WEIGHT LOSS BEHAVIORS USED BY ACTIVE DUTY AIR FORCE PERSONNEL TO MAINTAIN COMPLIANCE WITH WEIGHT CONTROL STANDARDS

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DECKER

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ABSTRACT

Anecdotal comments suggest that military personnel utilize weight loss techniques that may be detrimental to their health. Whereas Sweeney and Bonnabeau (1990) studied a group of reserve Army medics to determine what they did to maintain weight standards, this descriptive study was designed to uncover the weight loss methods used by active duty Air Force personnel and to describe the frequency and duration that these methods were used. Demographic data were included to determine if differences existed between the various groups. Data on activity levels were also collected. Fifty-five individuals completed the survey. The data collected indicated that unhealthy weight loss behaviors were being utilized. The demographic data show that young females are most likely to engage in the pathogenic behaviors. The results of this study support the need for ongoing weight loss interventions.

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by

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THESIS

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DEDICATION

None of this, or anything else I accomplish in my life, is possible without Jesus. He makes me what I am. He also surrounds me with people who encourage, nurture, and support me. For all this, I am grateful.

I also dedicate this work to my family and friends. Without the sacrifice made by my husband, Jason, none of this would have been possible. The time we have been apart has allowed both of us to grow and achieve great success. Now we will be able to reap the benefits of our patience.

I want to thank my parents, Jim and Sandy Decker and Jim and Judi Shultz. Each of them offered me support when times got rough. Their faith in me and love was endless. I could not have finished this without them.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: THE RESEARCH PROBLEM

Introduction

The purpose of this study was to describe the weight loss behaviors used by active duty Air Force personnel to maintain compliance with weight control standards. The descriptive nature of this study provides a perspective into the positive and negative behaviors utilized by overweight personnel. The results may provide an area of health promotion that requires attention from nurse practitioners.

The emphasis on military personnel to comply with weight standards has increased. Air Force Instruction 40-502, The Weight Management Program, requires that each individual be weighed at least once a year. If the individual's weight exceeds the standard, he is measured to determine body fat percentage. If the individual exceeds the body fat standard, he is placed in the Weight Management Program (WMP) (AFI 40-502). He is also weighed before promotions, reenlistment, temporary duty or permanent change of station. Each of these personnel actions may be withheld or delayed if the individual is overweight or overfat.

Upon entering the WMP program, individuals receive a medical examination and diet counseling. Then the participants enter a 90-day exercise program. During Phase I, they are weighed on a monthly basis and are required to show satisfactory progress. This is defined as loss of one percent body fat per month or three pounds per month for women or five pounds per month for men. Failure to progress through the program results in administrative action by the unit commander. This ranges from verbal counseling to separation from the military.

Participants may enter Phase II when they meet the weight or body fat requirements. This consists of a six-month period of observation. Weighing and measuring continues on a monthly basis. If the individuals exceed the weight standard during Phase II, they are sent back to Phase I with administrative actions.

When the individual has maintained the weight or body fat standards for six consecutive months, he enters a one-year Probation Period. If the individual exceeds weight standards, he returns to Phase I with administrative actions. After one year of compliance with the weight standards, the individual is removed from the WMP. The repercussions for not meeting the standards are serious.

Anecdotal comments suggest that Air Force personnel utilize weight loss techniques that may be detrimental to their health. Sweeney and Bonnabeau (1990) conducted a study of 342 US Army reservists to determine the weight loss methods they used. Fifty-two percent (177/342) of the respondents reported using, or would not hesitate to use, at least one of six unhealthy weight loss methods listed. Almost four percent of the participants would use or had used all six methods listed. These methods included starvation diets, fad diets, self-induced vomiting, laxatives, diuretics and diet pills.

The authors considered the members of the Medical Unit well versed in the possible side effects of the methods listed. They considered the use of unhealthy weight loss behaviors as desperate measures to avoid reprimand or punishment. They also felt that the behaviors reported were not unique to their sample. Individuals will go to extremes to stay in good standing with military standards.

AFI 40-502 is important to the public image of the Air Force. However, it does not promote the health of the service members. Individuals that utilize negative weight loss techniques may be compliant with the standard, but that does not make them healthy. One role of nurse practitioners is health promotion (Griffith & Rahman, 1994). Nurse practitioners can focus on unhealthy weight loss behaviors identified by this study and play a role in emphasizing better alternatives. Nurse practitioners frequently participate in patient teaching. They are able to explain to individuals the effects that negative weight loss behaviors have on their overall health and their ability to perform their duties. They can then recommend more practical weight loss techniques, such as exercise and a low fat diet and provide positive reinforcement for healthy eating behaviors. They can explain that there are no quick fixes for being overweight.

Teaching can be done in an environment less threatening than the WMP. Individuals know when they are above the weight or body fat standards. They can approach the nurse practitioner before they have difficulty with a weigh-in. Sweeney and Bonnabeau (1990) reported anger, hostility, and resentment from troops when they were placed in the WMP. Service members may be more accepting and less stressed by weight loss methods when they are presented as health promotion measures and not as requirements to avoid punishment.

The present study is an attempt to determine how individuals cope with this stressor. It includes demographic data and compares the methods used by personnel from differing backgrounds. The behaviors used need to be identified. The next step would be

to determine if the techniques are detrimental or acceptable. Unhealthy behaviors need to be identified before changes are made to promote healthier practices.

Statement of the Problem

The problem addressed by this study deals with compliance with AFI 40-502, The Weight Management Program. As questioned by Sweeney and Bonnabeau (1990), is it "encouraging positive health behaviors as intended, or is it also fostering negative, unhealthy practices as individuals attempt to meet preestablished designated weight and body fat standards (p. 256) ?". Unhealthy weight loss behaviors have negative effects on an individual's overall health and ability to perform his duties. This does not make a fit fighting force.

Research Questions

Very little has been published on weight loss behaviors used in the military. The questions this study proposed to answer were:

1. What behaviors are active duty Air Force personnel using to maintain compliance with weight control standards?

2. Do personnel use certain behaviors based on demographic characteristics?

Answering these questions should lead to a better understanding of how active duty personnel lose weight.

Research Instrument

The research variables in this study fall under the broad category of weight loss behaviors. The methods that Sweeney and Bonnabeau (1990) inquired about included the use of weight control programs, exercise, and unhealthy weight loss practices. The

unhealthy behaviors listed consist of starvation diets, fad diets, self-induced vomiting, laxatives, diuretics, and diet pills. In this study, these variables were measured by a questionnaire which reported usage of these behaviors by active duty Air Force personnel to meet weight requirements. The frequency and the circumstances surrounding the use of these practices were also measured. Demographic information was collected to allow for comparison between ranks, career fields, levels of education, ages, sex, and activity levels; and weight loss behaviors.

Conceptual Framework

This research was based on the principal of wellness. It focused on identifying stressors and preventing any negative responses that resulted. Betty Neuman's Systems Model addresses stressors and an individual's reaction to stressors (Marriner-Tomey, 1994). It also discusses nursing's role in assisting the client.

Neuman's theory is based on the client as "wholes whose parts are in dynamic interaction (Marriner-Tomey, 1994, p. 271). " The parts consist of several lines of defense surrounding a core structure of energy and resources . The variables affecting the client are identified as physiological, psychological, sociocultural, developmental, and spiritual. The relationship between these variables influences a client's protective mechanism and determines the client's response. Another assumption made by Neuman includes a client's normal range of responses to the environment. It is represented by wellness and stability, and stressors attacking different levels of defense. Neuman developed a diagram consisting of several concentric circles to assist in visualizing her theory. The outer most circle is not solid and represents the client's

flexible line of defense. Its role is to fight the invasion of stressors or the reaction to stressors. It acts as a buffer for the normal line of defense. Prevention strategies can strengthen this line of defense.

The first solid circle is the normal line of defense. The usual degrees of wellness are established at this level. It protects the basic core structure of an individual. It is also the location for normal patterns of client wellness and is able to remain stable in the presence of most stressors.

When the normal line of defense is penetrated, the lines of resistance are activated. They are the last barrier before the core structure and represent resources that the client engages to defend against stressors. When these lines of resistance fail, the core structure begins to lose energy and the client deviates from his or her level of wellness. When the core structure is penetrated and the client responds to the stressor, the response takes the form of instability or illness.

A client's response to stressors depends on resistance from the lines of defense. The results of stressors attempting to penetrate the defense may be negative or positive. Nurses typically focus on negative stress responses.

Nurses determine the client's level of stability, the internal and external environmental stressors, and the effect of these stressors on the client's system stability (Meleis, 1991). Neuman states that nurses' actions focus on primary, secondary, and tertiary prevention and their care focuses on responses labeled stressful responses.

Primary prevention identifies potential stressors and works to prevent a stress

response. The reaction is prevented or decreased by reducing the client's connection with the stressor or strengthening the client's lines of defense.

Secondary prevention occurs once the stressor has already engaged the individual. The nursing role in this case is to enhance the client's wellness and attempt to decrease the stressor. The client's internal and external resources are used to strengthen the lines of defense to protect the core structures.

Tertiary prevention follows secondary prevention. Its goal is to return the client's system to a stable level. Energy is put into strengthening the lines of defense and preventing a recurrence of the stress reaction. Nursing plays a supportive role in all levels of prevention. The caregiver's goal is to maintain or to bring about the system's stability. Neuman labeled this process reconstitution.

A major role for nurse practitioners is promoting wellness (Griffith & Rahman, 1994). In this study, the process of weighing in or being measured may be viewed as a stressor for personnel exceeding weight standards. This stressor is able to penetrate the flexible line of defense. The individual engages in unhealthy weight loss behaviors as a negative stress response. The depth of penetration into the system's defenses may depend on the amount of weight by which the individual exceeds the standards and the time frame available to decrease the weight to comply with standards. The survey tool was designed to determine what weight loss behaviors were utilized and how often. The answers to these questions determine at what level the defenses have been entered.

Knowing the strength of the stressor will enable the health care providers, especially nurse practitioners, to determine what level of prevention is necessary. Goals

are established by negotiation with the client to correct variances from wellness (Marriner-Tomey, 1994). Being able to anticipate weighing in as a stressor enables nurse practitioners to intervene and assist the individual in building up the lines of defense and decrease the effect of the stressor. An example of this would be losing weight by a safe and effective process and therefore being in compliance with the weight standard.

The demographic data aid in determining the role that Neuman's variables play. The age, rank, and level of education were included in the demographic category. The questions regarding lifestyle addressed the impact of the sociocultural variables. Neuman's other variables were not included in the questionnaire.

Operational Definitions

For the purpose of this study, the following definitions were used:

Stressors

Tension-producing stimuli with the potential for causing disequilibrium (Marriner-Tomey, 1994).

Reconstitution

The state of adaptation to stressors in the internal and external environment (Meleis, 1991).

Weight Management Program (WMP)

A rehabilitative program designed to assist overweight individuals in meeting Air Force body fat standards. It also monitors individuals for 18 months after meeting body fat standards (AFI 40-502, 1994).

90-Day Exercise Program

A specifically designed conditioning and dietary program for members in the WMP (AFI 40-502, 1994).

Overfat

Body fat percentage exceeding standards set by the WMP.

Physical Fitness

The ability to rapidly transform stored energy to work. The ability to do daily tasks efficiently, without undue fatigue, and have ample energy remaining for military contingencies, emergencies, and leisure pursuits (AFI 40-502, 1994).

Satisfactory Progress

A change in body fat composition or weight that results in a decrease of a least one percent in body fat per month or a weight loss of three pounds per month for women or five pounds per month for men.

Unsatisfactory Progress

Failure to reduce body fat or weight at the rates described for satisfactory progress while in Phase I or an increase in body fat resulting in an individual's exceeding body fat standards while in Phase II or the probation period.

Limitations and Assumptions

Wellness representatives from the study site distributed the survey. The purpose of the study and the importance of handing out all of the surveys were discussed with the group. The researcher had no way of knowing if all of the intended surveys were actually

distributed by the wellness representatives. This method of distribution was utilized to keep the participants anonymous to the researcher.

The sample was limited to 250 of the 10,000 potential participants at the study site. This was done as a cost containing measure. The anticipated sample size would have yielded an adequate amount of data for analysis; however, the number of actual participants was not adequate to determine if the variable of career field correlated to weight loss behaviors used. Descriptive statistics were used to analyze the data.

By not distributing the survey by hand, validation of responses could not be determined. It was assumed that all participants answered the questionnaire honestly.

Summary

The purpose of this research was to discover the methods of weight loss utilized by active duty Air Force personnel to remain compliant with AFI 40-502, The Weight Management Program. Sweeney and Bonnabeau's study (1990) was conducted with personnel from an Army Reserve Unit. They discovered that 39 percent (133/342) of the respondents had difficulty maintaining their weight. This study combines a descriptive research design, the conceptual framework of the Neuman's systems model (Marriner-Tomey, 1994) and a survey to determine how active duty Air Force personnel cope with mandatory weight standards. The results of the survey attempt to answer the research questions noted. Chapter Two provides an overview of the literature as it applies to this study of weight loss behaviors of active duty Air Force personnel.

