing weight, overweight and obese women were not statistically different in their degree of discrepancy.

7. Discrepancies between women's weight-loss goals and the CPGs were not significantly decreased by an Internet-based educational program alone. The complexity of weight-loss perceptions and goals apparently requires an educational intervention with increased depth of content expanded to a longer time period. Addressing the weight-loss issues from personal, emotional, and social angles that were not adequately addressed in the Internet educational program is suggested.

8. Satisfaction with the CPGs was moderate, suggesting that ways of improving attitudes (i.e., acceptance) need to be explored.

9. Educating participants about CPGs for weight loss did not have a significant impact on weight-loss patterns, weight satisfaction, or six-month weight-loss goals over a three month period.

of time.

10. The absence of mutual goal setting processes, personal interaction and communication, or repeated transactions related to weight perceptions and weight-loss goals interferes with weight-loss goal attainment. This conclusion reinforces King's theory of goal attainment (1981).

Implications

Implications of the study are important for women, healthcare providers, and for society. The study supports that weight concerns are present for many women, even those who are of normal weight. Women continue to invest time and money in potential solutions to weight concerns, some of which are not effective. Many women have insufficient knowledge about the exercise and diet patterns that best support weight loss or that are recommended based on clinical research, such as those from the NIH. Research-based education in these areas should be sought by and provided for women who desire weight loss. There was evidence in this study of intellectual acknowledgment of the benefit from certain weight-loss activities, such as regular exercise, but without associated behavior change or action. Women need to seek mechanisms of support or programs for weight loss that foster behavioral follow-through in such areas. As underscored by the study findings, (a) knowledge alone is insufficient for weight change and (b) weight issues are complex, involving personal, social, and emotional issues. In an effort to increase the efficiency and cost-effectiveness of weight-loss programs it seems important that these elements be addressed.

Healthcare providers may benefit from this research in learning more about women's weight-loss perceptions and goals. The research demonstrates that women's perceptions and goals are different from those of healthcare providers and from CPGs. Some of their goals are, in fact, unhealthy or unrealistic. Therefore, it is essential that healthcare providers assess women's weight-loss perceptions and goals and provide a variety of educational programs, personal interactions, and supportive interventions aimed at fostering healthy self-concept and healthy and

realistic goal-setting related to weight. Better understanding of what the patient wants is an important starting point for mutual goal setting (King, 1981). Use of an Internet-based educational program might be part of the educational process, but is unlikely to be solely sufficient in improving weight perceptions and goals, and in ultimately improving weight-loss outcomes, unless combined with other features such as email, chat-room discussions, or some type of list-serve that would provide opportunity for further interaction and discussion with healthcare providers and other participants, knowledge reinforcement, and support for behavior change.

Healthcare providers must consider how to implement CPGs. The CPGs put forth mandated goals and do not support mutual goal setting which would be most effective for goal attainment (King, 1981). Finding a balance between what women want and the CPGs' standards may be difficult and requires careful consideration in order for achievement of positive weight-related outcomes.

It is important that healthcare providers evaluate clients' learning from educational programs. It is equally important that they evaluate the degree to which clients incorporate concepts that are presented as a part of a weight education programs into their own value system. As evidenced in this research, women had insufficient knowledge or inadequate incorporation of concepts into their own value systems even after an educational intervention. Regular reinforcement of concepts may improve both knowledge and value formation.

It is very unlikely that a family practice setting will have sufficient time, staff, budget, or resources for meeting all of clients' weight-related education needs. Development of a network of resources and referrals would therefore be important. This study indicates that women attempting weight loss are more familiar with exercise guidelines than with dietary guidelines. Educational sessions regarding nutrition and diet for weight loss should be a priority and a high-referral item. The need for exercise education should not be overlooked, however, as this study indicated that women tend to want to over-exercise, exercise for longer-than-recommended time periods, early in their weight-loss programs. This can increase stress, strain, and the potential for injury or, in

some cases, be deemed too difficult which can, in turn, lead to discouragement and abandonment of exercise. Later, women tended to plan insufficient exercise, preventing their obtaining maximum exercise benefit and potentially increasing the risk of weight gain and weight cycling. Again, ongoing discussion among participants might improve awareness of the possible pitfalls and ways to deal with them.

Weight problems are often overlooked or ignored in women (Foster & Johnson, 1998). Healthcare providers need to be aware of the presence of weight concerns, even for normal weight individuals. Assessing weight goals and providing supportive weight maintenance services for normal weight individuals may be helpful. Early intervention in the presence of weight gain, prior to progression to overweight and obesity, is preferable. Overweight and obese women, should be tactfully approached about weight perceptions and goals when they fail to initiate such discussions.

