ABSTRACT

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Exercise practices of bulimic women in treatment were investigated using a questionnaire developed by the researcher. Twenty-six women diagnosed and currently receiving treatment for bulimia at the Regional Clinic for Eating Disorders participated in the study. Ninety-six percent of the group reported binge-eating behaviors with a mean frequency of 20.1 times/month. Forty-six percent of the group reported vomiting behaviors with a mean frequency of 26.6 times/month. Eighty-five percent of the group reported using exercise as a method of weight loss. Percentages reported were similar to those of other researchers. The primary motivations for exercising included the following: a) weight control, b) to lift spirits or for emotional well-being, and c) to improve body appearance. The primary influences of current exercise practices were friends, television, and magazines. The mean exercise duration was 556 minutes/week, well above the American College of Sports Medicine (ACSM) minimum recommendations of 20 to 30 minutes at least three days per week at 65 percent of maximal heart rate for conditioning or maintaining cardiovascular fitness. The mean rate of perceived exertion was 14, just above the ACSM recommended minimum of 12 to 13 for conditioning and maintenance of cardiovascular fitness.

Use of Exercise

by

Bulimic Women in Treatment

A Thesis Presented

to

The Graduate Faculty

University of Wisconsin - La Crosse

In Partial Fulfillment

of the Requirements for the

Master of Science Degree

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by

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CHAPTER I

INTRODUCTION

Over the past ten years, eating disorders have become increasingly common in our society. Anorexia nervosa and bulimia are the most serious of these disorders. Both disorders are observed primarily in women, but may also be found in males, particularly in weight-regulated athletes, such as wrestlers (Anderson, 1984).

Anorexia nervosa is estimated to be present in about one of every 200 American girls (0.5%) between 12 and 18 years of age (Gandour, 1984). Bulimia has been found to have a 2 to 17 percent incidence depending on the population surveyed (Halmi, Falk, & Schwartz, 1981; Killen, et al., 1986; Peterson, 1984; Stangler & Printz, 1980). The statistics for bulimia are still emerging. In a recent survey, 32 percent of female college athletes (N=182) used pathogenic weight-control behaviors compatible with the diagnostic criteria for bulimia (Rosen, McKeag, Hough, and Curley, 1986).

Anorexia nervosa is characterized by self-induced starvation resulting in severe weight loss, usually at least 25 percent of original body weight. At the same time, the anorexic individual denies the emaciation and continues to exist on a self-imposed starvation diet. This behavior is a result of an intense fear of becoming fat (Szmukler, 1982).

Bulimia is characterized by uncontrollable episodes of eating large amounts of food in a short period of time, commonly referred to as binge-eating. In direct contrast to the binge-eating behavior, there is an intense fear of becoming fat, as in anorexia. This fear generally causes the bulimic individual to use some method of purging to avoid the fattening effects of their binge-eating. As a result, the bulimic individual's weight usually fluctuates within a normal range.

Unlike the anorexic individual, the bulimic individual is aware the binge-eating is abnormal and fears the inability to stop eating voluntarily. Depressed mood and self-deprecating thoughts are common findings in these individuals following the occurrence of a binge-eating episode (Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. [DSM-III], 1980).

Food cravings, uncontrollable appetite, and unhappiness are the feelings most frequently reported immediately prior to binge-eating. Regardless of whether the episode is planned or spontaneous, binge-eating is usually done in private, but under special circumstances will occur in front of family members and/or friends. The binge-eating episode may last from minutes to hours, and ends only with abdominal pain, sleep, self-induced vomiting or interruption. Some individuals may induce vomiting and resume uncontrolled eating several times in one episode (Pyle, Mitchell, & Eckert, 1981). The frequency of binge-eating episodes varies greatly, ranging from several times a day to less than once every two weeks. Eating normal meals between binge-eating episodes

may be fairly infrequent even though the individual feels a strong urge to eat (Mitchell, Hatsukami, Eckert, & Pyle, 1985; Pyle et al., 1981).

Purging behaviors serve three purposes in the bulimic individual: a) to decrease possible weight gain, b) relieve fullness, and c) restore a sense of control after binge-eating (Johnson, C., Lewis, & Hagman, 1984). The two most commonly reported purging behaviors are self-induced vomiting and laxative abuse.

Excessive exercise is commonly reported and recognized as a method of weight loss used by anorexic individuals (Blinder, Freeman, & Stunkard, 1970; Chalmers, Catalan, Day & Fairburn, 1985; Delaney & Silber, 1984; Larocca & Stern, 1984). Among bulimic individuals, exercise use is not as extensively documented. Researchers report that both diagnosed bulimic individuals and those with behaviors compatible with bulimia use exercise for weight control or as a purging behavior. Exercise among the aforementioned individuals reportedly ranges from low level to excessive (Boskind-White & White, 1983; Fairburn & Cooper, 1982, 1984; Killen et al., 1986; Pyle, Mitchell, & Eckert, 1981). The specific attitudes associated with the reported exercise are not documented. Even though current research has not specifically investigated the use of exercise by bulimic individuals, exercise sessions are reportedly used in the course of therapy for these individuals (G. E. Brooks, personal communication, March 17, 1986; Johnson, Schlundt, Kelley, & Ruggiero, 1984; Larocca, 1984). More knowlege of exercise use by bulimic individuals would enable treatment

centers to develop and implement more appropriate and therapeutic exercise modalities for this population.

Statement of the Problem

The study was performed to describe the use of exercise by bulimic women in treatment as interpreted through examination of demographic data, exercise practices, motivational factors, and relationships among these variables.

Need for the Study

Contrary to the beliefs of the individuals using pathogenic weight-control behaviors, these behaviors can lead to significant problems. Many bulimic persons report spending the majority of their waking hours thinking of food (Boskind-White & White, 1983; Fairburn & Cooper, 1982; Gross, 1983; Pyle et al., 1981). This preoccupation may lead to failure in school, loss of employment, and social isolation (Fairburn & Cooper, 1984; Pyle et el., 1981; Russell, 1979). Many researchers report finding high levels of anxiety and depression in bulimic individuals which may result in suicidal attempts (Fairburn & Cooper, 1982; Pyle et al., 1981; Russell, 1979; Weiss & Ebert, 1983). Russell (1979) studied 30 bulimic individuals and found 11 had made suicidal attempts and one succeeded during the course of the study. Reed and Sech (1985) studied a group of bulimic individuals (N=5) and found that two had suicidal ideation. Fairburn and Cooper (1984) indicated 2 of 35 patients studied had made suicidal attempts and

another patient was considered at high risk. Suicide is the most common form of death reported in the literature for persons with bulimia.

Social and psychological problems are not the only sources of impairment. Medical complications are common and can be either life-threatening or relatively benign. Self-induced vomiting can by itself lead to a host of problems including the following: a) enlarged parotid glands, b) oral, esophageal, and gastric tearing, c) dental erosion, d) aspiration, e) electrolyte imbalance, f) dehydration, g) chronic lethargy, and in severe cases, h) renal failure (Sansone, 1984). Death is rarely reported as a medical complication but has been known to occur. Recently, a 16 year-old girl died of complications resulting from ingestion of a baking-soda solution she used to induce vomiting (Palmer, 1986). Another potentially life-threatening method of purging is related to the ingestion of large amounts of syrup of ipecac. Syrup of ipecac is an emetic that is potentially cardiotoxic and has been known to produce full cardiac arrest (Sansone, 1984). Karen Carpenter, a well known musical artist, died as a result of ipecac poisoning (Cauwels, 1983). It is apparent that bulimia can lead to significant morbidity and even death.

Young women appear especially likely to develop pathogenic weight-control behaviors compatible with bulimia. A recent survey of female college athletes (N=182) found that 32 percent practiced at least one pathogenic weight-control behavior (Rosen et al., 1986). These behaviors were defined as binge-eating more than twice weekly, and the use of self-induced vomiting, laxatives, diet pills, and/or diuretics

specifically for the purpose of weight-control. A follow-up survey found that most of the athletes using pathogenic weight-control techniques were unaware these behaviors could result in adverse physical consequences.