CHAPTER TWO: REVIEW OF LITERATURE

Maintaining a fit and healthy military is an important priority. The weight standards are based on the belief that military personnel will be more ready for the combat role without excess weight (Everett, 1987). Health care dollars are also saved when personnel maintain a healthy weight (Hawkins, Cooke, & Major, 1986).

Each branch of the military has designed its own program to assist its members in remaining compliant with the weight and body fat standards. These programs are necessary due to the number of troops who become overweight. Nearly ten percent of Navy personnel are reported to be overfat by Navy standards (Trent & Stevens, 1995). Statistics are not available for the Army and Air Force. The punishments for exceeding weight or body fat standards are comparable between the services. Members of all three services may be subjected to discipline ranging from administrative action to discharge for being overweight or overfat (AFI 40-502, 1994; Troumbley, Burman, Rinke, & Lenz, 1990; Trent & Stevens, 1993; Hoiberg & McNally, 1991).

The types of programs available vary according to the branch of service. The Air Force WMP was described earlier. The Navy program consists of a three-tiered program in which individuals are assigned to the different tiers according to the amount of weight loss required and eligibility (Trent & Stevens, 1993). The authors reported possible difficulties with this program due to a lack of standardization. Funding and staffing are also reported as problems.

Troumbley and colleagues (1990) described the Army's Weight Control Program (AWCP) as a program to assist, educate, and motivate personnel. It consists of weighing

personnel every six months to determine compliance with Army Regulation 600-9. Individuals not meeting the standard are expected to lose the excess weight in a specified period of time. They are supplied with weight loss information from a dietitian, community health nurse and physical therapist (Sweeney & Bonnabeau, 1990). Troumbley and her research team reported that overweight individuals are usually female, older, of lower social status, less physically fit, and less motivated.

Hawkins and coinvestigators (1986) offered a profile of Army personnel entered into the AWCP. They surveyed 160 participants in the program at Fort Bliss, of which only eleven percent (18/160) were female. The females reported an average age of 21.7 years, compared to the males' average of 29.4 years. The women in the program were lower in rank than the males. The average man was 8.6 pounds overweight; women averaged 7.6 pounds overweight. Seventy percent (112/160) of the participants were ten pounds or less over the standard. Thirty-six percent (58/160) were five pounds or less over the established limit and only 3.8 percent (6/160) were more than twenty pounds overweight.

An Australian study of 400 high school females found that 50 percent (200/400) of high school females surveyed have dieted to lose weight, while only 20 percent of the males had dieted (Crawford & Owen, 1994). They also discovered that women were more likely to engage in harmful weight reduction methods than males. Zuckerman, Colby, Ware, and Lazerson (1986) reported that 50 percent (315/631) of the college women surveyed perceived themselves as overweight, while only 13 percent (36/276) of the men considered themselves overweight. Only ten percent (63/631) of the women in

the study and eleven percent (30/276) of the men were actually overweight. This research project also concluded that individuals that lacked effective methods for tolerating stress were more prone to bulimia.

Another study conducted to describe characteristics and weight loss methods of persons trying to lose weight was done by Horm and Anderson (1993). They used data collected from the 1985 and 1990 versions of the National Health Interview Survey. They compared the results from several areas of questioning. During the 1985 survey, 24,171 persons were interviewed. In 1990, 31,347 persons were included. Forty-five percent of Americans (14,106/31,347) considered themselves overweight in 1990. More specifically, 37 percent of the men and 52 percent of the women considered themselves overweight. The number of people in the male and female categories was not given. Their results also disclosed that people of lower socioeconomic status were less likely to consider themselves overweight. People with less than a high school education were also less likely to consider themselves overweight. With age as the variable, the group between 45 and 64 years were most likely to think of themselves as overweight. They were followed by the 25 to 44 year group.

Horm and Anderson reported few differences between the 1985 and 1990 survey results. In both surveys, 23 percent of men and 40 percent of women were trying to lose weight. From these groups, there was a difference in what they considered the best weight loss method. In 1985, the participants reported that "eating fewer calories" and "not eating before going to bed" as the best ways to lose weight. In 1990, the best way to lose weight was by "increasing their physical activity" or by "eating no fat". The authors

felt this was a demonstration of Americans becoming more educated about weight loss strategies.

Two important questions were asked by the National Institute of Health (NIH) Technology Assessment Conference Panel (1993). They wanted to know how often and in what ways Americans try to lose weight. They reviewed information from industry and other sources and allowed public comment during the conference. They found that 33 to 40 percent of adult women and 20 to 24 percent of men were currently trying to lose weight. The older age groups in both sexes were more likely to try to lose weight. The percent trying to lose weight also increased with increasing levels of education and family income. One reason given for weight loss was to improve self-image. Another reason was weight-related health problems. The most important reason cited for weight loss was concern about future and current health, fitness, and appearance.

The methods of weight loss reported from the NIH Technology Assessment Conference Panel were discussed by gender. Among women trying to lose weight, 84 percent were eating fewer calories and 60 to 63 percent were increasing physical activity. The men reported 76 to 78 percent were eating fewer calories and 60 to 62 percent were increasing physical activity. These percentages were derived from four national surveys reviewed by the Panel. Another study they reviewed listed additional methods such as vitamins, meal replacements, over-the-counter products, participation in a weight loss program, and diet supplements. These methods were indicated by both sexes as currently used weight loss techniques.

The second question asked during the NIH conference was how successful were the various weight loss methods. They acknowledged that there is a lack of data on many commercial weight loss programs. They were concerned about this since over $30 billion is spent annually in America for these programs. They did note that dietary changes were the most common weight loss strategy. This covers methods such as calorie restriction and special carbohydrate diets. Short-term success is usually achieved with these changes, but the tendency is to regain the weight. The panel concluded that weight loss success requires a diet that can be adhered to long enough to reach the goal weight.

Another study on weight loss behaviors also investigated gender as a variable. Serdula et al., (1993) reviewed data from 11,467 high school students and 60,861 adults. Among the adolescents, females were more than twice as likely as males to consider themselves to be overweight. Thirty-four percent of the females (2,000/5,882) believed they were overweight, while only 15 percent of the males (838/5,585) felt they were overweight. Forty-four percent of the females (2,588/5,882) reported they were currently trying to lose weight. Fifteen percent of the males (838/5,585) were actively trying to lose weight. The methods of weight loss reported were exercising, skipping meals, using diet pills, and self-induced vomiting. In each case, females reported a higher percentage of use. The percentages were increased even further when asked if they had ever used any of these methods.

The adults surveyed reported similar results in that women were more likely than men to consider themselves overweight. Women had a positive response rate of 38 percent (13,090/34,447) and men a positive response rate of 28 percent (7,396/26,414).

The results changed very little when the question asked if they were actively trying to lose weight. Thirty-eight percent of the women (13,090/34,447) and 24 percent of the men (6,339/26,414) were currently attempting to lose weight. The attempts at weight loss dropped off in all individuals over the age of 59. Educational level did not play a role in the female category. However, in the male group, the more educated men were more likely to try to lose weight. Once again, females were found to be more likely to consider themselves overweight than males.

The literature reports on a number of studies conducted to determine what unhealthy weight loss methods are utilized. Most of the research involved wrestlers they are required to weigh in before each competition to establish the weight class in which they will compete. Marquart and Sobal (1994) questioned 197 high school wrestlers about weight loss techniques. They reported restrictive eating, spitting, restricting fluids, wearing rubber suits, sitting in saunas, taking laxatives and diet pills, and vomiting as the most commonly utilized weight loss strategies. Other weight loss techniques revealed in the literature include excessive exercise, gradual dieting, and heated wrestling rooms (Lakin, Steen, & Opplinger, 1990; Fogelhom, 1994).

Competitive body builders have also been identified as using negative weight loss methods (Anderson, Barlett, Morgan, & Brownell, 1995). Eighteen percent (8/45) of the body builders in the Anderson study used special diets, while 12 percent (5/45) chose to fast completely to lose weight. Nine percent (4/45) of their sample reported utilizing saunas, steam baths, and drinking less to lose weight quickly. Another six percent (3/45)

admitted using diuretics to slim down quickly. Calorie counting was the most commonly used method by body builders.

Competitive swimmers have been studied to determine their perception of weight and how they control their weight (Dummer, Rosen, Heusner, Roberts, & Counsilman, 1987). They collected data from 487 female and 468 male swimmers. They determined that females were more likely to misperceive themselves as overweight. Among the females, 15.4 percent (75/487) used weight loss techniques considered pathogenic. Only 3.6 percent (17/468) of the males reported the use of these behaviors. Pathogenic behaviors listed were self-induced vomiting and the use of laxatives, diuretics, and/or diet pills. More specifically, 7 percent (67/955) had fasted; 2.9 percent (28/955) had used self-induced vomiting; 2.8 percent (27/955) had used diet pills; 0.8 percent (8/955) had used laxatives; and 0.5 percent (5/955) had used diuretics. Other weight loss techniques reported were eating smaller meals, skipping meals, calorie counting, special diets, sauna or steam baths, and spitting. Females, as a group, were more likely to engage in the pathogenic behaviors.

Another group studied has been female gymnasts. Rosen and Hough (1988) surveyed 42 female college gymnasts. Sixty-two percent (26/42) reported using at least one form of pathogenic weight control. Self-induced vomiting was reported by 26 percent (11/42) of the group. Other commonly used methods were the use of diet pills and fasting. Each of these methods had 24 percent of the respondents (10/42) reporting their use. Other behaviors listed were diuretic use, fluid restriction, and laxative use. These pathologic weight loss methods are reported to lead to malnutrition, dehydration,

loss of vital electrolytes, hypoglycemia, and excessive adrenergic stimulation (Rosen & Hough,1988). The end result of these difficulties is decreased performance, increased risk of injury and even death. The gymnasts studied felt they were under great pressure to control their weight and, therefore, resorted to the use of these extreme behaviors.

Dehydration is a commonly reported means of weight loss. Groves (1987) reported on the effects of dehydration from excessive sauna use. The purpose is to lose weight and build endurance. The main risk with this method is raising the body temperature to a potentially stressful level. Strength, power and endurance are diminished for 24 to 36 hours after a session in the sauna. That is the amount of time necessary to allow the fluid to return to the muscle tissues. The article advocated a less drastic weight loss method of careful dieting and good nutrition.

Unhealthy weight loss techniques have been shown to affect performance. Weissinger, Housh, and Johnson (1993) stated that the only weight loss strategies that increase performance levels include increased exercise, skipping snacks, eating smaller meals, and counting calories. Weight cycling, the process of repeatedly losing and gaining weight, has been shown to reduce the resting metabolic rate which makes subsequent weigh loss more difficult (Horswill, 1993). Lakin et al. (1990) stated that 2.8 percent (21/764) of the high school wrestlers surveyed met the criteria for bulimia due to their choice of weight loss strategies. Perriello and co-researchers (1995) reported on the harmful effects of rapid weight loss on performance. They listed a decrease in strength and power, a decrease in muscular endurance, a decrease in testosterone, and a decrease

in isometric endurance and short-term sprinting as side effects of dehydration and starvation. In the military, a decrease in these abilities equals a decrease in readiness.

Freischlag (1984) studied the effects of rapid weight loss on the performance and health of high school wrestlers. The experimental group consisted of 104 high school wrestlers. The control group was comprised of 73 randomly selected male high school students. Food restriction was found to lead to a decrease in grip strength among wrestlers with rapid weight loss. The control group showed an increase in the mean grip strength during the four month test period. Energy levels were also reported to be lower in the group of wrestlers than among the control group. The method of weight loss was not indicated as a variable in this study.

Negative weight loss strategies can also affect an individual's health. Perriello and colleagues (1995) listed the harmful effects of these strategies as growth retardation, a high incidence of eating disorders, a decrease in concentration, mental dysfunction, decreased thermoregulatory function, electrolyte imbalances, decreased plasma volume and renal blood flow, increased susceptibility to infections, decreased protein levels, amenorrhea and osteoporosis. Fogelhom (1994) states that weight cycling leads to a lower resting energy expenditure and theorized that this could lead to an increased susceptibility to obesity with age. He also reports that overuse of diuretics to lose weight increases the risk of severe cardiac disorders. Frequent laxative use is associated with hypokalemia and a variety of gastrointestinal difficulties.

Brownell, Steen, and Wilmore (1987) offered a review of what is known about the metabolic and health effects of weight regulation practices in athletes. Based on the

research reviewed, they concluded that repeated cycles of weight loss and re-gain increased food efficiency so that weight loss would require greater calorie restriction with an increasing number of cycles. They also determined that the ratio of fat to lean may change when weight is lost and re-gained. Body fat distribution may also shift. This has the potential to increase the risk of heart disease. Weight cycling may lead to problems later in life.