Public health education is another golden opportunity for healthcare providers. In community settings, healthcare providers have the opportunity to introduce the public to the NIH CPGs for weight loss. Schools, churches, civic centers, job sites, public libraries, shopping centers, and even public parks have potential as sites for reaching individuals who are not able to be reached within the healthcare setting or as sites for simply reinforcing information that individuals have obtained in a healthcare setting. Public presentations, health fairs, lecture series, support groups, weight programs, walking programs, posters, billboards, and literature are just a few ways that the public can be reached with news about healthy weight loss and weight management that is within CPGs.

The computer and the Internet offer other limitless possibilities for reaching the public with weight awareness bulletins, weight-loss recommendations, weight education, and guided discussions. Attitudes and social values are hard to change, but change will gradually occur if persistent efforts are made. The moderate acceptance of the CPGs that was evident in the study sample represents openness and suggests the possibility for change. The change will, however,

take longer than three months, and more than one educational approach in one session.

Recommendations for Future Research

The findings and conclusions of the research offer a number of possibilities for future research:

1. Refine the Weight Perceptions and Goals Questionnaire to better assess both knowledge and actual practice for weight-loss related activities such as exercise and diet, and in a similarly designed study examine these areas more closely.
2. Through qualitative research, more thoroughly explore the attitudes of women about weight and weight loss and their responses and interpretation of the CPGs.
3. Design and conduct a longitudinal study that investigates the effects of weight-loss patterns that are in harmony with the CPGs on actual satisfaction, psychological variables, such as self-concept and body image, and on health-related variables.
4. Implement an educational intervention that is in harmony with CPGs for at risk, or actually overweight and obese children of school age, and then conduct longitudinal research regarding weight patterns and weight-loss perceptions and goals.
5. Replicate the current study design with revisions to the Weight Perceptions and Goals Questionnaire, and with additional reinforcement and personal support following the Internet education, in order to evaluate whether such additional interactions and interventions decrease discrepancy between women's weight perceptions and goals and the CPGs.
6. Investigate the acceptability of and application of CPGs for weight loss in other populations, such as children, adolescents, older adults, males, and specific ethnic groups.
7. Investigate the effectiveness of public health educational programs and promotion of CPGs' weight-loss concepts in various populations, particularly minority groups at high risk for overweight and obesity.

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APPENDIX A
Human Subjects Approval

TEXAS WOMAN'S
UNIVERSITY
DENTON/DALLAS/HOUSTON

HUMAN SUBJECTS
REVIEW COMMITTEE
P.O. Box 425619
Denton, TX 76204-5619
Phone: 940/898-3377
Fax: 940/898-3416

January 22, 1999

Ms. Holly Gadd
503 Greenbrier Ave.
Keene, TX 76059

Dear Ms. Gadd:

Your study entitled "Congruence of Women's Weight Perceptions and Weight-loss Ideals with Clinical Practice Guidelines for Weight and Weight Loss" has been reviewed by a committee of the Human Subjects Review Committee and appears to meet our requirements in regard to protection of individuals' rights.

If applicable, agency approval letters obtained should be submitted to the HSRC upon receipt. The signed consent forms and an annual/final report (attached) are to be filed with the Human Subjects Review Committee at the completion of the study.

This approval is valid one year from the date of this letter. Furthermore, according to HHS regulations, another review by the Committee is required if your project changes. If you have any questions, please feel free to call the Human Subjects Review Committee at the phone number listed above.

Sincerely,



Chair
Human Subjects Review Committee

cc. Graduate School
Dr. Gail Davis, College of Nursing
Dr. Carolyn Gunning, College of Nursing

APPENDIX B
Agency Permission

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Office of Sheila Horsley, MD

GRANTS TO Holly Gadd MS, RN, CSFNP

a student enrolled in a program of nursing leading to a Doctoral Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

Improving women's weight-loss perceptions and goals: An internet-based educational approach.

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (may not) be identified in the final report.
3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date: 1/29/99

Sheila K. Horsley MD
Signature of Agency Personnel

Holly Gadd
Signature of Student

Dr. C. Davis
Signature of Faculty Advisor

* Fill out and sign three copies to be distributed as follows: Original - Student; First copy - Agency, Second copy - TWU College of Nursing.

APPENDIX C

Cover Letter to Subjects

Invited Study Participant:

Excess weight is a problem for many women. It creates personal concerns as well as potential health risks. In the United States today, much money is spent by women who want to lose weight. Additional money is spent in managing illnesses that are directly related to being overweight.

Healthcare providers are concerned about the increasing incidence of weight problems in women. They are interested in helping women find ways to deal with their weight more effectively and to live happier and healthier lives. National health care organizations have provided guidelines to help meet these goals. The major purpose of this study is to evaluate these guidelines to see how they compare to women's ideas about weight and weight management and to see if women's ideas about weight and weight management and their actual weight loss are different after receiving information about the guidelines.