In another survey, self-induced vomiting and laxative and diuretic use was investigated in adolescents. Tenth-grade students (N=1728) were surveyed to assess their attitudes about eating, dieting, weight-control and frequency of purging. Thirteen percent reported having purging behaviors. Female purgers outnumbered male purgers two to one (Killen et al., 1986). In both the male and female groups, those with purging behaviors felt significantly more guilty after eating large amounts of food, counted calories more frequently, dieted more often and exercised less frequently than those who did not purge. In addition, short-term weight fluctuations occurred more frequently among female purgers than female nonpurgers. The female purgers and non-purgers did not differ in measured weight or body fat.

A contradiction exists between the two studies cited above. In the first study, participation in competitive sports appears to predispose the individual to pathogenic weight-control behaviors compatible with bulimia. In the second study, the use of pathogenic weight-control behaviors is found to be more significant in those individuals with less frequent levels of exercise. Schwartz, Thompson and Johnson (1982) state that there is no one model that predisposes an individual to developing an eating disorder. It is their belief that several factors contribute to the eating disorders, including socio-cultural norms and

values, family and peer influences, and psychogenetic and biogenetic vulnerabilities. Exercise and weight-control programs are experiencing great popularity and growth in America today. In view of the possible relationship between exercise and eating disorders, exercise use in the individual with bulimia is an area that has not been well investigated. Further research to provide a better understanding of this serious disorder is warranted.

Delimitations

The following were delimitations of the study:

1) Participants in the study were diagnosed and currently receiving treatment for bulimia at the Regional Clinic for Eating Disorders, La Crosse, Wisconsin, during the months of May, June, or July 1986.

2) The sex of the bulimic individuals studied was female.

3) The data collected were obtained from questionnaires developed by the primary investigator and administered by clinic personnel.

Limitations

The following were limitations of the study:

1) The number of participants in the study was small (N=26).

2) The bulimic individuals studied had variable levels of severity of the eating disorder.

3) The bulimic individuals studied were at varied levels of therapy and/or recovery.

4) Exercise levels of the bulimics may have been affected by the season of the study.

Assumptions

In the development of the study, the following assumptions were made:

1) The individuals studied were representative of the general bulimic population.

2) The survey was administered according to instructions given by the primary investigator.

3) The respondents reported their behaviors and attitudes accurately.

Definitions of Terms

Binge-eating: rapid ingestion of large amounts of food in a discrete period of time, usually less than two hours (DSM-III, 1980).

Purging: some method, or combination of methods used by an individual after binge-eating to decrease possible weight gain, relieve fullness, and restore a sense of control; may involve exercise or actual evacuation of the intestines by self-induced vomiting, use of laxatives or diuretics (Johnson, C., et al., 1984).

Bulimia: a disorder characterized by episodic binge-eating, an awareness the eating pattern is abnormal and fear of not being able to stop eating voluntarily (DSM-III, 1980).

Anorexia: a disorder characterized by a self-induced starvation and denial of the illness due to an intense fear of weight gain and disturbed body image (Munoz, 1984).

Diuretic: any agent used to increase the secretion of urine (Thomas, 1975, p. D-54).

Laxative: any agent used to loosen or relax the bowels (Woolf, 1975, p. 652).

Quetelet index: a measure of body mass index. Calculated by the following formula: weight (kg)/height^2 (cm) X 10^3 (Glueck et al., 1980).

CHAPTER II

REVIEW OF RELATED LITERATURE

Young women today have more personal and professional options than ever before. Along with these choices, come more sociocultural expectations. Idealization of thinness and pressures on women to be independent and successful are felt to be causative factors in the rising incidence of eating disorders, one of which is bulimia (Garner, Garfinkel, Schwartz, & Thompson, 1980).

The American Psychological Association accepted and classified bulimia as a distinct syndrome outside the realms of anorexia and obesity in 1980. Women, especially during the years of late adolescence and early adulthood, are most affected by this disorder.

This chapter reviews the following related literature: 1) characteristics of bulimia, 2) current therapy and trends, 3) exercise and health, 4) assessment of instruments, and 5) summary.

Characteristics of Bulimia

Definition

Bulimia has been referred to in the literature by several different names: polyphagia, binge-purge or gorge-purge syndrome, bulimarexia and bulimia nervosa. In 1980, the American Psychiatric Association first published the criteria for diagnosis of the eating disorder. These criteria are as follows:

A. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time, usually less than two hours).

B. At least three of the following:

(1) consumption of high-caloric, easily ingested food during a binge
(2) inconspicuous eating during a binge
(3) termination of such eating episodes by abdominal pain, sleep, social interruption, or self-induced vomiting
(4) repeated attempts to lose weight by severely restrictive diets, self-induced vomiting, or use of cathartics or diuretics
(5) frequent weight fluctuations greater than ten pounds due to alternating binges and fasts

C. Awareness that the eating pattern is abnormal and fear of not being able to stop eating voluntarily.

D. Depressed mood and self-deprecating thoughts following eating binges.

E. The bulimic episodes are not due to Anorexia Nervosa or any known physical disorder (Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. [DSM-III], 1980, p. 70-71).

This definition is commonly accepted and used as a reference point but is criticized for lack of specificity and its exclusion of anyone who has previously had or currently has a history of anorexia. Several researchers feel that bulimia occurs along a continuum of weight disorders between anorexia nervosa and obesity (Casper, Eckert, Halmi, Goldberg, & Davis, 1980; Lowenkopf, 1983; Pyle, Mitchell, & Eckert, 1981; Reed & Sech, 1985; Russell, 1979; Stunkard, 1959). The controversy of delineating the two disorders is complicated by recent literature reports that almost 50 percent of anorexic individuals resort, at times, to binge-eating and vomiting behaviors (Casper et al., 1980; Garfinkel, Moldofsky, & Garner, 1980).

Bulimic and anorexic individuals exhibit both distinct and common clinical features. Bulimic individuals generally fall within a normal weight range but may repeatedly cycle between periods of weight gain and weight loss due to alternating binge-eating and fasting (Fairburn & Cooper, 1984; Pyle et al., 1981). Anorexic individuals have usually lost 25 percent of their original body weight (Blinder, Freeman, & Stunkard, 1970; Delaney & Silber, 1984). Both bulimic and anorexic individuals have unrealistic and perfectionistic expectations of themselves. The most pronounced area of such perfectionism relates to physical attributes and is exhibited in both eating disorders as an intense fear of becoming fat and a disturbed body image (DSM-III, 1980; Larocca & Stern, 1984; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Segal & Figley, 1985). "The body becomes the arena for the concrete interplay of separation issues. . . .Starving or controlling it serves the function of maintaining a tenuous self-other boundary" (Sugarman & Kurash, 1982, p. 62-63).

Demographic Data

Although bulimia as a recognized syndrome is relatively new (DSM-III, 1980), collected data have shown bulimic individuals to have common characteristics. Bulimia is considered a disorder of young women. In a survey of college students conducted by Halmi, Falk, and Schwartz (1981), 13 percent of the sample experienced the major symptoms of bulimia; of those, 87 percent were females and 13 percent were males. This high incidence in females and college students agrees with reports of other studies (Pyle et al., 1981; Russell, 1979; Stangler & Printz,

1980). Fifty-seven percent of bulimic patients seen by Fairburn and Cooper (1984) were reported to be students and 28.6 percent were wage earners. Pyle and associates (1981) found just the opposite with 23 of 34 bulimic patients reporting to be wage earners and 6 of 34 reporting to be students. However, the mean age of the women in these groups was very similar at 23.5 years and 24 years respectively, with a four year history of bulimia prior to seeking help (Fairburn & Cooper, 1984; Johnson, C., Stuckey, Lewis, & Schwartz, 1982; Mitchell et al., 1985; Pyle et al., 1981). Judging from this data, it appears that the disorder begins at a time when the social pressures, choices and responsibilities of adolescence and impending adulthood are felt the most.