Unhealthy weight loss has also been shown to affect an individual psychologically. Based on research done on high school wrestlers, Keller, Tolly, and Freedson (1994) associated the weight loss behaviors these wrestlers used with the disordered eating of individuals with anorexia nervosa and bulimia. They report an incidence of eating disorders among a group of 182 wrestlers as high as 25 percent (46/182). Emotional stability is shown to decline with excessive weight loss. Weight loss has also been associated with fatigue, anger, anxiety, feelings of isolation, depression, and low self-esteem.

Athletes are held accountable for their weight. According to Wilmore in an article by Thornton (1990), this sets up a natural environment for binge eating and purging. He also feels that any group is susceptible to eating disorders when there is a real emphasis on body image. This describes the military setting with mandatory weight and body fat requirements (AF 40-502. Recognizing these problems can be difficult, but it is the first step toward recovery. Rosen, McKeag, Hough, and Curley (1986) studied 182 female collegiate athletes to determine what type of person should arouse suspicion of having an eating disorder. Half of the athletes (57/114) who believed they had a history of obesity

reported using pathogenic weight loss techniques. The problem of inappropriate weight loss was more common among white athletes than black athletes. The author included a guide to assist in identifying pathogenic weight control behavior and tips on how to manage the situation appropriately. Behaviors to monitor include vomiting, binge eating, laxative use, severe calorie restriction, depression, and changes in physical appearance. The individual should be approached about these behaviors and given support in overcoming the disorder.

There are healthy methods of weight loss to be considered. Kayman, Bruvold, and Stern (1990) reported successful weight loss for women who learned weight loss strategies from a class or with the help of a physician or nutritionist. The plans utilized incorporated the use of exercise and a low fat-reduced sugar diet. Goal-setting programs are also reported as being successful in the area of weight loss (Berry, Danish, Rinke, & Smiciklas-Wright, 1989). These programs focus on health promotion at the work site. Another weight loss study reported success with commercial weight loss programs such as Weight Watchers (Marston & Criss, 1984). Forty percent (19/47) of the participants in the study group lost weight using this method. Approximately twenty percent (4/19) of the 19 successes were able to maintain their weight loss for greater than one year using strategies gained from the program.

Parlou, Krey, and Steffee (1989) reported that obesity was found to be more closely related to inactivity than to excess calorie intake. Their study of 160 subjects investigated the effect of exercise as an adjunct to diet in weight loss. No differences were observed among the eight exercise and nonexercise groups in age, height, initial

weight and weight to lose. The group with the least weight loss followed a balanced caloric-deficit diet and did not exercise. Each of the four exercise groups lost a greater percent of ideal weight than the nonexercise groups on the same diet. The investigators also did a follow up survey and found no significant changes in the exercise groups 6 and 18 months after the initial survey. The nonexercise groups regained approximately 60 percent of weight lost at six months and 92 percent of the weight by eighteen months. The individuals that continued to exercise or started to exercise after the study maintained weight loss or reversed weight regained. The authors concluded that the addition of exercise to a weight loss regime increased caloric expenditure derived from fat, decreased appetite, improved cardiovascular function and promoted a sense of psychological well-being.

Exercise has also been proven to be a significant factor in the weight loss process. Exercise decreases the total percentage of body fat and increases the lean body mass (Grubbs, 1993). This is fortunate since an increase in lean body mass means that more calories are required to maintain weight without any increase in exercise. Exercise may also decrease an individual's appetite. The effect is more pronounced in men than women. The type of exercise also determines the rate of weight loss. Weight loss is reported to be more rapid in individuals that walk or cycle instead of swim (Gwinup, 1987). However, Woodruff, Conway, and Linenger (1992) report that involvement with the Navy's Basic Exercise Program (BEP) is not enough to reduce an individual's weight to meet standards. Some individuals involved in their study gained weight and/or body fat and some overfat individuals became obese. Weight loss achieved by exercise alone

is more limited than that which can be obtained by calorie restriction. This was a conclusion from the NIH Technology Assessment Conference Panel (1993). They also reported the other benefits of exercise to include increased high-density lipoprotein cholesterol and increased lean body mass. They also found that continued exercise decreased the tendency for rapid post-program weight gain. The amount of weight loss by exercise ranges from 4 to 7 pounds.

A third positive weight loss technique found in the literature is behavior modification. This includes identifying eating and related life-style behaviors, setting specific behavior goals, modifying determinants of the behavior to be changed and reinforcing the desired behaviors. The goal discussed by the NIH Technology Assessment Conference Panel was to focus on gradual change which can be done as a group or on an individual basis. Participants achieved an average 1 to 1.5 pounds lost per week. The down side is that one third of the weight lost will be regained at the end of one year and most of the weight lost will be regained by five years. This is a safe method, but not usually effective in the long run.

The role of physicians in advising high school wrestlers about weight loss was examined by Tipton (1987). Wrestlers reported getting weight loss advice from parents, coaches, physicians, school administrators, school nurses, and health educators. The physician was the least contacted and consulted. Fellow wrestlers were most often sought out for advice. They recommended a daily calorie intake of 0 to 500 kcal per day. Dehydration was also commonly used to make weight. Physicians are encouraged to take a more active and aggressive role in promoting healthier weight loss practices. This

should extend to all health care providers. Offering better nutrition information, supervising weight loss practices, and encouraging better hydration states are all appropriate roles for health care providers.

In summary, the Army and Navy have studied the effects of their weight management programs. The need for these programs is evident. Studies have also been conducted to determine which individuals are most likely to be overweight and therefore at risk for engaging in unhealthy weight loss behaviors. The Air Force has not investigated how its personnel maintain compliance with its weight standards. Sweeney and Bonnabeau's study (1990) gave a brief glimpse with a specific population. The literature on weight loss behaviors used by other populations is extensive. Negative weight loss behaviors have been shown to affect performance and the physical and psychological health of individuals. Research has also shown that there are positive alternatives to the negative strategies uncovered. The most effective strategies include exercise and a low fat diet.

CHAPTER THREE: METHODOLOGY

This chapter describes the methodology of the study: the research design, instrumentation, validity and reliability testing, sampling and protection of human rights. The identified population for this study was active duty Air Force personnel assigned to one large Air Force base in the eastern United States. The variables examined were various weight control techniques, demographic characteristics and activity level.

Research Design

This was a descriptive study using a questionnaire to determine what weight loss strategies active duty Air Force personnel use to maintain compliance with AFI 40-502. The purpose of a descriptive study is to identify variables as they occur naturally, without any intervention (Burns & Grove, 1993). Descriptive studies are used to identify problems in current practice. By determining what weight loss behaviors are being used, problems may be identified.

There was no manipulation of the variables in this study. The phenomenon of interest identified is potential weight loss behaviors used by active duty personnel. The variables identified included the various pathologic weight loss techniques available, as well as the frequency and duration of use. The variables were defined operationally and also in regards to the conceptual framework selected.

The initial steps in conducting this study were to obtain a tool and select the desired sample. The tool was obtained from COL Sandra Sweeney, USA (Ret), one of

the authors of the original study. The sample was selected using a convenience sampling method.

The survey was modified and examined for content validity. Approval to conduct the study was obtained from the Institutional Review Board at the Uniformed Services University of the Health Sciences. An Air Force survey control number authorizing distribution of the survey was granted. Permission to conduct the study at the Air Force base was granted by the Public Affairs Office and the Wellness Center. The questionnaires were distributed to the wellness representatives from each squadron. Each wellness representative was instructed to distribute the survey packet to personnel from their squadron and inform the participant that the packet included instructions for completion and that the survey was anonymous. A cover letter in the packet requested that the participant complete the questionnaire anonymously and return it in the self-addressed, stamped envelope.

This process was carried out for both the pilot and the major study. The variables were coded and data reviewed after the pilot study was completed. No changes were made in the distribution process or the survey. Once questionnaires from the major study were received, data entry was initiated. The data were entered and analyzed using the Statistical Packages for the Social Sciences (SPSS) program. Descriptive statistics, including frequencies, means, and ranges, were generated to summarize the data.

Instrumentation

The instrument for this study was an adaptation of a questionnaire developed by Dr. Sandra Sweeney and Dr. Raymond Bonnabeau for the original study describing

weight loss behaviors of Army Reserve personnel (Appendix A). Dr. Sweeney is a professor of nursing systems at the University of Wisconsin-Eau Claire. Dr. Bonnabeau is a physician and former commander of the 30th Hospital Center, Chicago, Illinois.

The original questionnaire was specifically adapted for their study. It consisted of primarily forced choice items, although there were two open-ended questions. In an attempt to ensure confidentiality and anonymity, the only demographic data requested elicited a distinction between officers and enlisted. It was judged to have face and content validity, but how this was determined was not clarified.

The questionnaire was mailed to all members of the Army Reserve component commanded by Dr. Bonnabeau. Fifty-one percent of the questionnaires (342/669) were returned. The consensus of the respondents was that a weight control program was acceptable, but that the implementation and operation of the program was flawed.

The questionnaire utilized in this study was modified from the original. One question was deleted since active duty personnel do not participate in an annual tour. Five questions, numbers 17 to 21, were added to collect more extensive demographic data. This was based on a recommendation made by Sweeney and Bonnabeau (1990). The remaining 18 questions consisted of 13 yes/no questions, 2 multiple choice questions, and 3 open-ended questions. The yes/no questions inquired about difficulty maintaining weight and specific weight loss behaviors. The multiple choice questions asked how much weight loss was desired and the type and frequency of exercise. The open-ended questions solicited information about weight loss behaviors not listed and any comments the respondent might have about the study.

Validity and Reliability Testing

Validity

Validity of an instrument is a determination of the degree to which the tool actually reflects the variables being examined (Burns & Grove, 1993). Content validity determines to what extent the instrument includes all the major elements of the topic being studied. Estimates of the validity of this survey tool were not previously obtained. For this study, the content validity index (CVI) was determined by having two experts rate the content relevance of each item using a 4-point rating scale. To be considered an expert, the individual needed a minimum of a master's degree in a health field, was identified by their peers as an expert in weight loss or health promotion, had a military background, and was currently practicing in the field of weight loss or health promotion. The questions were ranked on a scale ranging from 1 (not at all relevant) to 4 (very relevant). The CVI, based on these results, was calculated to be 0.83. Based, on these recommendations, three questions were modified to better define the variable for the participants

Reliability

Reliability is concerned with how consistently the tool or technique measures the concept of interest. A pilot study was conducted to evaluate the sampling process and to determine test-retest reliability of the instrument. Fifty survey packets were distributed to the wellness representatives to disperse to personnel from their squadron. Each packet contained two copies of the survey (numbered), a consent form, instructions on how to

complete the survey, and two self-addressed, stamped envelops. The instructions stated to complete the first survey upon receipt and to mail it to the investigator. The same procedure was followed with the second survey two weeks later. Four participants returned both copies of the survey and four participants returned one copy of the survey. The reliability was determined by percent agreement to be 0.93 based on the responses of the four participants who completed the survey on the two separate occasions.

Sample

The target population consisted of active duty Air Force personnel. The personnel at the study site were chosen because of the convenient location and because approximately 10,000 personnel are assigned to the base with all career fields represented. The sample size for the pilot study was limited to 50 participants to contain costs. Two hundred and fifty surveys were distributed for the major study. Again, this number was chosen to have a sample large enough to be representative of the population but small enough to contain costs.

The participants in the study were chosen by the wellness representatives from the various squadrons on the base. The only criteria for inclusion in the study were that the participant must be an active duty Air Force member and stationed at the study site. All ages, ranks, career fields, and educational backgrounds were included.

Protection of Human Rights

Participation in this study was completely voluntary. A cover letter was included with the survey to explain the purpose of the study and that completion of the survey implied informed consent (Appendix B). The study received approval of the thesis

committee and the Institutional Review Board (IRB) at the Uniformed Services University of the Health Sciences. Approval was also received from the Public Affairs Office and the Wellness Center at the study site. The following procedure was used to ensure the confidentiality of the subjects responses. Participants in the pilot study received numbered surveys only to match up the original with the second survey. At no point were participants identified by name. Completed surveys were mailed to the researcher in stamped, self-addressed envelopes. Only the investigator was allowed access to the completed surveys. The participants were offered the opportunity to obtain the completed results of this study by so indicating on the survey form.

Summary

The descriptive nature of this study allowed the weight loss behaviors actually used by personnel to be identified. Interventions were not employed to influence the results. The questionnaire included mainly dichotomous questions. It asked questions about which behaviors were used, when they were used and how frequently they were used. This particular questionnaire was selected to replicate the original study as closely as possible. The content validity to determine the appropriateness of the tool to the purpose of the study and estimates of test-retest reliability were obtained to determine the stability or consistency of responses over time. A convenience sample was obtained from the study site. No patient contact was involved and anonymity was maintained. Descriptive statistics were used to evaluate the data. Chapter Four presents the data collected in this study.