You are invited to participate in this study. Depending on the study group to which you are assigned, your participation will take from approximately 20 minutes to one hour. This will include filling out a survey today and again at a later office visit. Additionally, some participants will complete a computerized educational program that will take 20 - 30 minutes. Your decision about participating in the study is completely voluntary; it will not affect your care in any way. You may feel free to withdraw from the study at any time. All information will remain anonymous and confidential.

Please read the attached consent form. If you decide to participate, please sign the form. If you have questions prior to signing this, you may call me at the phone number provided at the top of the consent form.

Should you choose to participate, complete the brief questionnaire. Give the questionnaire to the nurse when you are called back for your appointment. She will fill in some additional information. You may be asked to participate in the educational program before repeating the questionnaire at a later time.

Risks related to this research are minimal. Some subjects find it stressful to think and talk about their weight. The benefits of this research far outweigh the risks. Benefits may include increased awareness of weight, insight into one's weight patterns, ideals and goals, increased knowledge about risks of overweight, about what one should weigh and how quickly or slowly one should lose weight. If you desire information about the results of the study, you may complete the address form attached to this letter and turn it in to the receptionist when you leave.

Thank you for your time, for considering being a part of this research study, and for participating, if you choose.

Sincerely,

Holly Gadd, MS, RN, CS-FNP

PhD Candidate, Texas Woman's University

APPENDIX D

Consent Form

TEXAS WOMAN'S UNIVERSITY
SUBJECT CONSENT TO PARTICIPATE IN RESEARCH

Improving women's weight-loss perceptions and goals:
An Internet-based educational approach.

Principal Investigator:

Holly Gadd, MS, RN, CS-FNP

PhD Candidate, Texas Woman's University

Phone: (817) 645-3921 ext. 248 or (817) 293-6988

Faculty Advisor:

Dr. Gail Davis

Phone: (940) 898-2401

I understand that the purpose of the study is examine how well women's ideas about how much they should weigh and how they should lose weight, match with standards and ideas that healthcare providers have about these same issues. The study will also examine the effects of an Internet-based educational program on women's ideas about their weight, their feelings about the weight goals recommended by healthcare providers, and on their weight.

As a participant in the study, I will assigned to one of two groups. One group will receive detailed information about the weight guidelines issued by the National Institutes of Health that healthcare providers use to guide their clinical practice. The information will be gained through an interactive computer program lasting 20 to 30 minutes. I will be able to complete this program in this physician's office at my convenience (probably at one of my usual weigh-in visits), or I may choose to complete it using a computer outside of the office. I will be given information about how to access the educational program and agree not to share that information with others. If I am assigned to the other group, I will not complete the computer program during the time I am

enrolled in this study, though I will be provided with the opportunity to do so at a later date, if I choose.

Regardless of what group I am in, I will complete a short questionnaire at the beginning of the study and have my height, weight and waist circumference checked. The questionnaire will be repeated 2 weeks after completing the educational program, if I was in that group. If I am not in that group, I will repeat the questionnaire on my next office visit. The questionnaire takes 5-10 minutes to complete. Additionally, my weight will be monitored for 3 months.

I understand that there are few, if any risks to me from participating in the study. I may feel stressed as I think more about my weight. If this occurs, I can discuss these feelings with the office staff or researcher.

My identity will be carefully protected and will not be disclosed in any manner by the researcher in her writings. All data will be used collectively; I will not be identified in any way. I will be assigned an identification number that will be matched to my name on a list that is available only to the researcher. This list will be destroyed when all the data are collected. My questionnaire will be stored in a locked file at the researcher's office and, upon completion of the study, will be destroyed by shredding.

By participating in the study, I may actually benefit. I may gain more insight into my feelings about my weight and my weight-loss goals and even experience a sense of relief based on information I receive. I may learn more about the health risks of being overweight and about healthy approaches to weight management.

I understand that the researchers will try to prevent any problem that could happen because of this research. I will let them know at once if there is a problem and they will help me. I understand, however, that TWU does not provide medical services or financial assistance for injuries that might happen when taking part in this research.

If I have any questions about the research or about my rights as a subject, I should ask the researchers, whose phone numbers are at the top of this form. If I have questions later, or

wish to report a problem, I may call the Office of Research & Grants Administration at 940-898-3377.

I understand that my participation in this study is completely voluntary. I do not have to participate in the study; and, if I choose to participate, I am free to change my mind and withdraw from the study at any time. I will not be penalized for not participating or for withdrawing from the study. My health care will not be affected by not participating.

I have had adequate opportunity to learn about this study and ask questions of concern to me regarding this study. I have been offered a copy of this consent form for my personal records.