Bulimia is not exclusive to any one race or social class. However, researchers report that white, single women with at least some college education account for 70 percent or more of bulimic individuals studied (Fairburn & Cooper, 1982; Halmi et al., 1981; Johnson, C. L., Stuckey et al., 1982; Pyle et al., 1981; Russell, 1979). In addition, most bulimic individuals reportedly come from upper and middle class families (Casper et al., 1980; Fairburn & Cooper, 1984; Garfinkel et al., 1980; Mitchell et al., 1985; Reed & Sech, 1985). Bulimic females are often high academic achievers (Bauer, 1984; Russell, 1979) and exhibit perfectionism in their work to compensate for feelings of social inadequacy (Casper et al., 1980; Russell, 1979). Boskind-White & White (1983) report perfectionism is most extreme if "male attention is not. . .forthcoming" (p. 106).

Bulimic individuals often fall within a normal weight range. Fairburn and Cooper (1982) found that 83.2 percent of the bulimic individuals (n=499) weighed between 85 and 115 percent of the matched population mean weight (MPMW) with a group mean of 97.6 percent. In a later study (Fairburn & Cooper, 1984), 65.7 percent of the bulimic individuals (N=35) weighed between 85 and 100 percent MPMW and 22.9 percent weighed between 101 and 115 percent MPMW with a group mean of 97.3 percent. In both studies, the bulimic patients had weight histories that suggested they were prone to being overweight. Using Metropolitan Life Insurance Tables, 1959, Mitchell and associates (1985) found that 52.4 percent of the bulimic patients evaluated were within 10 percent of their ideal body weight, 27.2 percent were more than 10 percent below ideal body weight, no one was more than 25 percent below ideal body weight, 20.4 percent were 10 percent or more above ideal body weight, and 4.7 percent were 25 percent or more above ideal body weight. Of these individuals, 56.4 percent had been 10 percent or more above ideal body weight at one time. Reed and Sech (1985) report that at the time of initiation of a group treatment program, only one member (N=5) was overweight compared to the national range from Metropolitan Life Insurance Tables, 1969. All five individuals indicated they had been 20 to 30 pounds heavier prior to developing purging behaviors. This is consistent with the findings of other researchers (Garfinkel et al., 1980; Halmi et al., 1981).

A more recently reported measure of height and weight is that of body mass. Touyz and associates (1985) studied bulimic patients and

found their mean height to be 163.3 cm, mean weight 57.6 kg, and mean Quetelet index (QI) 2.22, with a standard deviation (SD) of 4.3. This as in comparison to anorexia patients who had a mean height of 160.9 cm, a mean weight of 40.6 kg, and mean QI of 15.6 with a SD of 2.1. Killen and associates (1986) studied tenth grade students and reported that female students with purging behaviors had a mean weight of 56.3 kg and a mean QI of 2.2, the SD was not reported. QI tends to increase with age in white females in the general population (Glueck et al., 1980).

Eating Behaviors

Bulimic behaviors often appear in the individual following a period of dieting initiated after suggestions by friends or family members to lose weight. Fairburn and Cooper (1982) reported that 83 percent (N=499) of the women in their study were attempting to lose weight at the time of onset of vomiting. Half of the women (52.7%) formulated the idea to induce vomiting on their own, but 26.6 percent got the idea from the media and 17.4 percent from friends or relatives. Pyle and associates (1981) reported the onset of bulimic behaviors in their patients also began during a period of dieting for 30 of 34 patients in their study. "Dieting episodes frequently followed suggestions by family members or friends that they lose weight" (p. 61).

Initial dieting behaviors may include periods of fasting which result in a craving for food and the beginning of binge-eating behaviors (Casper et al., 1980; Gross, 1983). Pyle and associates (1981) reported that 29 of 34 bulimic patients indicated they had strong appetites with poor control, had difficulty in knowing when they were full, and tended

to alternate between periods of fasting and binge-eating. Mitchell and associates (1985) specifically studied the fasting behaviors and eating patterns of bulimic women in treatment (N=275). Ninety-two percent of the patients in their study reported fasting; 21.3 percent ate two or more normal meals a day; 18.7 percent ate one normal meal a day; 38.9 percent ate a normal meal only once or several times a week; and 21.9 percent ate normal meals less than once a week or not at all. Other researchers report that a cyclical pattern develops in which the bulimic individual alternates between binge-eating and fasting. At this point, most time is spent thinking of food and hiding the binge-eating and fasting from others (Boskind-White & White, 1983; Gross, 1983; Pyle et al., 1981; Russell, 1979).

Fear of rejection, confrontation, disappointment, anxiety, and occasionally joy or celebration will precipitate a binge-eating episode. Casper and associates (1980) state that the activities associated with the eating process have an emotionally soothing effect. Reed and Sech (1985) report that bulimic individuals studied by them stated "anger, depression, frustration, futility, inability to meet the expectations of others, and sometimes joy or celebration" (p. 18) were the feelings that led to binge-eating. Similarly, craving certain foods, being unhappy, unable to sleep, hungry, anxious, frustrated/angry, bored, or feeling good were reported by Pyle and associates (1981) as feelings that led to binge-eating in their patients.

In the study by Pyle and associates (1981), bulimic patients kept daily logs of their eating behaviors. The median reported duration of

binge-eating episodes was one hour, but the range was from 15 minutes to more than eight hours. This agrees with Reed and Sech (1985) who reported the average duration of binge-eating in their patients was one hour.

Mitchell and associates (1985) studied bulimic patients to determine if there was a particularly high risk time of day for binge-eating. Of the individuals studied (N=275), 46.2 percent indicated late afternoon, 52.4 percent indicated early evening and 54.2 percent indicated late evening respectively were the times they usually had binge-eating episodes. Binge-eating reportedly occurred at any time for 33.5 percent of the individuals and 15 to 25 percent indicated times after midnight, or early morning to early afternoon hours. These data agree with other researchers who report that a typical binge-eating episode occurs in the evening when the individual is alone (Boskind-White & White, 1983; Reed & Sech, 1985; Russell, 1979; Segal & Figley, 1985).

The frequency of binge-eating episodes varies greatly. Fairburn and Cooper (1984) reported that 48.6 percent of their patients (N=46) were binge-eating at least daily and 17.1 percent at least twice a day. Pyle and associates (1981) reported that of 34 bulimic patients, 19 were binge-eating daily, 12 were binge-eating several times a week, and 3 were binge-eating weekly. Mitchell and associates (1985) studied bulimic patients (N=275) and 73.9 percent were binge-eating several times a day, 8.1 percent once a day, 13.6 percent several times a week, 2.6 percent once a week, and 2.9% less than once a week.

High-calorie junk foods usually avoided at other times, and foods with a sweet taste, and a texture that facilitate rapid eating are the foods of choice for a binge-eating episode. Some specific examples of foods consumed are bags full of sweets such as cookies and candy bars and/or fried foods in large quantities such as doughnuts, french fries and potato chips. Caloric intake during binge-eating can range from 1,000 to 20,000 calories (Boskind-White & White, 1983; Gross, 1983; Russell, 1979).