CHAPTER FOUR: DESCRIPTION OF DATA

Results

This chapter will present the findings obtained from the data collection. A narrative presentation of the data will start with the questionnaire rate of return, demographic information (see Table 1), and then proceed through the remaining questions. Summary tables are then presented for each set of data.

Return Rate

Fifty five of 250 (22%) questionnaires were returned to the investigator. None of the returned questionnaires were excluded from the study but some questionnaires contained incomplete information which accounts for the varying response rates in the variable categories. No questionnaires were received after the established deadline.

Demographic Information

The age of the participants ranged from 19 to 52 years. The mean age was 32.2 years and ranged from 19 to 52 years of age. Forty-two percent of respondents (N=23) were less than 30 years old, forty percent (N=22) were between 30 and 40 years old, and 18 percent (N=10) were greater than 40 years old.

Sixty percent (33/55) of the participants were male. Thirty-eight percent (21/55) of the participants were female and two percent (1/55) did not indicate gender.

Respondents were asked to indicate the highest level of education completed. Thirty-one percent (16/51) listed high school as the highest level of education completed. Thirty-three percent (17/51) of the sample had an associate's degree. Twenty percent

(10/51) indicated they held a bachelor's degree, and fourteen percent designated a master's level of education (7/51). Two percent (1/55) held a doctoral degree.

Fifty-three participants completed the question on rank. Enlisted personnel made up 83 percent (44/53) of respondents, while officers consisted of 17 percent (9/53) of the sample. Twenty-nine percent of the participants (15/53) were airmen, 26 percent of the sample (19/53) were non-commissioned officers (NCOs) and 19 percent (10/53) were senior NCOs. Company grade officers made up four percent (2/53) of the sample with field grade officers comprising the remaining fourteen percent (7/53) of the sample.

Fifty participants completed the questions regarding career field. Each of the following career fields comprised two percent (1/50) of the sample for a total of six percent (3/50). These included contracting, safety, and training. Four percent (2/50) of the respondents were a part of the Air Force Honor Guard with another four percent (2/50) working in the civil engineering field. Six percent (3/50) of the study participants functioned as medical administrators. The transportation squadron had four personnel return surveys, which consisted of eight percent of the sample. Ten percent (5/50) of the respondents came from both the Air Force Band and the services squadron. Computer systems operators comprised twelve percent (6/50) of the sample. Twenty percent (10/50) of participants were members of the medical group with the remaining twenty percent (10/50) being part of the personnel/finance section.

Table 1

Demographic Data

Item	Number	Percent (100)
Age		
< 30 years	23/55	42
30-39	22/55	40
>40	10/55	18
Sex		
Male	33/54	61
Female	21/54	39
Educational Level		
High School	16/51	31
Greater than High School	35/51	6
Rank		
Enlisted	44/51	83
Officer	9/51	17
Career Field		
Air Force Band	5/ 50	10
Computer System Operator	6/50	12
Medical	10/50	20
Personnel/Finance	10/50	20
Services	5/50	10

Questions Number One to Five (see Table 2)

The following limitations should be kept in mind throughout this section of results. Not all participants completed every question. In most cases, this was based on the previous response. Also, for several of the questions, multiple answers were appropriate.

The first part of the questionnaire asked about the individual's ability to maintain one's weight. All participants answered this question. Thirty-eight percent (N=21) reported difficulty maintaining their weight. The remaining 62 percent denied difficulty maintaining their weight. Nine percent of respondents (5/55) reported being placed on the weight control program some time during their career. No respondents indicated that they were currently enrolled in the weight control program.

Only forty participants completed question number four. Twenty percent of respondents (8/40) stated they had attempted to lose weight when told they were not in compliance with Air Force standards. Eight percent (32/40) denied trying to lose weight when told they were not within Air Force weight standards. Several participants added that they had never been told they were not within standards and therefore checked the negative response.

The next question inquired about membership in weight loss organizations. Only nine percent of the respondents (5/55) had joined an organization to lose weight.

Table 2

Weight Beliefs and Practices of Participants

Belief/Practice	N = 55	% (100)
Have Difficulty Maintaining Weight	21	38
Have Been Placed on the WMP	5	9
Currently in the WMP	0	0
Tried to Lose Weight When Not in Compliance	8/40	20
Joined a Weight Loss Organization	5	9
Wishes to Lose Weight	30	54.5
Denied School or Training	0	0
Weight Fluctuates >10 lbs/month	2	4
Have an Eating Disorder	2	4
Treated for an Eating Disorder	0	0

Note. WMP = Weight Management Program; N = frequency of response; (%) = valid percent of each variable.

Questions Number Six and Seven

The answers to question number six showed that 54.5 percent of respondents (30/55) aspired to lose weight (see Table 2). Forty-five percent of individuals (25/55) indicated they did not wish to lose weight.

The amount of weight loss desired was also examined (see Table 3). Thirty-five responses were recorded. The amount of weight loss desired ranged from zero to thirty

pounds. The mean number of pounds indicated was thirteen. The most frequently cited amount of weight loss was ten pounds.

Table 3

Number of Pounds Participants Desired to Lose

Pounds	N = 35	% (100)
0-5	7	20
6-10	10	28.6
11-15	7	20
16-20	6	17.1
21-25	4	11.4
26-30	1	2.9
Totals	35	100

Question Number Eight

This question contained two parts. The first asked if the individual had ever been denied a school, training program, or award because they were enrolled in the weight management program (see Table 2). All respondents (100%) denied ever being counseled in such a manner. The response to the second part of the question was then unnecessary. None of the respondents inserted a number to indicate the number of times they had been denied training or awards due to placement in the weight management program.

Question Number Nine

All respondents completed this question. Only two individuals (4%) indicated that their weight fluctuated more than ten pounds within a month (see Table 2). The remaining 96 percent stated they did not have weight fluctuations to that degree within a one month period.

Questions Number Ten and Eleven

All respondents entered a response to this question. Two respondents (4%) indicated they might have an eating disorder (see Table 2). One of the individuals added that she was a compulsive overeater. The second individual offered no additional comments. The other 53 respondents denied having anorexia nervosa or bulimia nervosa. One hundred percent of the sample (N = 55) denied ever receiving treatment for an eating disorder.

Question Number Twelve

This question consisted of nine separate parts. All respondents completed this question. The first five parts inquired about specific weight loss behaviors (see Table 4). Twelve of the 55 participants (22%) stated they had tried or would not hesitate to try a severely restricted diet to lose weight. Popular dieting regimes had been or would be used by fifteen individuals (27%) to lose weight. Only three participants (5.5%) stated they had tried or would consider self-induced vomiting as a weight loss method. Laxative use was reported by eleven percent (6/55) of the sample participants.

Another temporary weight loss method explored was diuretic use. Five individuals (9%) reported using or considered using diuretics for weight loss, whereas

prescription or non-prescription diet pills were considered or used by 16 percent (9/55) of the sample participants.

Table 4

Techniques Used or Considered to Lose or Maintain Weight

Technique	N = 55	%
Severely Restrictive Diet	12	22
Popular Diet Regime	15	27
Self-induced Vomiting	3	5.5
Laxatives	6	11
Diuretics	5	9
Diet Pills	9	16

Note. N = frequency of response; (%) = valid percent for each variable.

The next part of the question inquired about frequency of usage (see Table 5). Only eighteen participants entered responses to this question. Thirty-nine percent (7/18) had used one of the above methods once in the last year. Another 39 percent (7/18) had used these behaviors 2-5 times in the last year. Eleven percent (2/18) indicated these behaviors had been used more than five times in the past year. The other eleven percent (2/18) had responded negatively to using any of these methods in the past year.

Table 5

Frequency Weight Loss Methods Are Used in the Last Year

Frequency	N = 18	% (100)
Not in the last year	2	11
Once	7	39
2-5 Times	7	39
>5 Times	2	11
Totals	18	100

Note. N = frequency of response; (%) = valid percent for each variable.

The third part of this question offered three options and requested information on when these behaviors were utilized (see Table 6). Participants were also allowed to enter their own time. The first option was before each annual weigh-in. Thirty-three percent (6/18) stated this was a time they used the stated methods. The second option was before each monthly weigh-in while in the weight management program. No participants stated that this was a time they engaged in these particular behaviors. The third and final option was when reporting to a military school. Eleven percent of respondents (2/18) stated this was one time they have used the above methods of weight loss. Sixty-seven percent (12/18) listed their own particular situations when these weight loss methods were employed. The responses are included with the percent of positive responses noted. Percentages are based on twelve positive responses. Other circumstances included when participating in physical training testing (8%), for a special occasion not otherwise specified (25%), prior to a permanent change of station (8%), most of the time (16.7%),

before the summer (8%), when personally dissatisfied with one's appearance (25%), and when starting a particular exercise program (8%).

The last part of this question asked participants to list any other weight control methods that were used. Participants were able to list more than one alternative method, so percentages are not given. Eleven participants wrote that no other methods were used to control weight. Exercise was the most commonly given method of weight control with seventeen participants (94%) citing it. Eleven people stated that a sensible diet was another weight control method used. Another method of suggested weight loss was herbal management. Two individuals added this to their list. One person cited a combination of a "balanced social, emotional, and spiritual life" as her weight control technique. One individual skipped meals to control weight. Other suggestions added by a single participant were not eating after 1800 and the use of Slimfast.

Table 6

Situations When Weight Loss Methods Were Used

Situation	N	%
Annual Weigh-In	6	33.3
Monthly Weigh-In	0	0
Reporting for School	2	11
Other	12	66.7

Note. N = frequency of response; (%) = valid percent for each variable.

Question Number Thirteen

This question was completed by 25 of the 55 participants (46%) in the study. The question only required answers if these weight loss behaviors had been used (see Table 7). The second part of the question asked when the weight loss technique was used (see Figures 1-3).

Thirty-two percent (8/25) of individuals stated that restricted eating was used to lose weight. The range of time this method was used was three days to three months. The mean number of days this technique was used by individuals indicating a positive response (8/25) was 18.5 days.

Popular dieting regimes were used by 36 percent (9/25) of the respondents. Of these nine respondents, the range of duration was two weeks to continuously. Two individuals stated they used this method continuously. Among the other seven, the mean duration of use was 39 days.

Table 7

Weight Loss Behaviors Used

Behavior	N = 25	%
Restrictive Diet	8	32
Popular Diet	9	36
Self-induced Vomiting	0	0
Laxatives	5	20
Diuretics	5	20
Diet Pills	6	24
Exercise	23	92
Other	4	16

Note. N = frequency of response; (%) = valid percent for each variable; Participants were allowed to select more than one behavior.

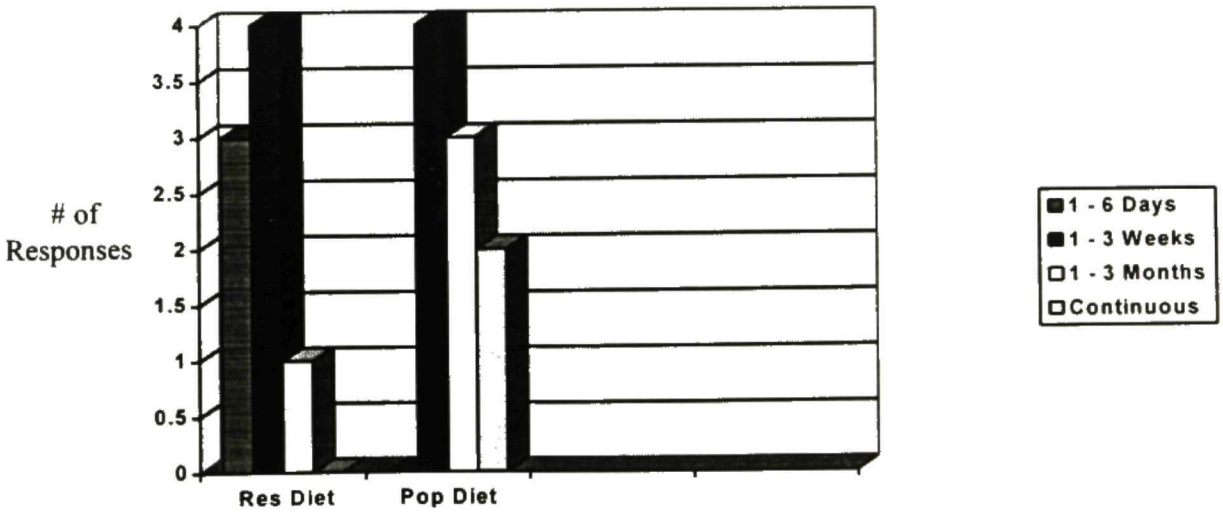

Figure 1. Dieting as a weight loss behavior: Duration of use and number of responses. (# = number; Res Diet = restrictive diet; Pop Diet = popular diet).

None of the participants indicated they had used self-induced vomiting as a means of weight loss, however, twenty percent (5/25) of the sample that completed this question reported laxative use as a weight loss technique. For individuals using this method, the range of time was one day to two weeks. The mean amount of time this method was used was 4.2 days prior to a weigh-in.