I hereby release the Texas Woman's University and the undersigned party acting under the authority of Texas Woman's University from any and all claims arising out of such taking, recording, reproducing, publishing, transmitting, or exhibiting as is authorized by the Texas Woman's University.

Signature of Participant

Date

The above consent form was read, discussed, and signed in my presence. In my opinion, the person signing said consent form did so freely and with full knowledge and understanding of its contents.

Witness

Date

APPENDIX E
Weight Perceptions and Goals Questionnaire

WEIGHT PERCEPTIONS & GOALS QUESTIONNAIRE

Directions: Circle or write in the most appropriate answer.

Today's date: _____

1. Age: _____ years
2. Race/ethnic group:
 - 1 Caucasian/White
 - 2 African-American/Black
 - 3 Hispanic-American/Latino
 - 4 Asian-American
 - 5 Native American/American Indian
 - 6 Other (please specify) _____
3. Marital Status:
 - 1 Single
 - 2 Living with significant other
 - 3 Married
 - 4 Divorced
 - 5 Widowed
4. Educational Level: (circle the highest level completed)
 - 1 Grammar School
 - 2 High school or GED
 - 3 Some college courses
 - 4 Vocational school
 - 5 College degree
 - 6 Graduate degree
 - 7 Other (please specify) _____
5. Employment:
 - 1 Unemployed
 - 2 Homemaker
 - 3 Employed outside the home, part-time
 - 4 Employed outside the home, full-time
 - 5 Retired
 - 6 Other (please specify) _____
6. Occupation: _____
7. Number of children and ages: _____
8. Household (combined) income per year:
 - 1 Less than \$20,000
 - 2 \$20,001 to 40,000
 - 3 \$40,001 to 60,000
 - 4 \$60,001 to 80,000
 - 5 \$80,001 to 100,000
 - 6 Over \$100,000

9. Previous/current medical problems (check all that apply):
- | | |
|--|---|
| ☐ Diabetes | ☐ High blood pressure |
| ☐ High cholesterol or triglycerides | ☐ Heart disease (angina, heart attack) |
| ☐ Stroke | ☐ Arthritis (osteoarthritis) |
| ☐ Gall bladder problems | ☐ Sleep apnea |
| ☐ Cancer – location: _____ | |
10. Are you a smoker?
1 Yes 2 No
11. Current height: _____ inches
12. Current weight: _____ pounds
13. Weight at age 20: _____ pounds
14. Lowest weight since age 20: _____ pounds
15. Highest (nonpregnant) weight since age 20: _____ pounds
16. Has your weight changed more than 7 pounds in the last year either intentionally or unintentionally?
1 Yes Up _____ pounds
 Down _____ pounds
2 Yes, Repeatedly up and down
 Number of up and down cycles in the last year _____
3 No
17. Have you attempted weight loss in the past year?
1 Yes 2 No
18. Approximately how many weeks out of the last year were spent trying to lose weight?
_____ Weeks
19. What weight loss methods have you used? (select as many as necessary)
- 1 calorie reduction
 - 2 fat reduction
 - 3 regular exercise
 - 4 weight loss/monitoring support groups (eg. Weight-watchers)
 - 5 non-prescriptions herbs or medications
 - 6 prescription medicines
 - 7 use of laxatives, diuretics or vomiting
 - 8 other alternatives (eg. Acupuncture, yoga, etc.) _____
20. Which of the above methods has been most helpful in your weight loss attempts?
Select the top three most helpful methods:
- _____ Most helpful
- _____ Second most helpful
- _____ Third most helpful

21. Do you consider yourself to be overweight?
1 Yes 2 No
22. Do you think you need to lose weight?
1 Yes 2 No
23. How satisfied are you with your current weight? (select the number that best represents your level of satisfaction)
0 1 2 3 4 5 6 7 8 9 10
Not at all satisfied Moderately satisfied Very satisfied
24. How much do you want to weight 6 months from now? _____ Pounds
25. I plan to reach this goal by losing _____ pounds per week.
26. My *initial* activity goals for weight loss are _____ minutes of exercise _____ days per week.
27. My *ultimate* activity goals for weight loss and maintenance are _____ minutes of exercise _____ days per week.
28. My weight-loss eating plan includes eating approximately _____ calories of food and drink per day.
29. My weight-loss eating plan includes eating _____ percent or less of my calories as fat.
30. My current activity level is:
1 sedentary 2 moderate regular exercise 3 regular intense exercise
31. How important is feeling good physically in deciding what to weigh?
0 1 2 3 4 5 6 7 8 9 10
not at all important moderately important very important
32. How important is feeling good emotionally in deciding what to weigh?
0 1 2 3 4 5 6 7 8 9 10
not at all important moderately important very important
33. How important is preventing illness or health problems in deciding what to weigh?
0 1 2 3 4 5 6 7 8 9 10
not at all important moderately important very important
34. How motivated are you to engage in weight loss activities?
0 1 2 3 4 5 6 7 8 9 10
not at all motivated moderately motivated very motivated
35. How willing are you to lose 10 percent of your current weight in the next 6 months?
(Ten percent = your current weight without the last digit. For example, if your weight is 184 pounds, ten percent is 18 pounds).
0 1 2 3 4 5 6 7 8 9 10
not at all willing moderately willing very willing