The first purging behavior appears approximately one year after binge-eating behavior begins, and is generally self-induced vomiting. This behavior is used by the bulimic individual to prevent the fattening effects of the binge-eating, and to maintain "a self-imposed and specific weight threshold" (Russell, 1979, p. 443). The frequency of vomiting behaviors varies much like binge-eating behaviors. Mitchell and associates (1985) reported that 63.7 percent of their patients (N=275) self-induced vomiting several times a day, 8.1 percent once a day, 9.6 percent several times a week, 2.6 percent once a week, and 4.1 percent less than once a week. Fairburn and Cooper (1982) reported 56.1 percent of their study participants (N=499) self-induced vomiting at least daily and 17.5 percent more than once weekly. Pyle and associates (1981) reported vomiting was practiced by 16 of 34 patients on a daily basis, 9 of 34 several times a week, 5 on a weekly basis, and 2 less than weekly. Vomiting behavior may progress in frequency to occur spontaneously after eating and up to 15 times per day (Russell, 1979). Most bulimic individuals report drinking large amounts of fluid while

binge-eating and/or adopting a special posture and exerting slight pressure on the abdomen immediately after binge-eating to facilitate the vomiting (Boskind-White & White, 1983; Russell, 1979). After a period of time, the bulimic individual actually binge-eats in order to purge (Boskind-White & White, 1983; Johnson & Larson, 1982). Reed and Sech (1985) state their patients reported feeling relieved, cleansed, purified, calm, and secure after vomiting.

Weight-control behaviors are not limited to vomiting. Other methods of weight-control include chewing and spitting out food, rumination of food, 24-hour fasting, and the abuse of laxatives and diuretics (Fairburn & Cooper, 1984; Mitchell et al., 1985). Though these behaviors are used less frequently than vomiting, one or more generally occur in 30 to 60 percent of those individuals who use self-induced vomiting. Exercise is also reportedly used for weight control and will be presented in the following section.

Exercise Behaviors

Pyle and associates first reported the use of exercise by bulimic individuals as a method of weight-control in 1981. Twenty-six of thirty-four bulimic individuals studied reported using daily exercise to control their weight. In another survey of women (N=499), 61.3 percent stated they used exercise in addition to vomiting to compensate for their overeating (Fairburn & Cooper, 1982). A subsequent study of bulimic individuals (Fairburn and Cooper, 1984) found 28.6 percent (N=35) used exercise for weight-control. Boskind-White and White (1983) observed that bulimic individuals in their groups were likely to

"exercise compulsively, swimming many laps, running many miles, and working out with. . . weights" (p. 44). Larocca (1984) describes exhaustive physical activity as a purging behavior demonstrated by his bulimic patients in "running enormous distances, bicycling dozens of miles or doing 200 sit-ups in quick succession" (p. 290). Mitchell and associates (1985) surveyed bulimic individuals (N=275) and reported that exercise was a "commonly practiced" method of weight-control (p. 483). Of those individuals surveyed, 18 (6.7%) reported exercising less than once a week, 21 (7.9%) exercised once a week, 53 (19.9%) exercised several times a week, 68 (25.5%) exercised once a day and 84 (31.5%) exercised several times a day. Although these studies have reported the use of exercise by bulimic individuals, research regarding their exercise attitudes and behaviors is lacking.

Medical Problems

A number of medical complications are often noted in bulimic individuals. The most commonly reported complaints are secondary to exposure to gastric acids and include the following: sore throat, multiple cavities due to loss of tooth enamel, and parotid gland inflammation seen as swelling in the lateral parts of the cheeks (Peterson & Barkmeier, 1983; Sansone, 1984). The second most commonly reported complications are secondary to fluid depletion and electrolyte imbalances that can occur from self-induced vomiting and/or the use of laxatives and diuretics. A low serum potassium level, hypokalemia, is particularly common and causes the weakness and lethargy often reported by bulimic individuals. However, hypokalemia can also lead to more

serious complications such as paresthesias, tetany, cardiac arrhythmias, and even death (Cauwels, 1983; Sansone, 1984).

Other medical complications documented in the literature include: aspiration, esophageal tears or rupture, femoral or hiatal hernia due to pressure applied to induce vomiting, a generalized skin rash, osteomalacia, renal damage, and gastric dilatation which can lead to death (Gross, 1983; Palmer, 1986; Sansone, 1984).

Menstrual irregularities are common (Boskind-White & White, 1983; Fairburn & Cooper, 1982; 1984), and chemical abuse or dependency is not unusual (Garfinkel et al., 1980; Mitchell et el., 1985; Pyle et al., 1981). Cathartic colon, which often requires surgery, may be a consequence of laxative abuse. Findings in this entity include a thinning and atrophy of layers of the colon with accompanying inflammation and superficial ulceration (Sansone, 1984).

It is apparent the medical consequences of bulimia can be severe. In their attempts to maintain the perfect weight, bulimic individuals may be placing their health at considerable risk.

Personality and Psychological Characteristics

Bulimic individuals are reported to be socially active, but frequently experience feelings of inadequacy or inferiority and prefer solitude. Casper and associates (1980) studied female anorexia patients (N=105) and found the individuals with bulimic behaviors to have more extroverted behavior ($p<.01$) but more sensitivity in interpersonal relationships than the fasting patients ($p<.01$). These data agree with a similar study in which bulimic individuals were reportedly less

isolated and formed more relationships than fasting individuals (Garfinkel et al., 1980). A related study found that the number of intimate friendships and the frequency of social contacts were not significantly different between bulimic and control groups (Weiss and Ebert, 1983). Despite being socially active, bulimic females report a lack of intimacy in their relationships, especially those with men (Boskind-White & White, 1983). In fact, the majority of bulimic patients report problems with interpersonal relationships, self-concept, and depression (Mitchell et al., 1985; Pyle et al., 1981).

Several researchers have documented depression and anxiety among bulimic individuals. Weiss and Ebert (1983) found bulimic individuals to rate themselves as being significantly inferior to a control group in five of six self-esteem categories including happiness, lack of anxiety, physical appearance, perceived intellectual ability, and acceptable behavior. Perceptions of popularity were about the same among both groups of individuals. McCanne (1985) studied a group of college students in therapy for bulimia and found them to have more anxiety and less assertiveness than either a general therapy group or a control group. In a survey by Fairburn and Cooper (1982), 68.1 percent of the bulimic respondents (n=499) had high scores on the anxiety and depression scales of a general health questionnaire. Lowenkopf (1983) reports that most bulimic individuals seen by him initially entered themselves into treatment not for their eating behaviors, but for problems of depression, lack of direction, problems in school, and feelings of inadequacy.

The anxiety and depression experienced by bulimic individuals are manifested in different ways. Casper and associates (1980) found bulimic individuals reported more somatization in the form of headaches, dizziness, and stomach discomfort than fasting individuals. Pyle and associates (1981) studied bulimic individuals (N=34) and report that most complained of weakness, lethargy, and, in general, not feeling well" (p. 63). Garfinkel and associates (1980) report bulimic patients have more labile moods, and are at increased risk for self-mutilation and suicide attempts than anorexic patients. Weiss and Ebert (1983) report bulimic individuals had more distress due to perceptions of bodily dysfunction than a non-bulimic control group. The bulimic group consistently rated themselves sicker than the controls in the following areas: a) depression, b) anxiety, c) obsessiveness-compulsiveness, and d) interpersonal sensitivity.

In an area that may be related, researchers have documented severe body-image disturbance among bulimic individuals (Fairburn & Cooper, 1984). H. Bruch (1973) was one of the first researchers to write about the body-image disturbance among individuals with eating disorders. Since then, researchers have documented a significant relationship between greater dissatisfaction with the body, lower self-perception, and a greater severity of binge-eating ($p<.05$) (Wolf & Crowther, 1983). Recent studies with bulimic women have consistently found that body size and body shape are overestimated when compared to actual measures of the subjects bodies.