Diuretic use was indicated by twenty percent (5/25) as a weight loss practice. The range of time prior to a weigh-in that this was applied was from one day to two months. The mean amount of time that this was used was 14.4 days.

Diet pills, prescription and non-prescription, were taken by 24 percent (6/25) of the responding participants to lose or maintain their weight. The amount of time that these individuals engaged in this practice ranged from two weeks to two months. One of the six did not indicate when they used this technique. The mean length of use for the remaining five subjects was 41.6 days.

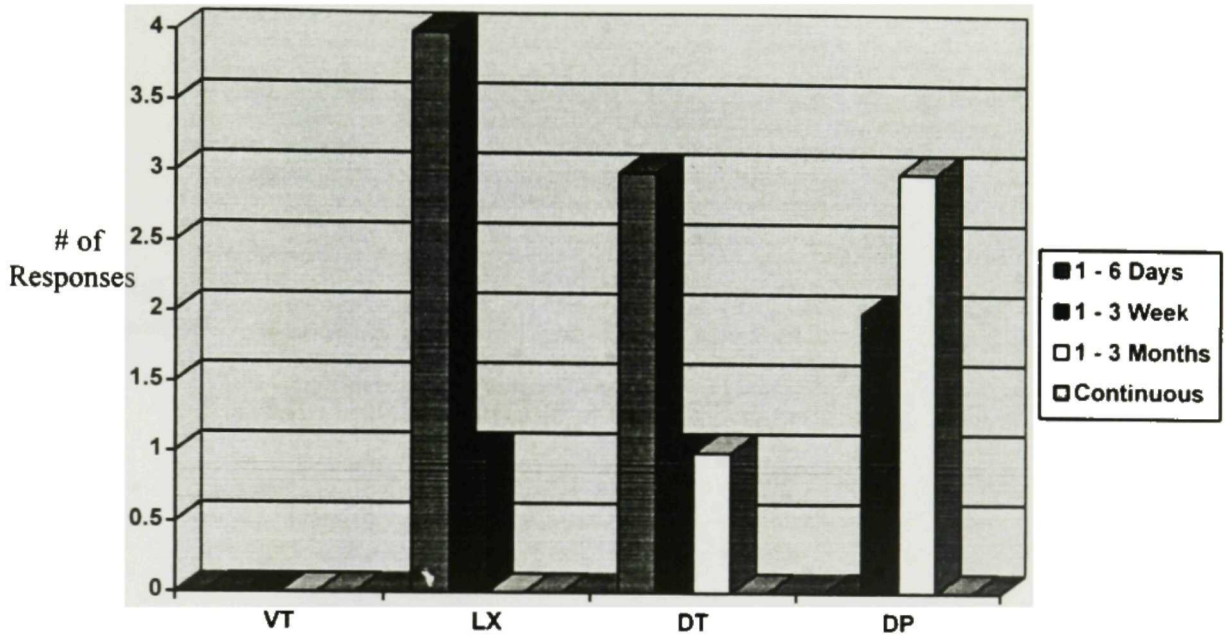

Figure 2. Chemical weight loss behaviors: Duration of use and number of responses. (# = number; VT = vomiting; LX = laxatives; DT = diuretics; DP = diet pills).

The most popular form of weight maintenance was exercise. Ninety-two percent (23/25) reported exercising to lose or maintain weight. The range of time listed for use was three days to continuously. Fifty-six percent of the positive responses in this category used exercise on a continuous basis to control their weight.

Two spaces were left open for participants to enter in other forms of weight loss. Other techniques reported and the number of individuals reporting it are as follows: sensible diet (2/55), multi-vitamin/amino acids (1/55), and a cabbage soup diet (1/55). Respondents reported using the sensible diet on a continuous basis. The multi-vitamins/amino acids were used for seven days prior to a weigh-in. The cabbage soup diet was also initiated seven days before weighing in.

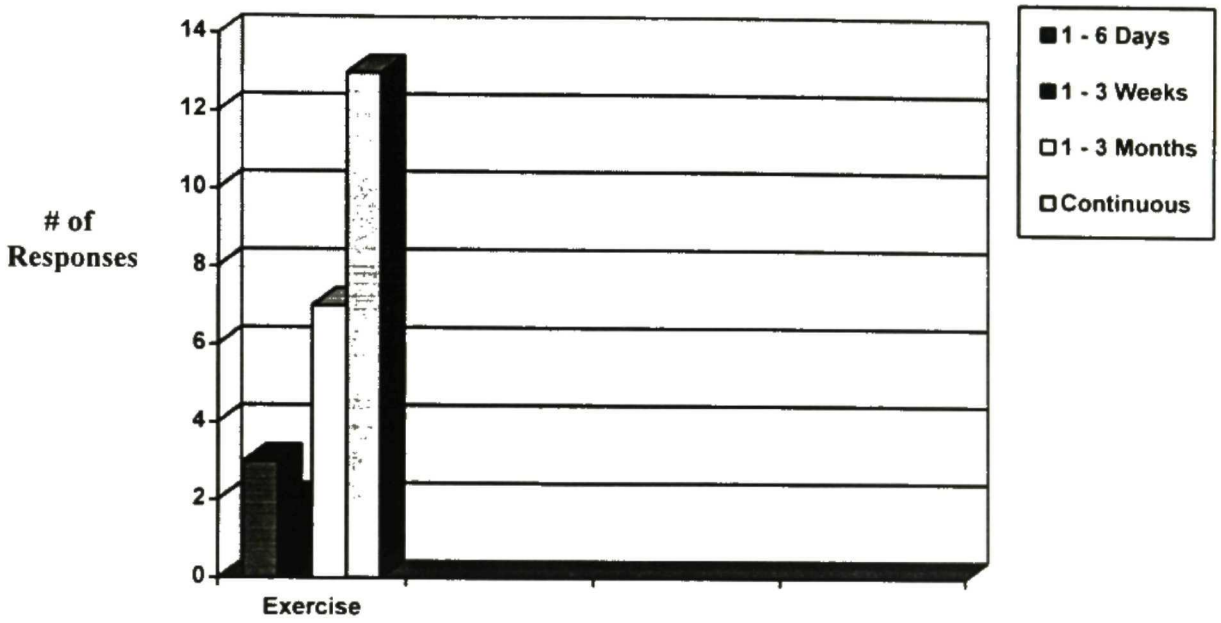

Figure 3. Exercise as a weight loss behavior: Duration of use and number of responses. (# = number).

Responses According to Age

Crosstabulations were completed to determine how the different age groups responded to questions on weight, weight loss and exercise. The respondents were classified as less than 30 years old, between 30 and 40 years old, or greater than 40 years old. Individuals less than 30 years old (N = 32) made up 42 percent of the sample. Participants between 30 and 40 years old (N = 22) comprised 40 percent of the sample with participants greater than 40 years old (N = 10) making up the remaining 18 percent.

Table 8

Weight Loss Beliefs and Practices According to Age

Age Group(years)	< 30		30-40		>40	
Weight Loss Practice	N	%	N	%	N	%
Maintain Weight	7/21	33.3	8/21	38.1	6/21	28.6
Desire Wt Loss	8/30	26.7	14/30	46.6	8/30	26.7
Wt Loss Organization	2/5	40	1/5	20	2/5	40
Restrictive Diet	5/12	41.7	4/12	33.3	3/12	25
Popular Diet	6/15	40	5/15	33.3	4/15	26.7
Vomit	3/3	100	0/15	0	0/15	0
Laxative	4/6	66.7	2/6	33.3	0/6	0
Diuretic	3/5	60	1/5	20	1/5	20
Diet Pill	4/9	44.4	4/9	44.4	1/9	11.2
Regular Exercise	20/45	44.4	18/45	40	7/45	15.6

Note. N = frequency of response; (%) = valid percent for each variable.

The first question reviewed inquired about difficulty maintaining weight (see Table 8). Twenty-one respondents indicated they had difficulty maintaining their weight. Seven of the 21 (33.3%) were in the less than 30 age group. Eight of the respondents (38.1%) were from the 30 to 40 age group and the greater than 40 age group had six participants (28.6%) indicate positive responses.

The next question, examined by age groups, was desire to lose weight (see Table 8). Thirty participants reported a desire to lose weight. The youngest age group had eight participants (26.7%) wanting to lose weight. The 30 to 40 year old age group contained fourteen individuals (46.6%) inclined to lose weight. The oldest age group included eight positive responses (26.7%) to this question. The amount of weight loss desired by the various age groups is presented in Table 9.

Table 9

Number of Pounds Participants Desired to Lose by Age Group

Age Group (years)	<30		30-40		>40	
Pounds	N	%	N	%	N	%
0-5	0	0	1	50	1	50
6-10	2	20	5	50	3	30
11-15	3	42.9	3	42.9	1	14.2
16-20	0	0	4	66.7	2	33.3
21-25	3	75	0	0	1	25
26-30	0	0	1	100	0	0

Note. N = frequency of response; (%) = valid percent for each variable.

The next series of questions examined the type of weight loss behaviors the participants used or would consider using (see Table 8). Five participants had joined a weight loss organization. Forty percent (2/5) of the positive responses came from the less than 30 age group with another forty percent (2/5) from the greater than 40 age group. The 30 to 40 age group had only one positive response (20%) to this question.

Restrictive dieting was considered or used by twelve individuals (see Table 8). The majority of them (41.7%) were part of the less than 30 category. One third (4/12) of the positive responses were from the 30 to 40 age group. Twenty-five percent (3/12) of the participants considering restrictive dieting were from the greater than 40 age division.

Popular diets were contemplated or used by fifteen participants (see Table 8). Six of the fifteen (40%) were less than 30 years old. Five of the fifteen (33.3%) were between the ages of 30 and 40 years old. The oldest age group had four of the fifteen (26.7%) positive responses.

Another weight loss technique examined was vomiting (see Table 8). There were three positive responses to this particular question. All three (100%) were from individuals in the less than 30 age division.

Laxative use was also analyzed by age divisions (see Table 8). Six positive responses were recorded for laxative use as a weight loss method. Four of the six (66.7%) were in the less than 30 age category. The remaining two (33.3%) were from the 30 to 40 age range. None of the participants over forty years old indicated they would consider laxatives to lose weight.

Another variable that was further examined was diuretic use (see Table 8). Five participants indicated they had or would consider using diuretics to lose weight. Sixty percent (3/5) were in the youngest age category. Twenty percent (1/5) came from each of the other two age divisions.

The last weight loss method examined was the use of diet pills (see Table 8). Nine respondents indicated that this may be an option for them. Both the less than 30 age

group and the 30 to 40 age group had four positive responses (44.4% each). The one remaining positive response (11.2%) came from the greater than 40 age division.

The final section evaluated by age division was regular exercise (see Table 8). Forty-five of the 55 participants indicated they participated in a regular exercise program. Twenty of the 45 (44.4%) were part of the less than 30 age group. Forty percent (18/45) of the positive responses came from the 30 to 40 year old division. The remaining seven positive responses (15.6%) were from the greater than 40 age category.

Responses According to Gender

Crosstabulations were performed to determine how the different genders responded to questions on weight, weight loss, and exercise. Sixty-one percent (33/54) of the respondents were male and 39 percent (21/54) of the respondents were female.

The first question reexamined was about difficulty maintaining weight (see Table 19). Twenty-one respondents felt they had difficulty maintaining their weight. Ten of the 21 (47.6%) were male and eleven of the 21 positive responses (52.4%) were from females.

The next question reviewed by gender was a desire to lose weight (see Table 19). Thirty participants stated they wanted to lose weight. Sixteen of the thirty (53.3%) were males. Fourteen of the positive responses (46.7%) came from females. The amount of weight loss desired by the two sexes is presented in Table 10.

Table 10

Number of Pounds Participants Desired to Lose by Gender

Sex	Male		Female	
Pounds	N	%	N	%
0-5	0/2	0	2/2	100
6-10	3/10	30	7/10	70
11-15	5/7	71.4	2/7	28.6
16-20	4/6	66.7	2/6	33.3
21-25	2/4	50	2/4	50
26-30	0/1	0	1/1	100

Note. N = frequency of response; (%) = valid percent for each variable.

The next seven questions examined the various weight loss techniques the participants used or would consider using (see Table 11). Five participants had joined a weight loss organization. One of the five individuals (20%) was male.

Another weight loss technique inquired about was restrictive dieting (see Table 11). Twelve individuals considered this method. The majority of individuals (66.6%) indicating this as a possible weight loss method were female. Popular diets were considered by fifteen participants (see Table 11). Eight of those individuals (53.3%) were women.

Vomiting was also examined by genders (see Table 11). There were three positive responses regarding this method: all three (100%) were females. Another variable was laxative use (see Table 11). Six positive responses were recorded for laxative use as a

weight loss method. Five females (83%) and one male (16.7%) indicated a positive response to this question.