36. How satisfied would you be with that 10 percent weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
37. How satisfied would you be taking up to 6 months to achieve a 10% weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
38. How satisfied would you be in maintaining a 10% weight loss for 6 months before attempting any further weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
39. Are you currently enrolled in a weight loss program?
 1 Yes 2 No

APPENDIX F

Weight Perceptions and Goals Questionnaire Follow-up Forms

WEIGHT PERCEPTIONS & GOALS QUESTIONNAIRE

Two-week retest

Directions: Circle or write in the most appropriate answer.

Today's date: _____

1. Age: _____ years
2. Race/ethnic group:
 - 1 Caucasian/White
 - 2 African-American/Black
 - 3 Hispanic-American/Latino
 - 4 Asian-American
 - 5 Native American/American Indian
 - 6 Other (please specify) _____
3. Marital Status:
 - 1 Single
 - 2 Living with significant other
 - 3 Married
 - 4 Divorced
 - 5 Widowed
4. Current height: _____ inches
5. Current weight: _____ pounds
6. Do you consider yourself to be overweight?
 - 1 Yes
 - 2 No
7. Do you think you need to lose weight?
 - 1 Yes
 - 2 No
8. How satisfied are you with your current weight? (select the number that best represents your level of satisfaction)

0	1	2	3	4	5	6	7	8	9	10
Not at all satisfied			Moderately satisfied				Very satisfied			
9. How much do you want to weight 6 months from now? _____ Pounds
10. I plan to reach this goal by losing _____ pounds per week.
11. My *initial* activity goals for weight loss are _____ minutes of exercise _____ days per week.
12. My *ultimate* activity goals for weight loss and maintenance are _____ minutes of exercise _____ days per week.
13. My weight-loss eating plan includes eating approximately _____ calories of food and drink per day.

14. My weight-loss eating plan includes eating ____ percent or less of my calories as fat.
15. My current activity level is:
 1 sedentary 2 moderate regular exercise 3 regular intense exercise
16. How important is feeling good physically in deciding what to weigh?
 0 1 2 3 4 5 6 7 8 9 10
 not at all important moderately important very important
17. How important is feeling good emotionally in deciding what to weigh?
 0 1 2 3 4 5 6 7 8 9 10
 not at all important moderately important very important
18. How important is preventing illness or health problems in deciding what to weigh?
 0 1 2 3 4 5 6 7 8 9 10
 not at all important moderately important very important
19. How motivated are you to engage in weight loss activities?
 0 1 2 3 4 5 6 7 8 9 10
 not at all motivated moderately motivated very motivated
20. How willing are you to lose 10 percent of your current weight in the next 6 months?
 (Ten percent = your current weight without the last digit. For example, if your weight is 184 pounds, ten percent is 18 pounds).
 0 1 2 3 4 5 6 7 8 9 10
 not at all willing moderately willing very willing
21. How satisfied would you be with that 10 percent weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
22. How satisfied would you be taking up to 6 months to achieve a 10% weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
23. How satisfied would you be in maintaining a 10% weight loss for 6 months before attempting any further weight loss?
 0 1 2 3 4 5 6 7 8 9 10
 not at all satisfied moderately satisfied very satisfied
24. Are you currently enrolled in a weight loss program?
 1 Yes 2 No

WEIGHT PERCEPTIONS & GOALS QUESTIONNAIRE

Questionnaire for monthly follow-up

Directions: Circle or write in the most appropriate answer.

Today's date: _____

1. Do you consider yourself to be overweight?
1 Yes 2 No
2. Do you think you need to lose weight?
1 Yes 2 No
3. How satisfied are you with your current weight? (select the number that best represents your level of satisfaction)
0 1 2 3 4 5 6 7 8 9 10
Not at all satisfied Moderately satisfied Very satisfied
4. How much do you want to weight 6 months from now? _____ Pounds

APPENDIX G

Marlowe-Crowne Social Desirability Scale (Form C)

The Marlowe-Crowne Social Desirability Scale (Form C)

Personal Reaction Inventory

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally.