Huon and Brown (1986) compared female anorexia and bulimia patients with non-patients in a process that utilized mirrors, video cameras, and an adjective scale to rate 'the self'. The results demonstrated an instability in body size estimation and that fatness was the focus for judgements about the body in both the patients and nonpatients. Touyz, Beumont, Collins, and Cowie (1985) studied anorexia and bulimia patients using a distorting lens technique. Ninety-five percent of the bulimic patients overestimated their shape by 11.31 percent in contrast to 48 percent of the anorexic patients who overestimated by 5.51 percent. In addition, the bulimic patients wished to be significantly smaller than their current size. Among the anorexic patients, the desire to be smaller was not significant. A third study (Willmuth, Leitenberg, Rosen, Fondacaro, & Gross, 1985) compared normal-weight females with bulimia with normal-weight controls in estimations of body size. The women with bulimia overestimated the size of their chest, waist, hips, and abdomen significantly more than the control group. Both groups overestimated the size of their faces. However, the clinical significance of body size distortion in bulimia has not yet been determined.

In addition to body size distortion and somatization, many researchers have found bulimic individuals to have impulsive behaviors such as stealing and drug use. Garfinkel and associates (1980) found bulimic individuals used alcohol, street drugs, and reported stealing significantly more frequently than anorexic individuals $p<.05$. Casper and associates (1980) found 24 percent of bulimic patients reported

compulsive stealing compared to 4 percent of anorexic patients. Mitchell and associates (1985) found 34.4 percent (N=273) of bulimic patients had a history of problems with alcohol or other drugs. Pyle and associates (1981) studied bulimic patients (N=34) and reported that nine individuals were stealing before the onset of bulimia, and 18 began stealing after the onset of bulimia. Twenty-two individuals were using alcohol at least several times a week and seven used amphetamines intermittently. It is apparent from these reports that the problem with impulse control is not limited to binge-eating episodes and may involve other areas of the bulimic individual's lifestyle not yet researched.

Current Therapy and Trends

Reports in the literature suggest that there is no single cause for bulimia. Bauer (1984) describes it as a symptom of complex underlying problems. Boskind-White and White (1983) define it as a learned behavior. Often it is the result of a combination of genetic, familial, and sociocultural factors (Larocca & Stern, 1984; Schwartz, Thompson, & Johnson, 1982).

Present day methods of treatment are experimental and controversial. A wide scope of therapies and interventions are practiced, the following are newly emerging: the use of videotape in group therapy (Reed & Sech, 1985), structured nutrition education (Larocca, 1984; Pyle, Mitchell, Eckert, Hatsukami, & Goff, 1984), self-help groups (Larocca & Stern, 1984), hypnosis, and psychopharmacologic interventions (Johnson, C., et al, 1984). More

traditional therapy modalities utilize the behavioral approach. Boskind-White and White (1983) describe a workshop format with 15 to 20 hours of therapy over a three-day period using both behavioral and group techniques. Success rates of their groups are not measured. Roy-Byrne, Lee-Benner and Yager (1984) combine behavioral with psychodynamic approaches in a group situation. Many of their findings support those of Bauer (1984) and Boskind-White and White (1983). Specifically, the group approach provides the following: a) training in social skills including assertiveness for difficult interpersonal situations, b) opportunity to develop, observe and practice these skills in a supportive environment, and c) generation of alternatives to binge-eating and self-defeating or rigid thinking.

W. G. Johnson, Schlundt, Kelley and Ruggiero (1984) determine appropriate therapy according to the following models of bulimia: the energy-balance and anxiety-disorder models. The first method of therapy uses behavioral modification techniques to change eating and exercise patterns to obtain an acceptable weight or energy balance. Regular aerobic exercise is a therapeutic goal. On the other end of the exercise spectrum, Larocca (1984) uses a required routine of exercise to avoid excessive activity which he has observed in some bulimic patients. The second method of therapy parallels bulimia with an obsessive-compulsive syndrome. The individual eats until the urge to vomit is apparent. At that time, vomiting is prevented by keeping the individual in the eating situation and reviewing associated feelings until the urge passes. Due to the small number of patients evaluated in

the study, inconclusive results were found, but both therapy methods succeeded in reducing the rates of vomiting and binge-eating.

Exercise and Health

Weight-control

From 1959 to 1979, ideal shapes for women became progressively thinner, while the actual body weights of women were consistently heavier. During the same period of time, the mean number of feature articles on dieting and weight loss increased in six major magazines from 17.1 in the first decade to 29.6 in the second decade (Garner, Garfinkel, Schwartz, & Thompson, 1980). Unfortunately, many people do not understand the basic concepts of weight-control and/or prefer to use quick-loss dieting methods in attempting to reach the "ideal shape".

Maintaining a stable body weight requires a balance between caloric intake and energy expenditure. There are three medically recognized methods to lose weight, including the following: 1) reduce caloric intake below maintenance requirements, 2) increase caloric output by increasing activity, and 3) combine methods by decreasing daily food intake and increasing daily activity (McArdle, Katch, & Katch, 1981).

There are clearly important reasons and distinct advantages to a weight-loss program that combines exercise with dietary restriction. One reason for including exercise in a weight-loss program is related to the weight set-point of each individual. The set-point theory was first proposed by Newmann and includes the following: 1) there is an internal control for fat storage and weight which matches appetite and energy

expenditures, and 2) genetic factors are the primary determinants of weight set-points (cited in Bennett & Gurin, 1982). Exercise is known to increase the basal metabolic rate and enhance the mobilization of fat, thereby neutralizing the natural tendency of the body to lower energy needs during a period of dieting.

The second reason for including exercise in a weight-loss program is related to the loss of lean body weight (LBW) that can occur with dieting alone. Zuti and Golding (1976) studied three groups of adult women during a 16-week period of weight loss. The groups utilized diet; diet and exercise; and exercise respectively. There were no significant differences seen between groups in weight loss. However, body fat was most reduced by the group combining diet and exercise. In addition, the exercise group increased LBW by 0.9 kg, the diet and exercise group increased LBW by 0.5 kg, but the diet only group lost 1.1 kg of LBW.

The American College of Sports Medicine (ACSM, 1986) offers the following recommendations for a safe weight-loss program:

> 1) Provides intake not lower than 1200 kcal/day for normal adults in order to get a proper blend of foods to meet nutritional requirements. . . .
>
> 2) Includes foods acceptable to the dieter. . .
>
> 3) Provides a negative caloric balance (not to exceed 500-1000 kcal/day lower than recommended) resulting in gradual weight-loss. . . . Maximal weight loss should be one kg per week.
>
> 4) Includes the use of behavior modification techniques to identify and eliminate diet habits that contribute to improper nutrition.
>
> 5) Includes an endurance exercise program of at least three days/week, 20 to 30 minutes in duration, at a minimum intensity of 65 percent of maximal heart rate.

> 6) Provides that the new eating and physical activity habits can be continued for life in order to maintain the achieved lower body weight. (pp.46-47).

Emotional Well-Being

Exercise not only improves dieting outcome and weight maintenance, it also improves emotional well-being. Merzbacher (1979) tested psychological and intelligence factors in volunteers (N=31) before and after a 26-day program of diet and exercise. Significant improvements in psychological and personality factors as well as increased mental acuity were found in all subjects. This agrees with data collected by other researchers.

Carter (1977) studied adults (N=216) and found a positive correlation between exercise and happiness. Joesting and Clance (1979) compared runners and nonrunners on body-concept and self-concept. Runners had a significantly higher mean score in self-concept and body-concept than nonrunners. In a later study, students (N=37) who participated in five or more hours of physical activities per week were compared with students (n=29) who did not participate in regular physical activity. Regular activity participants scored significantly higher ($p<.01$) in both self-concept and body-concept (Joesting, 1981). Wilson, Berger, and Bird (1981) studied anxiety levels among three groups of individuals (N=42). The groups participated in running; an organized exercise class; and eating respectively. All three groups showed significant decreases in anxiety after performing their respective activities. Stevens (cited in Sperling, 1986) examined the relationship between exercise and mental health among the general

population (N=32,101). Frequent exercisers had more positive moods and less anxiety and depression than those who exercised little or not at all. Frequent exercisers were defined as those who got at least 30 minutes of vigorous exercise three times a week or more.