Diuretic use was also analyzed by gender (see Table 11). Five positive responses, all female, were recorded for diuretic use as a possible weight loss technique. The last weight loss behavior reviewed was the use of diet pills (see Table 11). Nine respondents, eight females (88.9%) and one male (11.1%), stated that this may be an option for them

The final section reexamined by gender dealt with participation in a regular exercise program (see Table 11). Forty-five of the 55 participants indicated they engaged in a regular exercise program. Eighteen of the 44 participants (40.9%) that exercise on a regular basis were women.

Table 11

Weight Loss Beliefs and Practices According to Gender

Sex	Male		Female	
Weight Loss Practice	N	%	N	%
Maintain Weight	10/21	47.6	11/21	53.4
Desire Wt Loss	16/30	53.3	14/30	46.7
Wt Loss Organization	1/5	20	4/5	80
Restrictive Diet	4/12	33.3	8/12	66.6
Popular Diet	7/15	46.7	8/15	53.3
Vomit	0/3	0	3/3	100
Laxative	1/6	16.7	5/6	83.3
Diuretic	0/5	0	5/5	100
Diet Pill	1/9	11.1	8/9	88.9
Regular Exercise	26/44	59.1	18/44	40.9

Note. N = frequency of response; (%) = valid percent for each variable.

Responses According to Educational Level

The data collected was examined to determine how participants with different educational backgrounds maintained their weight. Participants were classified as high school graduates or greater than a high school education. The second group included participants with an associate's degree, a bachelor's degree, a master's degree and a doctoral degree. Thirty-one percent of the sample (16/51) stated high school was their highest level of education. The other 69 percent (35/51) stated they held a higher degree.

The first question asked about difficulty maintaining weight (see Table 12). Thirty percent (6/20) of the respondents having difficulty maintaining weight were high school graduates. Seventy percent (14/20) of individuals having weight problems had completed more than a high school education.

The next seven questions concerned various weight loss behaviors individuals may have used or considered using to lose weight. The first method discussed was joining a weight loss organization (see Table 12). Only four individuals reported this as a method they had used. One of the four (25%) had a high school education and the remaining three (75%) reported a higher level of education.

Another variable investigated the use of restrictive dieting. Twelve individuals considered or used this as a means to lose weight (see Table 12). Twenty-five percent (3 of 12) of the positive responses came from individuals with only a high school education. Seventy-five percent (9 of 12) of the responses were reported by individuals with further education.

Popular diets were considered or used by fourteen respondents (see Table 12). Six of the fourteen (42.9%) held a high school diploma. Eight of the fourteen (57.1%) held an advanced degree.

Vomiting as a weight loss method was also analyzed by educational level (see Table 12). There were three positive responses. One response (33.3%) was from the category of individuals holding a high school diploma. The remaining two responses (66.7%) were from individuals reporting advanced education.

Laxative use was also reexamined by level of education (see Table 12). Six individuals reported using or would consider using this as a means of weight loss. One of the six (16.7%) considering this had a high school education. Five of the six (83.3%) respondents were from the category of higher education.

Another variable that was investigated further was diuretic use (see Table 12). All four (100%) of the positive responses came from individuals with an education beyond high school. The last means of weight control examined was the use of diet pills (see Table 12). There were eight positive responses from individuals also reporting their level of education. Each group had four (50%) positive responses.

The final variable inspected with regards to educational level was regular participation in an exercise program. Forty-two participants reported their level of education as well as stated they engaged in exercise on a regular basis. Eleven of the 42 (26.2%) regular exercisers held a high school diploma. The remaining 31 (73.8%) reported holding an advanced degree.

Table 12

Weight Loss Beliefs and Practices According to Educational Level

Level of Education	High School		Greater than High School	
Weight Loss Practice	N	%	N	%
Maintain Weight	6/20	30	14/20	70
Wt Loss Organization	1/4	25	3/4	75
Restrictive Diet	3/12	25	9/12	75
Popular Diet	6/14	42.9	8/14	57.1
Vomit	1/3	33.3	2/3	66.7
Laxative	1/6	16.7	5/6	83.3
Diuretic	0/4	0	4/4	100
Diet Pill	4/8	50	4/8	50
Regular Exercise	11/42	26.2	31/42	73.8

Note. N = frequency of response; (%) = valid percent for each variable.

Responses According to Rank

Further examination of some of the variables was done in regards to the participant's rank. The two groups evaluated were enlisted and officer. Fifty-three individuals reported their current rank. Eighty-three percent (44/53) stated they held an enlisted rank and seventeen percent (9/53) indicated they were officers.

Table 13

Weight Loss Beliefs and Practices According to Rank

Rank	Enlisted		Officer	
Weight Loss Practice	N	%	N	%
Maintain Weight	15/21	71.4	6/21	28.6
Desire Wt Loss	22/29	75.9	7/29	24.1
Wt Loss Organization	3/4	75	1/4	25
Restrictive Diet	8/12	66.7	4/12	33.3
Popular Diet	11/14	78.6	3/14	21.4
Vomit	3/3	100	0/3	0
Laxative	4/6	66.7	2/6	33.3
Diuretic	2/4	50	2/4	50
Diet Pill	7/8	87.5	1/8	12.5
Regular Exercise	35/44	79.5	9/44	20.5

Note. N = frequency of response; (%) = valid percent for each variable.

The first question analyzed requested information about ability to maintain weight (see Table 13). Twenty-one individuals stated they had difficulty controlling their weight (fifteen [71.4%] enlisted personnel and six [28.6%] officers). Participants were also queried about their desire to lose weight (see Table 13). Twenty-nine respondents indicated they would like to lose weight. Enlisted personnel made up 22 of the 29 (75.9%) individuals wishing to lose weight. The officer category contained 7 of the 29

(24.1%) positive responses. The amount of weight each individual wanted to lose according to rank is included in Table 14.

Table 14

Number of Pounds Participants Desired to Lose by Rank

Rank	Enlisted		Officer	
Pounds	N	%	N	%
0-5	1/2	50	1/2	50
6-10	8/10	80	2/10	20
11-15	5/7	71.4	2/7	28.6
16-20	4/5	80	1/5	20
21-25	3/4	75	1/4	25
26-30	1/1	100	0/1	0

Note. N = frequency of response; (%) = valid percent for each weight category.

The next series of questions reviewed pertain to the various methods of weight loss. Four people joined weight loss organizations(see Table 13). Seventy-five percent (3/4) of these individuals were enlisted personnel and 25 percent (1/4) were officers.

Another method of weight control used or considered by active duty personnel was restrictive dieting (see Table 13). Twelve participants indicated they had used or would think about using this to maintain their weight. Eight of the twelve (66.7%) were enlisted, and the remaining four (33.3%) were officers.

Popular diets were another weight loss behavior participants had a chance to deliberate (see Table 13). Fourteen individuals indicated this was an option they would

consider. Enlisted personnel were more likely to use popular diets with 78.6% of positive responses (11/14) coming from that category. The remaining three responses (21.4%) were from the officer group.

Vomiting was not commonly reported as a weight loss method (see Table 13). Only three positive responses were noted. All three responses (100%) fell into the enlisted category.

Another technique discussed was the use of laxatives (see Table 13). Six individuals indicated they would consider or had used this as a means of weight control. Four of the six (66.7%) were in the enlisted category. The remaining two (33.3%) were in the officer category.

Diuretic use was also analyzed by rank (see Table 13). Four positive responses were recorded for diuretic use as a weight loss method. Each group had two individuals (50%) reporting diuretics as a means of weight control.

The final weight loss method considered by participants was the use of diet pills (see Table 13). Eight respondents indicated that this may be an option for them. Seven of the eight (87.5%) were in the enlisted group.

The final section evaluated by rank was regular exercise (see Table 13). Forty-four of the 55 participants indicated they participated in a regular exercise program and indicated their rank. Thirty-five of the 44 (79.5%) were enlisted personnel.

Activity Level

A series of questions were added to the survey to determine the activity level of the participants. The first question asked the respondent to indicate the amount of time

(in percentages) they spent sleeping, on duty, or involved in leisure activities (see Tables 15 and 16). The next two questions inquired about the activity level of the respondent during duty and leisure time. Examples were given to assist participants in assigning values to various activities.

Sleeping

The amount of a respondent's day that was reported as time sleeping ranged from ten percent to fifty percent. The mean time sleeping was reported as 28.8 percent, which equates to 6 hours and 48 minutes of sleep on an average day.

Duty Time

The amount of the participant's day that was reported as duty related ranged from 10 percent to 75 percent. The mean amount of time spent involved in duty related activities was 46.4 percent, or somewhat greater than eleven hours out of a day spent in activities related to work.

Leisure Time

The amount of leisure time reported by respondents as involving leisure activities ranged from 10 percent to 45 percent. The average time respondents participate in leisure activities was 24.8 percent or approximately six hours of leisure time on an average day.

Table 15

Percent of Time Spent in Various Activities

Activity percent	Sleeping		Duty Time		Leisure Time	
	N	%	N	%	N	%
0-25%	4	7.8	1	1.9	20	38.5
26-40%	45	86.4	14	26.9	31	59.6
41-60%	3	5.8	33	63.5	1	1.9
Totals	52	99.7	52	100	52	100

Note. N = frequency of response; (%) = valid percent for each variable.

Table 16

Mean Results of Time Spent in Various Activities

Percent of Day Activity	Hours	Mean Percent
Sleeping	6 hrs, 49 mins	28.8
Duty Time	11 hrs, 11 mins	46.4
Leisure Activities	6 hrs	24.8
Totals	24 hrs	100

Activity Level During Duty Time

Respondents were asked to indicate what percentage of their duty time they were very physically active, somewhat physically active, not very physically active, and not physically active (see Table 17). The range of time spent involved in very physical activity at work was zero to ninety percent. Twenty-six participants (52%) reported that

their duty did not involve activity that was very physically active in nature. The average percentage of time spent very physically active at work was 12.1 percent. Activities involving substantial physical activity were construction and carrying heavy loads.

The range of time spent engaged in somewhat physical activities during duty time was zero to one hundred percent. Fourteen respondents (28%) reported no activity at work that was somewhat physical in nature. The mean amount of time spent participating in somewhat physical activity at work was 22.2 percent. Carrying light loads was considered a somewhat physical activity.

The amount of time spent in activities that were not very physically active ranged from zero to one hundred percent. Eleven participants (22%) stated no time was spent in activities that did not require much physical activity while five participants (10%) revealed that all of their duty time was involved at this level of activity. The mean amount of time spent engaged in activities not requiring much physical activity was 30.4 percent. An example of this type of activity included directing traffic.

The last level of activity included was not physically active. The range of values was zero percent of their time to one hundred percent of their time. Fifteen individuals (30%) stated they spent none of their duty time involved in activities not requiring physical activity. The mean amount of time spent in tasks considered not physically active was 35.6 percent. This type of duty was comprised of computer work.

The results revealed that most of the individuals participating (35.5%) spent their duty time involved with activities that do not require physical activity (see Table 18). The amount of time spent in activities with not much physical activity was 30.4 percent.

Respondents reported being somewhat physically active during 22.1 percent of their duty time. The remainder of duty time (12.0%) was spent engaged in very physical activities.

Table 17

Level of Activity During Duty Time

Activity Level Percent	VP		SWP		NVP		NP	
	N	%	N	%	N	%	N	%
0-25%	43	86	33	66	30	60	26	52
26-50%	5	10	12	24	11	22	11	22
51-75%	1	2	3	6	2	4	3	6
76-100%	1	2	2	4	7	14	10	20
Totals	50	100	50	100	50	100	50	100

Note. VP = very physically active; SWP = somewhat physically active; NVP = not very physically active; NP = not physically active; N = Frequency of response; (%) = valid percent of each variable.

Table 18

Mean Level of Activity During Duty Time

Level of Activity	Mean Percent
Very Physically Active	12.0
Somewhat Physically Active	22.1
Not Very Physically Active	30.4
Not Physically Active	35.5
Total	100

Activity Level During Leisure Time

Participants were asked to identify the percentage of their leisure time that included activities requiring them to be very physically active, somewhat physically active, not very physically active, and not physically active (see Table 19). The amount of time spent in activities that were very physically active ranged from zero to one hundred percent. Twelve participants (24%) indicated that no leisure time was spent being very physically active. One respondent (2%) reported being very physically active throughout all his leisure time. The mean amount to time spent very physically active while at leisure was 19.5 percent. An example of this type of activity was running.

The range of time spent engaged in somewhat physical activities during leisure time was zero to one hundred percent. Ten participants (20%) revealed that no leisure time was spent participating in somewhat physical activities. In comparison, two individuals stated that all of their leisure time was spent in activities requiring somewhat physical activity. The mean percentage of time spent in somewhat physical activities was 24 percent. Golfing and walking were considered activities included in this category.

The range of time participants were involved in not very physical activities was zero to one hundred percent. Twenty-six percent of respondents (13/50) stated that no time was spent at this degree of activity. One person reported that all leisure time activities were at the level of not very physically active. The mean percentage of time at this level of activity was 24.5 percent. General housework was the example given for not very physically active.