- | | | | |
|------|-------|-----|--|
| True | False | 1. | It is sometimes hard for me to go on with my work if I am not encouraged. |
| True | False | 2. | I sometimes feel resentful when I don't get my way. |
| True | False | 3. | On a few occasions, I have given up doing something because I thought too little of my ability. |
| True | False | 4. | There have been times when I felt like rebelling against people in authority even though I knew they were right. |
| True | False | 5. | No matter who I'm talking to, I'm always a good listener. |
| True | False | 6. | There have been occasions when I took advantage of someone. |
| True | False | 7. | I'm always willing to admit it when I make a mistake. |
| True | False | 8. | I sometimes try to get even rather than forgive and forget. |
| True | False | 9. | I am always courteous, even to people who are disagreeable. |
| True | False | 10. | I have never been irked when people expressed ideas very different from my own. |
| True | False | 11. | There have been times when I was quite jealous of the good fortune of others. |
| True | False | 12. | I am sometimes irritated by people who ask favors of me. |
| True | False | 13. | I have never deliberately said something that hurt someone's feelings. |

APPENDIX H

Nursing Form

Nursing Use Only

1. Weight: _____ pounds
2. Height: _____ inches
3. Waist circumference: _____ inches

APPENDIX I

Internet-based Education Program Web Pages

Weight Education

Concerned about your weight?

Others are too.

Check out the new guidelines for weight and weight loss.

Put out by -- the National Institutes of Health (NIH) in Washington DC June 1998

Visit each of the following pages:

- [Weight class](#)
- [Health risks](#)
- [NIH weight loss recommendations](#)
- [Approaches to weight loss](#)
- [Comment/Questions](#)
- [Go back to our main page](#)



Weight Classification

How much do I weigh?

Most of us talk about our weight in pounds or kilograms.
That's only part of the picture.

Body Mass Index (BMI) - A new way to think about weight

Body mass index is a calculation of the amount of weight for height (kg/m^2).

Normal body mass is 18.5 to 24.9 kg/m^2

BMI greater than 25 indicates excess body fat-the higher the number, the more excess fat

NIH uses these classifications:

BMI: less than 18.5 Underweight
 18.5-24.9 Normal
 25.0-29.9 Overweight
 30.0-34.9 Obese (class I)
 35.0-39.9 Obese (class II)
 greater than 40 Extremely obese

How do I measure up?

Enter your weight in pounds here:

Enter your height in inches here:

Calculate BMI

Your BMI is:

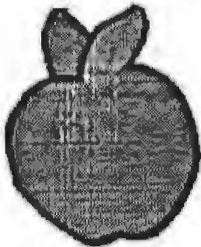
Interpretation:

I carry my fat well. Does that count?

Maybe



Persons shaped like pears, with more weight in the hips and thighs, have less risk of weight-related problems.



Persons shaped like apples, with more weight around the waist, have higher risk of weight-related problems, especially heart problems.

Previous page: [Weight Education](#)

Next page: [Health risks](#)

[Go back to our main page.](#)

Health Risks

"It's Ugly"

"My clothes don't fit"

Most women worry about excess weight because of how it makes them look, and what others think of them.

THOSE AREN'T THE ONLY PROBLEMS

Health care providers (doctors, practitioners, nurses) worry about costly and disabling illnesses that may result from being overweight.

Here are some of them:

HIGH BLOOD PRESSURE

- Makes the heart work harder
- Increases the chance of heart attack and stroke

HIGH CHOLESTEROL & TRIGLYCERIDES

- Promotes narrowing and clogging of blood vessels
- Increases the chance of heart attack and stroke

DIABETES MELLITUS

- High blood sugar levels
- Difficulty turning foods into energy for the body
- Increases the risk of heart and blood vessel disease, stroke, kidney failure, and loss of vision

CORONARY HEART DISEASE

Angina -

- Pain due to poor blood supply to the heart muscle
- May be a warning sign before a heart attack

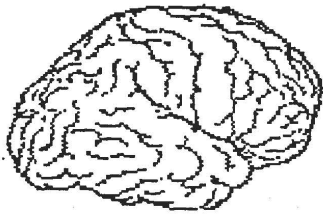
Heart attack (myocardial infarction) -

- Damage to the heart muscle from lack of blood supply and oxygen

Congestive heart failure -

- Inability of the heart to pump well enough to meet the body's demands





STROKE

- Blockage of blood flow to the brain or bleeding in the brain from a broken blood vessel
- May result in loss of memory, loss of speech, muscle weakness or paralysis of the arms and legs, problems with swallowing and eating, vision problems, difficulty caring for one's self

GALLSTONES

- Stones in the gallbladder where bile is stored
- May cause pain and digestive problems
- Stones may form more quickly during periods of rapid weight loss

ARTHRITIS

- Damage to joints - especially weight bearing joints like the hips, knees, and spine
- Causes pain and problems moving around
- May limit ability to exercise

SLEEP APNEA

- Absence of breathing for periods of time during sleep
- More common in BMI greater than or equal to 30, large neck (> 16 inches in women), large upper body, and snorers
 - Increases fatigue during the day
 - Increases weight gain, blood pressure, and heart irregularities
 - Increases risk for heart attack and stroke

CANCERS

Overweight women have higher rates of:

- Endometrial (uterus) cancers
 - Breast cancers
- Colon (intestinal) cancers

OTHER HEALTH PROBLEMS

- Respiratory problems, being short of breath with activity
- Infertility
- Pregnancy complications
- Menstrual irregularities
- Excess hair growth in women with masculine patterns
- Stress incontinence - urine leaking with any type of strain
- Social stigmas
- Depression

SO,

Which of these are the worst?