As noted earlier, binge-eating is often the end result of a build-up of anxiety and depression. In contrast, exercise has been shown to both decrease anxiety and depression. Evaluating exercise behaviors among bulimic individuals would help in the identification of both deficient and/or excessive practices that might influence emotional well-being and treatment outcome.

Assessment of Instruments

Bulimic Behaviors

Although published instruments are available for the assessment of behaviors associated with bulimia, researchers have more commonly developed and implemented their own. A review of published questionnaires and reports available in the literature identified several commonly investigated areas (Fairburn & Cooper, 1984; Garner, Olmsted, & Polivy, 1983; Halmi et al., 1981; Mitchell et al., 1985; Pyle et al., 1981; Pyle et al., 1984; Russell, 1979). Questions to elicit demographic characteristics were routinely included in major research surveys. The variables most commonly investigated included the following: a) age, b) sex, c) marital status, d) education, e) occupation, f) social class, g) age at onset of bulimia, h) duration of illness before receiving therapy, and i) height and weight. Additional

information regarding the onset and frequency of bulimic behaviors was elicited in the following areas: a) binge-eating, and b) methods of preventing weight gain. The other areas most commonly investigated by researchers included: a) feelings or thoughts associated with bulimic behaviors, b) psychosocial adjustment, and c) medical complications.

Exercise Behaviors

A thorough evaluation of exercise practices has not been commonly included in studies of bulimic individuals. The use of exercise by bulimic individuals is more often a voluntarily reported method of weight control (Fairburn & Cooper, 1982; 1984; Halmi et al., 1981; Pyle et al., 1981). Mitchell and associates (1985) investigated exercise incidence and frequency of use, but no instruments were found which specifically investigated exercise practices of bulimic individuals.

Accepted standards for evaluation of exercise are provided by the American College of Sports Medicine (ACSM, 1986). The recommended minimum amount of exercise for cardiovascular conditioning and maintenance includes 20 to 30 minutes, 3 times/week, at an intensity of not less than 65 percent of maximal heart rate for normal adults. However, this scale provides inadequate guidelines for distinguishing between exercise deficiences and excesses. A Borg scale rating of 12 to 13 is reported to be a reliable indirect measure of effort equivalent to 60 percent of maximal heart rate (ACSM, 1986). The Borg scale is a 15-point scale constructed to increase linearly with exercise intensity and used to evaluate perception of exercise effort (Borg, 1982). The scale values have been shown to be closely related to oxygen consumption

and consistent when comparing sedentary and active individuals at a predetermined percentage of moximal oxygen consumption (Mihevic, 1981).

Body Mass

In the assessment of body mass or adiposity, the measurements of height and weight provide a nonstandard reference point for comparison across groups. In attempts to produce a single standardized measure, researchers have developed formulas for calculation of body mass using height and weight measures. The Quetelet index, $weight/height^2 \times 10^3$, has been found to be weakly correlated with height (r=-.16) and strongly correlated with weight (r=.79) (Killen et al., 1986). For white females, the index gradually increases with age (Glueck et al., 1980).

Body Image

The use of projective techniques in analyses of body-image and self-concept has been practiced for several decades. Fisher and Cleveland (1968) were among the first researchers to utilize projective techniques. Assumptions initially made by them are still the basis for the examination of body-image. "The body-image boundary does not really mirror the actual properties of the body surface, but is rather a representation of attitudes and expectancy systems which have been projected onto the body periphery" (p. 367).

The house-tree-person technique is a two step projective process involving: 1) drawing a house, a tree, and a person, and 2) verbal interpretation of the drawings by the drawer. A point system considering detail, proportion, and perspective of the drawing is

applied to score the actual drawing. This measurement is analyzed together with the drawer's verbal interpretation of the drawings. However, the significance of any one aspect of the drawings varies greatly from individual to individual and must be interpreted in collaberation with an adequate psychological evaluation (Blatt, 1975; Buck, 1966).

Some examples of details the clinician might look for in the draw-a-person portion of this projective technique include completeness of body form, specifically the face, hands, arms, feet and legs, and the proportion and perspective of the details included in the drawing (Buck, 1966). Despite attempts to show a relationship between omission of body parts and low self-concept, inconclusive results have been found for this hypothesis (Fu, 1981). In further attempts to aid in identification of personality and the conflicts that might exist between individual needs and social demands, some researchers classify persons by body type (Zurcher, 1979).

Current methods in use for assessing body-image in bulimic individuals include the following: a) distorting photographs, b) mirrors, c) television video imaging, or d) a combination of these techniques.

Huon and associates (1986) describe a technique that combines the utilization of three different mirrors and three different television video images with a 14-point rating scale for assessment of body-image among bulimic and anorexic individuals. Touyz and associates (1985) took a photograph of each of their subjects and used a video camera to

vary the image in the horizontal plane without distorting height. The subjects were asked to adjust the image to correspond with their present and desired physiques. Willmuth and associates (1985) objectively measured the width of five body locations of their subjects including the face, chest, waist, hips and the distance from the navel to the back. Using a technique defined as 'adjustable markers' but not described in the study, the subjects then estimated the dimension of each of these five body regions four times.

These techniques all require the use of expensive equipment, expertise not readily accessed, and an intimate working relationhip with the eating disorder group to be studied. Furthermore, the clinical significance of these types of studies has not yet been determined. Most researchers agree that diagnosis should not be based on a single measure of body-image. Measure of body-image should be used only as one component of a multi-method approach in evaluating patients (Huon & Brown, 1986).

Summary

The eating disorder, bulimia, is a problem of increasing incidence and sobering consequences for the individuals afflicted with it. Investigative research over the past ten years has defined many of the characteristics common to this group and therapists have incorporated this knowledge into their treatment techniques. Although exercise is a commonly reported method of weight control among bulimic individuals,

researchers have not investigated this behavior thoroughly and inclusion of an exercise component in treatment programs is not commonly reported.

This study was performed in an attempt to add to the knowledge and understanding of the use of exercise by bulimic individuals. This information may be helpful in increasing awareness, and encouraging evaluation and clinical intervention when exercise practices are either deficient or excessive.

As demonstrated in the review of the literature, bulimia is a complex disorder. The lack of an adequate instrument for assessing the exercise practices of bulimic individuals appeared to justify the development of a comprehensive questionnaire.

CHAPTER III

METHODOLOGY

The purpose of this study is to evaluate the use of exercise by bulimic women in treatment. The procedures employed are presented according to the following sections: 1) Questionnaire development, 2) Questionnaire administration, and 3) Data analysis.

Questionnaire Development

A review of the literature found no instruments currently in print that would elicit data pertaining to exercise habits and bulimia, as required for this study. Drawing from current data in the literature and advice from experts in the fields of bulimia and exercise, the questionnaire was developed by the researcher (Appendix A).

Questions were developed to obtain information in the following categories: 1) demographics, 2) current exercise practices, 3) exercise associated attitudes and influences, 4) bulimic-related behaviors, and 5) body-image. The questionnaire was constructed using a combination of yes/no, open-ended, checklist/ranking, and Likert-scaled questions.

Demographic information was elicited in the following areas: a) age, b) level of education, c) primary occupation, d) onset of binge-eating behaviors, e) date entered into treatment for bulimia, and f) current height and weight. Most questions eliciting demographic data were placed first in the survey, since the first section was determined

to be the least sensitive portion of the questionnaire (Appendix A, items 1 through 4, and 13). Other demographic information was obtained and recorded by clinic personnel (Appendix B, item 5). The purpose of the demographic questions was to describe the group studied.

Data about current exercise practices were elicited in the following areas: a) type(s) of exercise used, and b) duration reported in time and distance. The categories of exercise presented were felt to include those most used by young women today. A category entitled 'OTHER' would allow the participants of the study to report any exercise activity not specifically listed. Participants of the study were also asked to identify any exercise activity in which they had participated at a competitive level (Appendix A, item 5).