The last level of activity included was not physically active. The range of values was zero to one hundred percent of their time. Thirteen individuals (26%) stated they spent none of their leisure time involved in activities not requiring physical activity. One respondent (2%) reported that all his leisure time consisted of activities that did not require physical activity. The mean percentage of time spent in non physical activities was 31.3 percent. Examples given for this level of activity consisted of reading or computer time. The results showed that most of the respondents' leisure time (31.3%) was spent engaged in activities that do not require being physically active (see Table 20). Not very physical activities comprised 24.5 percent of respondents' leisure time. Participants were somewhat physically active 24 percent of the time they are off duty. The remaining 19.5 percent of leisure time was spent engaged in very physical activities.

Table 19

Level of Activity During Leisure Time

Activity Level	VP		SWP		NVP		NP	
Percent	N	%	N	%	N	%	N	%
0-25%	38	76	35	70	30	60	25	50
26-50%	8	16	11	22	14	28	15	30
51-75%	2	4	2	4	5	10	4	8
76-100%	2	4	2	4	1	2	6	12
Totals	50	100	50	100	50	100	50	100

Note. VP = very physically active; SWP = somewhat physically active; NVP = not very physically active; NP = not physically active; N = frequency off response; (%) = valid percent of each variable.

Table 20

Mean Level of Activity During Leisure Time

Activity Level	Mean Percentage
Very Physically Active	20
Somewhat Physically Active	24
Not Very Physically Active	25
Not Physically Active	31
Total	100

Questions Number Fourteen, Fifteen and Sixteen

Participants were asked several questions regarding exercise. Eighty-five percent of respondents (47/55) stated they had a regular program of exercise. Only fifteen percent (8/55) did not incorporate a regular program of exercise into their daily routine.

The 47 participants who indicated that they did have a regular exercise program which lasted for a minimum of 15 minutes were asked how often they exercised (see Table 21). Twenty-three percent (11/ 47) exercised daily. Most participants reported exercising 1-4 times per week. This was seventy percent (33/47) of the exercising group. Only six percent (3/47) stated that they exercised less than once per week.

The next inquiry in this line of questioning pertained to the type of exercise practiced (see Table 22). More than one activity could be selected. Walking or running was used by 63.8 percent (30/47) of respondents who exercised. Another activity listed was aerobics. Only 12.8 percent (6/47) participants engaged in this activity. The

exercise bike and weights were each used by 42.6 percent (20/47) of the sample. Other exercise regimes were chosen by 29.8 percent (14/47) of respondents. Participants were not given the opportunity to enter the other activities specifically.

Table 21

Frequency of Exercise Programs (at least 15 minutes long)

Frequency	N = 47	% (100)
Daily	11	23.4
1-4x/wk	33	70.2
< 1x/wk	3	6.4
Totals	47	100

Note. N = frequency of response; (%) = valid percent for each variable.

Table 22

Type of Exercise Used on a Regular Basis

Type	Percentage
Walk/Run	63.8
Aerobics	12.8
Nautilus/Weights	42.6
Bike	42.6
Other	29.8

Comments from Participants

Several participants included additional comments at the end of the survey. One participant noted difficulty controlling diet during times of increased stress. The same

person also added that as he has gotten older, he has had to become more conscious of what he eats. Another respondent mentioned her difficulty maintaining an acceptable weight and added that although she has small successes she tends to gain back the weight. She noted that completing this survey reminded her that a sensible diet and regular exercise are the most appropriate weight loss methods. Several individuals stated that a sensible diet (low fat-low sugar) and regular exercise are helpful in regulating weight. No negative comments were noted.

Summary

The purpose of the descriptive study was to provide a picture of a situation as it occurred, without manipulation (Burns & Grove, 1993). The process used to report results from a descriptive study includes explaining the variables that are identified. This explanation includes frequencies, means and ranges of the given responses. The demographic data were combined to offer a picture of the sample. This information included age, gender, educational level, rank, and career field. The next section of data described weight loss beliefs, weight loss practices, timing of use and frequency of use. These variables were described to give an overall view of how active duty Air Force personnel maintain compliance with weight control standards. Four of the demographic characteristics were more closely examined regarding the various types of weight loss behaviors reported. The following sections included the level of activity that each participant reported and the exercise patterns and behaviors of the participants. The final section consisted of additional comments made by several participants. Examining the types and degrees of relationships was not the primary purpose of this study.

The final chapter will discuss the data just presented. It will compare the results of this study with the original study replicated, and will offer recommendations for further studies.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Content Discussion

The purpose of this study was to describe the weight loss behaviors used by active duty Air Force personnel to maintain compliance with weight control standards. This study was a replication of a study observing the weight loss behaviors of a medical Army Reserve group (Sweeney & Bonnabeau, 1990). This section will compare the results from the original study with the current data. It will also address the information collected in this study that was not included in the original study. The chapter will end with a discussion of further recommendations and implications for nurse practitioners.

Response Rate

The original study had a higher response rate (51%). The response rate for the current study was 22 percent. The difference in response rates was probably due to the different methods of distribution. The original study was sent to the participants and was returned by mail. The participants also knew the investigator. The other difference was the amount of demographic information requested. The original study only asked for the individual's rank which was noted by the authors as a limitation of the study. The current study included a number of questions about identifying characteristics. Both studies attempted to keep the participants anonymous.

Demographic Data

The only demographic data included in the first study was rank. The participants were asked to check if they were enlisted or officer. Thirty-three percent (112/342) of

their sample were officers, with 67 percent (230/342) being enlisted. Only seventeen percent (N= 9) in the current study were officers. The remaining 83 percent (N=41) were enlisted. Other demographic data collected in the current study included age, gender, educational level, and career field. These additional data will be discussed later.

Exercise

Both studies inquired about participation in a regular exercise program. In the initial study, 70.3 percent (240/342) stated they exercised on a regular basis. The active duty group in this study had a positive response rate of 85 percent (47/55). The difference in responses may be due to one sample being a reserve unit and one sample being an active duty group. Some squadrons conduct regular exercise programs for their troops. This could increase the number of positive responses for the active duty sample.

The responses to the frequency of exercise were similar in both studies. The original investigation showed 38.7 percent (91/236) exercising at least 15 minutes on a daily basis. In this study, 23.4 percent of the sample (11/47) stated they exercised daily. The majority of both samples stated they exercised 1-4 times per week. The numbers for the first study were 55.3 percent (131/236) and for the second study 70.2 percent (33/47). The fewest responses were reported in the category of exercising less than once per week. Six percent (14/236) of the initial study indicated this was how often they exercised. The current study had a positive response rate to this question of 6.4 percent (3/47). Both samples reported comparable results in the frequency of their exercise programs.

The next question queried about the type of activity involved in their exercise program. The results of the two studies had some similarities. Walkers and runners

made up 81.7 percent (168/263) of the exercise group in the initial study. The current study reported 63.8 percent (30/47) of the regular exercisers ran or walked as part of their program. This was the most frequently cited activity for both groups. Aerobics were more popular with the reservist sample as 22.1 percent (58/263) reported it as part of their exercise program. The active duty sample used in this study had a 12.8 percent (6/47) positive response rate to this activity. The percent of positive responses reported for weightlifting and bike riding were similar in both studies. Sweeney and Bonnabeau's study had 35.7 percent (94/263) lifting weights and 38.8 percent (102/263) riding bike. This investigation had a 42.6 percent (20/47) positive response rate for each activity. Thirty-seven percent (97/263) of the initial study reported using other types of exercise not specifically indicated. The current study indicated that 29.8 percent of the exercising group (14/47) engaged in other types of activities for exercise. The types of exercise used by both samples were fairly similar. They both ranked the type of exercise by frequency of report the same way. Running or walking appears to be the most popular form of exercise used by both of the military populations involved in these studies.

Weight Loss Beliefs and Practices

The next series of questions inquired about weight loss beliefs and weight loss methods. In both studies, 38 percent of the sample (130/342 and 21/55) reported difficulty maintaining their weight. With this information, it is interesting to note that 21.4 (73/342) percent of the reservists report having been placed on the weight control program. Only nine percent of the active duty sample (5/55) had been placed on the weight management program. Seventeen percent (58/342) of the initial sample were

enrolled in the weight control program at the time they completed the questionnaire. None of the current sample were enrolled in the weight management program at the time they completed the survey. There could be several reasons for these results. The active duty sample may do a better job at staying out of the weight management program because the Air Force has less stringent weight standards as compared to the Army. Another reason is the active duty versus reserve status. The active duty sample can be observed and reminded on a daily basis by their supervisors about their weight. The active duty sample has a more constant reminder. They may also work harder at maintaining their weight since the military is their only means of support. For the reservist, the income earned from the military is usually a supplement to their total income. This area showed several differences between the two samples.

The question asked if personnel had tried to lose weight when told they were not in compliance with their service's weight standards. Forty-two percent (142/342) of the original sample stated they had tried to lose weight when told they were out of standards. Twenty percent of the active duty sample (8/40) reported the same. This question is difficult to interpret. Five of the participants in the current study indicated they had not tried to lose weight because they had never been told they were not meeting the weight standard. This makes it difficult to determine if personnel answered "no" because they had never been out of compliance with the weight standard or because they had been out of compliance and chose to do nothing about it.

Another question compared between the two studies is enrollment in a weight loss organization. The original sample indicated that 17.7 percent (61/342) had joined an

organization to help them lose weight. The current sample had a positive response rate of nine percent (5/55). The original sample was twice as likely to join a weight loss organization such as Weight Watchers or TOPS. This is interesting since the original study was conducted in 1987. It might be that there is more media and advertising exposure to join these organizations to lose weight now than there had been in the past.

The desire to lose weight was shared equally by the two samples. The original study reported a positive response rate of 58.6 percent (200/342). The current study indicated that 54.5 percent of the sample wished to lose weight. The amount of weight loss desired by the two groups was also compared and found to be similar (see Table 23).

Table 23

Comparison of the Number of Pounds Participants Desired to Lose Based on Frequency and Percent

Group	Initial Sample		Current Sample	
Pounds	N	%	N	%
0-5	34/200	17	7/35	20
6-10	66/200	33	10/35	28.6
11-15	45/200	22.5	7/35	20
16-20	32/200	16	6/35	17.1
> 20	23/200	11.5	5/35	14.3

Note. N = frequency of response; (%) = valid percent for each variable.

The results from question number eight were consistent with previous questions. The initial sample indicated that 9.4 percent (31/342) had been denied a school, training program or award because they were enrolled in the weight control program. None of the

respondents in the current study reported this occurrence. The number of times the participant was reprimanded in this manner was also reported in the original study. Forty-one percent (13/31) had been reprimanded once, 51.6 percent (16/31) had been reprimanded from 1-3 times, and 6.5 percent (2/31) had been reprimanded from 4-6 times. There were no responses to that part of the question in this sample. The results to this question are not surprising. The original sample indicated a larger percentage of personnel enrolled in the weight control program compared to the current sample. It stands to reason that they would also have a higher percentage of individuals being punished for being enrolled in this program.

The next question inquired about significant weight changes in a one month period. Fourteen percent (48/342) reported an increase or decrease of ten pounds or more in a one month period during the initial study. Only four percent of the current participants (2/55) reported similar weight changes. One can only speculate why there is a difference between the two studies on this question.

The results from the next line of questioning were comparable. The participants were asked if they thought they might have an eating disorder. Both studies reported a positive response rate of four percent (14/342 and 2/55). The only difference was in the percent of individuals that had received treatment for an eating disorder. The original study cited 1.2 percent (4/342) of their respondents had been treated for an eating disorder. None of the participants (0/55) in the current study indicated they had received such treatment.

Participants were given a list of inappropriate weight loss behaviors and were asked to indicate if they had used or would consider using each of them to lose weight. The first method was restrictive dieting. The sample in the first study were more likely to use this behavior to lose weight. Forty-two percent (143/342) of the initial sample stated they would at least consider this method of weight loss. Only 22 percent (12/55) of the current sample indicated they would think about trying this technique. Popular diets would be considered an option for 26.5 percent (91/342) of the original group. The current sample reported similar results with a 27 percent positive response rate (15/55).

The results were also comparable when vomiting was the behavior in question. The original sample reported vomiting as a possible weight loss method for 4.5 percent (15/342) of the sample. The active duty sample had 5.5 percent of the participants indicating they would at least consider this behavior to lose weight.

Forty-two of the reservists (12.3%) reported laxative use as a weight loss method they would consider. The active duty sample had a similar response rate, with eleven percent (6/55) indicating laxatives were a potential weight loss method for them. Diuretics were also an option listed. The original group was more likely to consider diuretic use than the current sample. They reported a positive response rate of 19.6 percent (67/342). The other group only had nine percent (5/55) of the sample with positive responses. The other medication considered for weight loss was diet pills. This was another area where the two groups varied. The original study reported 26 percent (89/342) of the sample considering this method to lose weight. The current study concluded that 16 percent (9/55) of this sample would consider using diet pills to lose

weight. This is of interest since new prescription diet pills are currently being marketed as highly effective weight loss measures.