Any of the following are VERY HIGH RISK - VERY BAD, and need treatment (including weight management):

- Heart disease
- Heart attack
- Chest pain
- Previous bypass surgeries or vessel dilations around the heart
- Any blockage in blood vessels to the heart, brain or limbs
- Diabetes

Is that all?

NO

Any THREE (3) or more of these:

- Cigarette smoking
- High blood pressure
- High LDL cholesterol (low density cholesterol) - the bad guys
- Low HDL cholesterol (high density cholesterol) - the good guys
- High blood sugars or diabetes
- Family history (mother or father) of early heart attack -- (before age 55 in males, 65 in females)
- Female age 55 years or older or postmenopausal (males over age 45 years)

And we're still not done...

Lack of physical activity and high triglycerides add further health risk

How do I rate?

Any of the very bad problems?

How many off the second list? Was it 3 or more?

What about the last two?

Now I'm starting to get worried...

I didn't know it was all that bad...

What can I do?

Talk with your doctor, practitioner, or nurse.

Previous page: [Weight classification](#)

Next page: [NIH Weight Loss Recommendations](#)

Main page: [Family and Preventive Medicine](#)

NIH weight loss recommendations

The National Institutes of Health has drawn up guidelines for weight loss with the goal of:

Improving your health (this is most important)
Not making weight loss a terrible torture
Helping you feel and look better



Here's how to do it-be more healthy and lose weight:

THE INITIAL GOAL (for those who are overweight):

10% LOSS (in 6 months or less)

This amount is not designed to make the perfect new you

It WILL have noticeable effects

IT WILL MAKE YOU HEALTHIER

It WILL help prevent some of those awful problems and diseases

How much is 10% of my weight?

Enter your weight in pounds here:

Calculate Initial Goal

Your initial goal should be to lose pounds.

HOW FAST CAN I DO THIS?

Weight loss should generally be about 1-2 pounds per week.

If you lose 1 pound/week for six months, you could lose 26 pounds.

If you lose 2 pounds/week for six months, you could lose 52 pounds.

This may NOT be the number of pounds recommended for you however.

How many pounds was your initial 10% goal?

Enter the number of pounds here:

Calculate Number of Weeks

At one pound/week, it would take you weeks to achieve your first goal.

At two pounds/week, it would take you weeks to achieve your first goal.

Doesn't sound fast enough or dramatic enough to you?

Remember, the goal is to be more HEALTHY, and to ACHIEVE SMALL GOALS that can you can MAINTAIN.

MAINTAINING IS IMPORTANT

- NIH recommends maintaining the 10% loss for 6 MONTHS before trying to lose more
- During the six months, you have to KEEP THE GOOD HABITS THAT HELPED YOU TO LOSE
- You shouldn't gain back more than about 6 1/2 pounds.

Previous page: Health risks

Next page: Approaches to weight loss

Main page: Family and Preventive Medicine

Approaches to weight loss

There are LOTS of ways to lose weight

Successful losers use several ways: MORE IS BETTER

No, not more calories, more approaches!

#1 Motivation and attitude

- Do you really want to do it?
- Can you resist those high calorie, high fat, delicious foods-at least sometimes?
- Can you get more active?
- Is someone available to cheer you on?
- Will this make you feel better about yourself?

Wanting to lose weight and make changes in one's life is an important FIRST STEP!

#2 Diet



- Oh, that's a terrible sounding word.
- How many times have you tried that before? And how many varieties?

Check this out:



Here's how many calories/day it takes to maintain your current weight:
(This does not take into consideration activity levels or special metabolic needs)

Enter your weight in pounds here:

Enter your height in inches here:

Enter your age in years here:

Calculate Calories/Day

It takes Calories/day to maintain your current weight.

- Cutting back 500 calories per day will help you lose 1 pound/week
- Cutting back 1000 calories per day will help you lose 2 pounds/week

It's also good to keep fat intake to less than 30% of your calories

Don't want to eat that little?
Add exercise

Think you'll be hungry all the time, and never satisfied?
Maybe medication can help

#3 Activity/exercise

- It can be fun
- It can be addictive
- It can be pain free
- It doesn't have to take forever



START SMALL AND WORK UP

Initial activity goal:

10 minutes 3 times/week (walking, or whatever you like best)

Ultimate activity goal:

30-45 minutes/day 7 days/week - for the rest of your life!