Using characteristics that are reported in research to occur in bulimic individuals, the researcher prepared questions to identify the following exercise associated attitudes and influences: a) motivation for exercising, b) rate of perceived exertion, c) onset of current exercise practices, d) general perception of current exercise practices, and e) influences important in current exercise practices (Appendix A, items 6 through 10). The 15-grade Borg scale was used to measure rate of perceived exertion (RPE) (Borg, 1982). The Borg scale has been shown to have a correlation of 0.85 between RPE values and heart rate response (Mihevic, 1981).

Data identifying bulimic-related behaviors were elicited in the following areas: a) frequency of binge-eating, b) methods of weight loss, and c) feelings after binge-eating. In the area of weight loss,

frequency-of-use data were also elicited (Appendix A, items 12, and 14 through 17).

Two questions were included at the request of the clinical psychologist from the Regional Clinic for Eating Disorders (RCED) who was currently working with the bulimic individuals to be studied. (Appendix A, items 11,18). Item 11 incorporated a forced choice Likert-scale to determine, in general, how each participant of the study felt about her body. Item 18 instructed the participant to draw a picture of her whole body. A full blank page was used for this item.

The questionnaire was reviewed for content validity by a panel of four experts. The panel of experts consisted of two individuals knowlegeable and practicing in the field of physical fitness and two individuals knowlegeable and practicing in the fields of bulimia and counseling. Alterations were discussed and approved by the panel as a whole before being incorporated into the questionnaire.

Three graduate students in the field of adult fitness were then asked to complete the questionnaire, review it for readability, and comment on content and organization. All comments were considered by the researcher and changes were incorporated to improve presentation and elicit more specific data regarding exercise use.

The questionnaire was then reviewed by personnel at the RCED including two registered nurses, a dietician, and a clinical psychologist presently working with bulimic individuals. Changes were discussed and incorporated to elicit more specific data in the areas of binge-eating and weight loss behaviors.

A pilot study on the questionnaire was conducted with five graduate students in the field of adult fitness. The students reported no difficulty in following directions or completing the questionnaire and no recommendations for further change were received.

The questionnaire was returned to the original panel of four experts for final approval. All four members reviewed and accepted the questionnaire pending final minor revisions which were incorporated by the researcher prior to administration.

Administration

Subject Selection

Study participants were obtained from the Regional Clinic for Eating Disorders (RCED) in La Crosse, Wisconsin. The clinic was established in 1984, as a subsidiary of Saint Francis Medical Center (SFMC). RCED provides a comprehensive outpatient treatment program for individuals in the community with eating disorders.

The study was proposed to the clinical director of RCED and verbally approved. The clinical director then obtained verbal approval from the medical director of SFMC. A preliminary review of records by clinic personnel identified 28 females, ranging in age from 15 to 39 years, currently diagnosed and receiving treatment for bulimia according to DSM-III criteria (1980).

Distribution

The questionnaires were coded and delivered to the RCED on April 29, 1986. Clinic personnel administered the questionnaire over a nine-week period from May 5th to July 3rd, 1986, during regularly scheduled appointment times. This method was chosen to minimize stress for the participants and improve return rate. Prior to administration, the researcher met with clinic personnel to discuss consistency in presentation. A typed instruction sheet was included with each questionnaire to further aid in preventing introduction of bias (Appendix B).

Each of the 28 identified bulimic individuals was given an introductory letter which briefly explained the purpose and importance of participation in the study (Appendix C). An informed consent accompanied the introductory letter and was to be completed prior to participation in the survey (Appendix D). For those persons less than eighteen years of age, consent was obtained from both the bulimic individual and a parent or legal guardian.

When consent was obtained, the bulimic individual was measured for height and weight on a clinic scale by the nurse or dietician administering the questionnaire. Height was measured and recorded to the nearest half-inch and weight was measured and recorded to the nearest half-pound on a sheet provided with each questionnaire (Appendix B, item 5). The bulimic individual was then given the questionnaire to be completed and turned in prior to leaving the clinic.

The clinic secretary recorded the completed questionnaire number with the participants name in a register kept at the RCED for future data retrieval if required. A review of clinic records by the secretary determined the date treatment for bulimia began. This date was recorded on the sheet provided with each questionnaire (Appendix B, item 5).

Data Analysis

The completed questionnaires were coded by the researcher and analyzed by computer, using the SSPS package on a Digital Equipment Corporation VAX model 11/780 computer, at the Academic Computing Center, University of Wisconsin, La Crosse. The process of analyses required generation of new data from data originally collected. The following section will explain data generation and anlyses employed.

Height and weight data were converted to metric measures using 2.54 cm/inch and 2.2 lb/kg respectively. These measures were then converted to Quetelet index to facilitate comparisons across individuals within the group. Quetelet index was derived from the following formula: $\text{weight/height}^2 \times 10^3$ (Glueck et al., 1980).

With the exception of the categories of tennis and racquetball, duration data were calculated in each exercise category by the following formula: (minutes/day) X (frequency/day) X (days/week). Duration data for tennis and racquetball were computed by multiplication of the following: (minutes/day) X (days/week). Incompletely reported practices were categorized as missing and excluded from duration computations. Total duration data for all activities were generated by

simple addition of duration data. Duration and total duration data were reported in minutes/week.

Items 8 and 13 measured duration of exercise and binge-eating behaviors. Response categories allowed the individual four choices with interval ranges which were either three or six months. Interval midpoints were used to calculate group means. For those individuals who indicated response 5, duration of greater than two years, the specific response was converted to months for calculation of group means. Data for response 5, was categorized as missing and excluded from computations if the individual did not specify a time period.

Frequency of use data, for methods of weight loss and binge-eating episodes, were measured in different time frames. To permit comparison across individuals and compute means, data were converted to total number of episodes per six months (Appendix A, items 12,14).

Frequencies were tabulated for each category of checklist/ranking items, exercise motivation and influences (Appendix A, items 6,10).

Duration before treatment was calculated by subtracting item 13, onset of binge-eating, interval midpoint (response 1 through 4) or calculated months (response 5) from generated time in treatment data as previously described (Appendix A, item 13).

The data were analyzed using descriptive statistical techniques. Statistical methods included Spearman rho correlations and cross-tabulations.

Data collected in the study but not subjected to analyses include items 3,8,9,11,and 15 through 18. These data are presented in Appendix E.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to describe the exercise practices of bulimic females in treatment. This chapter presents data collected in the following order: a) results of the analyses, b) discussion of the results, and c) summary.

Results

The study involved 26 bulimic females currently receiving treatment at the Regional Clinic for Eating Disorders (RCED). Table 1 presents the descriptive analyses of the group demographic data including the following: a) age, b) education, c) height, d) weight, and e) Quetelet index (QI).

Table 1.
Means, standard deviations, and ranges of demographic data.

Variable	Mean	SD	Range
Age (yrs)	23.5	6.8	15.0 - 39.0
Education (yrs)	13.5	2.5	9.0 - 18.0
Height (cm)	160.0	5.2	154.9 - 172.7
Weight (kg)	59.9	8.5	44.1 - 80.9
QI (weight/height^2) X 10^3	2.28	0.35	1.67 - 3.16

The primary occupation listed by participants is presented in Table 2. The ages of the individuals within each occupation are presented to clarify group data. The category 'other' was selected by only one individual and is labeled 'child care' in the table as it was reported by her. A category labeled 'two roles' was developed to accomodate three individuals who reported two primary occupations. The two roles reported were 'student/wage earner' (n=2), and 'housewife/wage earner' (n=1).

Table 2.
Mean and median ages by primary occupation.

Category	n	%N	Age	
			Mean	Median
Student	13	50.0	19.5	19
Housewife	1	3.8	19.0	
Wage earner	8	30.8	29.1	28
Child care	1	3.8	39.0	
Two roles	3	11.5	22.0	19

Note. The age values represent years.

Table 3 presents group data in the following areas: a) duration of binge-eating, b) duration of binge-eating before treatment, and c) time in treatment. The longest reported time in treatment was 21 months.