The original and the current study had few differences. They each had the same percentage of personnel reporting difficulty maintaining their weight. The 21.4 percent (73/342) of individuals from the original study that had been placed in the weight control program was notable when compared to the nine percent (5/55) from the current study. Several possible reasons were given for this deviation. The percentage of people wanting to lose weight and the amount of weight loss desired were comparable. The original study had higher rates of restrictive dieting, diuretic use, and use of diet pills than the current study. Why there is such a difference is unknown. The current study reinforced the results of the original study. Both studies reported a number of individuals (178/342 and 20/55) who used unhealthy methods to lose weight to maintain compliance with military weight standards.

Additional Data Collected

This study collected data that was not included in the original study. Demographic data was collected to further identify groups that may be at greater risk for utilizing inappropriate weight loss behaviors. The older age group, greater than 40 years old, had more difficulty maintaining their weight than other age groups. They were also more likely to want to lose weight. When comparing behaviors used to lose weight, the less than 30 age category was more likely to employ the use of vomiting, laxatives and diuretics. The other methods listed were used equally according to representation in the sample.

Gender was another additional piece of data collected. The females reported more difficulty maintaining their weight than the males. Different weight and body fat standards are established for each gender. Females were more likely to incorporate the unhealthy behaviors into their weight loss strategy than the males. Exercise was equally divided among the sexes.

When educational level was considered, there were no big discrepancies. Individuals with a higher level of education had a slightly higher tendency to use popular diets, vomiting, and laxatives than individuals with a high school diploma. The level of education did not contribute much to the type of weight loss behavior used.

The last area where demographic groups were compared was rank. Officers had a slightly more difficult time maintaining their weight than enlisted personnel. Enlisted personnel were more likely to engage in vomiting and the use of diet pills than officers. On the other hand, officers were more likely to use restrictive diets, laxatives, and diuretics. Both groups engaged in unhealthy weight loss behaviors, but not to the same degree.

Although the person most likely to engage in unhealthy weight loss behaviors in this study was a young female, generalizations from the data cannot be made due to the relatively small sample size. Educational level and rank offer no clear indication of who would be the most likely to utilized the inappropriate methods listed.

Other data collected inquired about the participants' level of activity. The results showed that most of an individual's time is spent in duty related activities. Their activity during this time consisted mainly of activities that were not very physically active to not

physically active. Participants were slightly more active during their leisure time, but they spend less of their day at leisure activities.

The last area of supplementary data collected pertained to the duration of use of the various weight loss behaviors. Exercise was the most consistently used method. A majority of respondents using this method used it continuously. Restrictive and popular diets were the only other methods used on a continuous basis by anyone. The chemical forms of weight loss were usually used on a short term basis. This would be consistent with Neuman's systems model. The participants use these inappropriate behaviors when they become stressed about having to be weighed. The stress of being over their weight breaks down their normal lines of defense. These behaviors constitute the last resource the individual has before succumbing to the stress. This is where nurse practitioners can play an important role. They can offer individuals other resources that are more appropriate and also help to prevent the stress.

Implications for Military Health Care Providers

Overweight individuals are a part of the active duty Air Force population. These individuals should not need to be identified as overweight by an official weigh-in. Patients are weighed at each visit to a health care provider. These individuals should be approached about their weight when they enter the health care system for any reason. Health care providers should use every opportunity to provide clients with education about health promotion. This includes appropriate methods for weight loss. Individuals may not perceive weighing-in as a stressor if they are better able to control their weight. A sensible diet and exercise program are the most appropriate and successful weigh loss

methods. Health care providers could coordinate a weight loss program that provides education and support on an ongoing basis. Enrolling in this program could keep the individual from being caught outside of weight standards. It could even help them achieve a weight that would prevent them from needing to use unhealthy weight loss behaviors. Lifestyle changes are the only way to sustained weight reduction and maintenance.

Further Research and Recommendations

A descriptive study is a stepping stone to further research. It opens up an opportunity for further research based on the results. The study described the weight loss behaviors utilized by active duty Air Force personnel to maintain compliance with weight management standards.

The next step in the research process would be to develop a study involving manipulation of the subjects. One group could be offered education about appropriate weight loss behaviors. The other group, the control group, would not receive any education in this area. This intervention would allow further application of Neuman's system model. This study was an example of primary prevention. It indicated that a stressor does exist. The intervention would be consistent with secondary prevention. The survey could then be distributed and the results between the two groups compared.

Changes could also be made to the survey. Questions twelve and thirteen could be integrated to make the survey more concise and easier to complete. The demographic information should be included to offer comparisons between groups. The questions about activity level offer data that may be useful in other studies. It could be deleted

from this questionnaire. A limitation of the survey is the space provided for additional information. Useful data could be collected from individuals providing a narrative of the routine they go through prior to a weigh-in. There may be other behaviors identified if participants thought about the process they go through prior to a weigh-in.

Another line of questioning that could be added to future surveys could address the success of the these behaviors. Do personnel that use these methods make their weight when they utilize these behaviors? How does their weight one to two days after a weigh-in compare to their official weight? Do they feel guilt when they use these methods? What happens when they are called for a random weigh-in? These questions could be used to develop another descriptive study to further identify how maintaining compliance with weight standards affects personnel.

A qualitative study could be conducted to determine how personnel utilizing inappropriate weight loss behaviors feel about their weight and the pressure to maintain compliance with weight control standards. This would provide further evidence for Neuman's systems model. It would further identify weight as a stressor for part of the active duty population.

Another change recommended for further study is the distribution of the survey. The low response rate (22%) could have been due to several factors. The first is all the surveys may not have been distributed by the wellness representatives. The second is participants may not have wanted to divulge such sensitive information. The participants were kept anonymous, but they may have feared reprisal. Ensuring anonymity of the participants is helpful when dealing with a sensitive topic. A better rate of response could

be obtained by distributing the survey in person and allowing the participant to fill it out at that moment. The responses would be kept confidential and participants would not be asked to give their name, only demographic information. Distribution at large gatherings such as a commander's call could also increase the rate of return.

This study was just the first step in uncovering the weight loss behaviors used by military personnel. Other areas of weight management need to investigated. This study discovered that unhealthy behaviors are utilized. To ensure a fit and healthy military, these behaviors need to be addressed and replaced by more appropriate methods. The data presented provide evidence that a problem does exist in the Air Force. Further research needs to be conducted to determine the extent of that problem and how to solve it.

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APPENDIX A

Weight Control Survey

1. Do you have difficulty maintaining your weight?

_____ Yes _____ No

2. Have you ever been placed on the weight control program?

_____ Yes _____ No

3. If yes, are you on the weight control program now?

_____ Yes _____ No

4. Have you tried to lose weight when told you were not in compliance with Air Force standards?

_____ Yes _____ No

5. Have you ever joined an organization to help you lose or maintain your weight?

_____ Yes _____ No

6. Do you want to lose weight?

_____ Yes _____ No

7. If yes, how many pounds do you wish to lose? _____ pounds

8. Have you ever been denied a school, training program, or award due to being on the weight management program?

_____ Yes _____ No

a. If yes, how many times: _____ times

9. Does your weight ever increase or decrease (or both) by more than 10 pounds within any month?

_____ Yes _____ No

10. Do you think you might have an eating disorder such as anorexia nervosa (refusal to maintain a minimally normal body weight) or bulimia nervosa (repeated episodes of binge eating followed by inappropriate compensatory behaviors)?

_____ Yes _____ No

11. Have you ever received treatment for an eating disorder?

_____ Yes _____ No

12. Have you ever tried or would you not hesitate to use any of the following methods to lose or maintain your weight?

a. Severely restrictive dieting or limited starvation (less than 1200 calories/day)?

_____ Yes _____ No

b. Popular dieting regimes? (Rotation diet, Carbohydrate diet, etc.)

_____ Yes _____ No

c. Self-induced vomiting?

_____ Yes _____ No

d. Taking laxatives?

_____ Yes _____ No

e. Taking diuretics? (pills that force urination)

_____ Yes _____ No

f. Taking prescription or non-prescription diet pills?

_____ Yes _____ No

g. If yes, how often have you used these methods to lose weight during the past year?

_____ Once _____ 2-5 times _____ More than 5 times

h. If yes, when have you used these methods to lose weight?

_____ before each annual weigh-in
_____ before each monthly weigh-in (while in the weight management program)
_____ when reporting to a military class or school
_____ other, please specify _____

i. Do you use any other methods to control your weight that were not listed?

_____
_____
_____

13. Listed below are methods people have used to lose/maintain weight. In column 1, place a check mark beside each of the methods you have used. For the behaviors you have used, indicate in column 2 how soon you usually start using the method before the weigh-in. For example, if you diet continuously and take a diuretic one day before weigh-in, you would indicate this as shown below.

Ex.	column 1	column 2
dieting	X	___ ___ ___ X months weeks days continuously
diuretics	X	___ ___ 1 ___ months weeks days continuously

a. Restrictive dieting/ limited starvation	___	___ ___ ___ ___ months weeks days continuously
b. Popular dieting regimes	___	___ ___ ___ ___ months weeks days continuously
c. Self-induced vomiting	___	___ ___ ___ ___ months weeks days continuously
d. Taking laxatives	___	___ ___ ___ ___ months weeks days continuously
e. Taking diuretics	___	___ ___ ___ ___ months weeks days continuously
f. Taking prescription or non-prescription diet pills	___	___ ___ ___ ___ months weeks days continuously
g. Exercising	___	___ ___ ___ ___ months weeks days continuously
h. Other _____	___	___ ___ ___ ___ months weeks days continuously
i. Other _____	___	___ ___ ___ ___ months weeks days continuously

14. Do you have a regular program of exercise?

_____ Yes _____ No

15. If yes, do you exercise at least 15 minutes:

_____ Daily _____ 1-4 times/week _____ less than 1 time/week

16. If yes, do you:

_____ Walk/run
_____ Aerobics
_____ Nautilus/weights
_____ Bike
_____ Other

17. What is your current age? _____ years

18. What is your current rank?

_____ E-1	_____E-2	_____ E-3	_____ E-4
_____ E-5	_____ E-6	_____ E-7	_____ E-8
_____ E-9			
_____ O-1	_____ O-2	_____ O-3	_____ O-4
_____ O-5	_____ O-6	_____ O-7 and above	

19. What is your current career field and corps? _____

20. What is the highest level of education completed?

_____ High school
_____ Associate's Degree
_____ Bachelor's Degree
_____ Master's Degree
_____ Doctoral Degree
_____ Post Doctoral Fellowship

21. What is your gender?

_____ Male _____ Female

22. What percentage of your day is spent:
(Total should equal 100%)
_____ Sleeping
_____ Duty time
_____ Leisure Activities

23a. What percentage of your duty time are you:
(Total should equal 100%)
_____ very physically active (ex. construction, carrying heavy loads)
_____ somewhat physically active (ex. carrying light loads)
_____ not very physically active (ex. directing traffic)
_____ not physically active (ex. computer work)

b. What percentage of your leisure time are you:
(Total should equal 100%)
_____ very physically active (ex. running)
_____ somewhat physically active (ex. golfing, walking)
_____ not very physically active (ex. general housework)
_____ not physically active (ex. reading, computer time)

Please feel free to make any additional comments:

APPENDIX B

Cover Letter/Consent Form

Consent Form

Title of Research: Weight Loss Behaviors Used by Active Duty Air Force Personnel to Maintain Compliance with Weight Control Standards

Investigator: Elizabeth A. Decker, Capt, USAF, NC
Uniformed Services University of the Health Sciences
Graduate School of Nursing
(301) 847-1014 (home)

Purpose of Study: The purpose of this research study to is determine what behaviors active duty Air Force personnel are engaging in to remain compliant with Air Force Instruction 40-502. It is being completed to fulfill the thesis requirement for the Graduate School of Nursing - Family Nurse Practitioner Program.

Procedure/Tasks: Each participant will be asked to complete the accompanying survey form. Place the completed survey in the self-addressed, stamped envelope provided and mail it to the investigator.

Risk/Benefit: This study involves no physical risks or discomfort to you. Some participants may develop psychological distress due to the nature of the questions. While this study may not help you personally it may provide information to help health care providers to provide education regarding health promotion to overweight or overfat personnel.

Confidentiality: Any information obtained in this study will be treated in a confidential manner. Participants will remain anonymous throughout the study.

Right to Withdraw: Your cooperation is completely voluntary. You have the right to withdraw from the study. You have the right not to answer any or all the questions.

Cost: There is no cost to you for your participation in this study, nor will you be reimbursed for your participation in the study.

Information from the Investigator: The investigator will be happy to answer any questions regarding the study. The results of the study will be available at the Fitness Center once the data has been collected and analyzed.

Consent: To maintain anonymity, completion of the survey form implies consent to participate in the study.

Thank you for your cooperation.