#4 Behavior therapy

- Stress management (exercise works well for this too)
- Problem solving (finding good ways to deal with problems, other than drowning them in food)
- Social support (someone who cares, who's cheering you on, maybe even losing weight with you)
- Self-monitoring (checking up on yourself, being honest about things you're doing well and the things you're not doing so well)



#5 Pharmacotherapy (medicines to help with weight loss)

Recommended for individuals with BMI of 30 or above with no health risk factors for individuals with BMI of 27 and above with risk factors or disease

Includes:

- Stimulants (phentermine, Adipex): have a side-effect of decreasing the appetite; usually used for short-term therapy
- SSRI's (sibutramine, Meridia): regulate brain chemicals to decrease craving and compulsions to eat, and to increase satisfaction with meals; good for longer-term therapy
- Fat-absorption blockers (orlistat, Xenical): inhibit the absorption of dietary fats from the intestines following a meal. Must be taken with a low-fat diet.



#6 Surgery

- Can they just chop it off?
- How about a little trim here and there?
- Or maybe suck it out?

No, we're not going to talk about liposuction.

Surgical treatments, like stomach stapling and stomach bypass procedures, are reserved for the most obese (BMI greater than or equal to 40 or 35 with significant risk factors) where all other methods have failed.

These are serious measures, and done only after careful consideration. Individuals must have life-long medical follow-up after these types of surgery

Previous page: NIH weight loss recommendations

Next page: Comments/Questions

Main page: Family and Preventive Medicine

Comments/Questions

Input your Email if you would like to be contacted:

How did you like the program?

Did you learn anything new?

Do you think the NIH guidelines will be helpful to you?

Enter your comments and evaluation below:

Submit Query

Reset

Previous page: [Approaches to weight loss](#)
Main Page: [Family and Preventive Medicine](#)

APPENDIX J

Educational Program Evaluation Form

Educational Program Evaluation Form

Please evaluate the internet-based educational program about weight-loss guidelines by answering the following questions.

		Strongly agree			Strongly disagree		
1.	Easy access to web-site	5	4	3	2	1	
2.	Interesting presentation	5	4	3	2	1	
3.	Understandable	5	4	3	2	1	
4.	Easy to use	5	4	3	2	1	
5.	A good way to learn	5	4	3	2	1	
6.	Helpful information	5	4	3	2	1	
7.	Time consuming	5	4	3	2	1	

8. How long did the program take you? _____ minutes

9. What did you like most about the program?

10. What did you like least about the program?

11. Comments/suggestions:

APPENDIX L
Researcher Data Form

Researcher Data

BMI _____

Participant classification:

overweight obese I obese II obese III

1. CPG 6-month weight goal _____ Lb.

2. Lb./week: 1-2

3. Initial activity: a) 10 min.
b) 3 days/wk

4. Ultimate activity: a) 30-45 min.
b) 7 days/week

5. Calories: 1000-1200

6. Fat 30%

7. Follow up weight and satisfaction.

Date	Weight (pounds)	Satisfaction (0-10) 0= not satisfied 5= moderately satisfied 10= very satisfied
1 st month		
2 nd month		
3 rd month		

APPENDIX M

Worksheet to Accompany Educational Program

WEIGHT EDUCATION

Take Home Sheet

My BMI is:

This means that:

I am shaped more like an: Apple – my weight is of greater concern or
 Pear – my weight is of lesser concern

Check the health risks you have that go along with weight problems:

	High Blood Pressure		High Cholesterol or Triglycerides
	Diabetes		Coronary Heart Disease
	Stroke		Gall Stones
	Arthritis		Sleep Apnea
	Cancer		Breathing Problems
	Menstrual Problems		Bladder / Urine Incontinence
	Depression		Smoking
	Not Much Exercise		

I checked _____ risks. More than 1 or 2 mean that I really should lose weight.

Initial weight loss: 10% in six month: _____ Pounds in the next 6 months

At 1 pound per week, it would take me _____ Weeks

At 2 pounds per week, it would take me _____ Weeks

Goal: TO BE MORE HEALTHY

Weight loss approaches:

1. Motivation: Am I ready to lose? Yes or No

2. Diet

I need about _____ Calories per day to maintain my weight when I'm minimally active.

About 1/3 of these calories may be fat calories

I can eat more if I exercise more; or I can lose more quickly if I exercise more.

3. Exercise

Start with: 10 minutes, 3 times per week

Work toward: 30-45 minutes, 7 days per week

4. Behavior therapy: what will help me?

5. Weight loss medications: What drugs do I need more information about?