Table 3
Duration of binge-eating and treatment in bulimic females.

	Mdn	Mean	SD	Range
Duration of binge-eating (yrs)	5.3	6.1	6.3	.75 - 21
Duration before treatment (yrs)	4.4	5.8	3.1	.75 - 20.5
Time in treatment (months)	6.5	8.6	6.2	2 - 21

Incidence of bulimia-related behaviors is presented in Table 4. Represented behaviors include binge-eating and six methods of weight-loss previously reported to be common in bulimic patients. Participants of the study were not limited to one category in reporting weight-loss methods.

Table 4.
Incidence of bulimia-related behaviors.

Category	n	%N	freq/month	SD	Range
Binge-eating	25	96.2	20.1	33.4	0 - 151.6[a]
Vomiting	12[b]	46.2	26.1	40.9	0.2 - 151.6
Laxatives/diuretics	4	15.4	4.1	5.9	0.5 - 13.0
Diet pills	1	3.8	4.3		
Dieting	15	61.5	34.6	35.2	1 - 91.0
Exercise	22	84.6	29.5	22.0	3 - 106.2

Note. The values under freq/month represent mean frequency/month.
[a] One person, in treatment ten months, stated she had not had an episode of binge-eating during the six months prior to the survey.
[b] Thirty-three percent of vomiters indicated they also used laxatives, diuretics, or diet pills.

Exercise use data are presented in tables 5, 6, and 7. Data concerning the number of different exercise modes the participants of the study used are summarized in Table 5. Total duration and rate of perceived exertion (RPE) data are presented for each of the seven identified categories. Some individuals reported they used an exercise mode but gave incomplete duration data. These individuals were treated as nonparticipants within that exercise mode.

Table 6 summarizes the following data for each of the 12 possible exercise modes on the questionnaire: a) number of individuals who reported using each type of exercise, b) total duration, c) RPE, and d) QI of the individuals within each mode. Participants of the study were not limited to one exercise mode in reporting exercise practices. Some individuals within each mode reported incomplete data for calculating duration. Data from these individuals were treated as missing. As a result, the number of individuals reported within each exercise mode and used in calculation of means represents only those with complete duration data.

Table 5.
Means and standard deviations of total duration and RPE by number of exercise modes used.

# of modes	n	Total dur	SD	RPE	SD
0	6				
1	3	222[a]	173	13.3	2.5
2	7	625	423	14.0	1.8
3	2	404	190	13.5	.7
4	5	546	242	13.8	1.5
5	2	797	124	16.5	2.1
6	1	940		16.0	

Note. Total dur represents total duration and is reported in minutes/week.
[a] The value represents the mean.

Table 6.
Means and standard deviations of exercise duration, RPE, and QI by exercise mode.

Exercise mode	n	%N	Dur*	SD	Range	RPE	SD	QI	SD
Walking	15	57.5	300	298	30 -1170	14.0	1.9	2.35	.42
Running	6	23.1	99	71	26 - 180	14.8	2.0	2.27	.25
Bicycling	8	30.8	205	201	50 - 612	14.0	1.5	2.24	.30
Tennis	1	3.8	180			12.0		2.59	
Aerobics	9	34.6	150	84	30 - 275	15.1	1.8	2.26	.29
Dancing	1	3.8	60			16.0		2.32	
Gymnastics	1	3.8	60			16.0		2.32	
Weight lifting	7	26.9	95	50	45 - 180	14.6	1.7	2.27	.38
Team sports	2	7.7	490	156	380 - 600	17.0	1.4	2.41	.12
Other	5	19.2	159	165	48 - 450	13.8	1.5	2.08	.16

Note. n and mean values of Dur, RPE, and QI represent only those individuals with complete duration data.
*Dur represents mean duration of individuals within each exercise mode.

Correlation coefficients of the relationships between QI and exercise duration by mode are presented in Table 7. Correlation coefficients of the relationships between QI and total duration, QI and RPE, and total duration and RPE are presented in Table 8.

TABLE 7.
Spearman correlation coefficients between QI and exercise duration.

Mode	QI
Walking (duration)	-.1091
Running	-.0290
Bicycling	.1190
Aerobics	.3347
Weight lifting	.3424
Other	-.3000

Note. Exercise modes not included in the table had insufficient n for this analyses.
*p<.05

Table 8
Spearman correlation coefficients between total duration, RPE, and QI.

	Total Duration	RPE	QI
Total Duration		.2433	-0.2556
RPE			.0595
QI			

*p<.05

Motivational data are presented in tables 9, 10, and 11. Table 9 identifies the number of study participants who specified a rank between one and six within each of the 10 possible categories. 'Weight control' and 'improve body appearance' were the categories most frequently ranked number one. 'Weight control', 'improve body appearance', and 'lift spirits/emotional well-being' were the categories most frequently ranked between numbers one and six. Cross-tabulations between the top three motivational factors and top five exercise modes are presented in Table 10.

Table 9.
Exercise motivations.

Motivation	Rank						
	1	2	3	4	5	6	Total
Fun	2	2	5	3	5		17
Competitive sports		3				1	4
Weight control	11	4	1	2	2	1	21
Cardiovascular fitness	3	3	3	3	2	3	17
Lift spirits/emotional well-being	2	4	8	7	2		23
Prevent binge-eating		1		2	6		9
Improve body appearance	9	5	4	4	1	1	24
Impress/attract men			2	1	3	6	12
Enable binge-eating						1	1
Relieve guilt after binge-eating	1	2	1	2		4	10

Note. The values represent the number of study participants within each category at the specified rank, numbers one through six.

Table 10.
Cross-tabulations between motivational factors and exercise modes.

#1 rank	Modes: Walk	Run	Bike	Aerobics	Wt. Lift	Total n
Weight	n=6 66.7%	n=3 33.3%	n=4 44.4%	n=3 33.3%	n=1 11.1%	9
Spirits	n=1 100%	n=1 100%	n=1 100%	n=1 100%	n=1 100%	1
Body app	n=4 66.7%	n=1 16.7%	n=2 33.3%	n=3 50.0%	n=2 33.0%	6

Note. The categories under number one rank are: 'weight control', 'lift spirits/emotional well-being', and 'improve body appearance'.

Table 11 summarizes the following data for each of the 10 possible motivational categories on the questionnaire a) number of individuals who ranked each category number one, b) total duration, c) RPE, and d) QI of the individuals within each category. One individual did not respond to the motivation item on the questionnaire and another responded by placing a number one rank in five categories. Motivational data from these individuals were not included in the analysis.

Exercise influences are reported in Table 12. Data presented identifies the individuals, within each of the six possible categories who specified a rank between one and three.

Table 11.
Means and standard deviations of exercise duration, RPE, and QI by number one ranked motivation.

Motivation	n	%N	Dur*	SD	Range	RPE	SD	QI	SD
Fun	2	7.7	792	132	698 - 885	15.0	4.2	2.20	.41
Weight control	9	34.6	529	383	96 -1395	14.0	2.1	2.30	.39
Cardiovascular fitness	1	3.8	398			15.0		2.88	
Lift spirits/ emotional well-being	1	3.8	710			15.0		2.15	
Improve body appearance	6	23.1	545	324	180 - 940	13.8	1.2	2.50	.25

Note. n and mean values of Dur, RPE, and QI represent only those individuals with complete duration data.
*Dur represents mean total duration of individuals within each exercise mode.

Table 12.
Exercise influences.

Category	Rank			
	1	2	3	Total
Family	3	2	3	8
Friends	5	6	3	14
Television		6	5	11
Magazines	5	7	5	17
Doctor			1	1
Coach or exercise instructor	1			1
Other*	9			9

Note. The values represent the number of study participants within each category at the specified rank, numbers one through three.
* The category of other was specified to be the following: myself (n=7), mirror (n=1), co-workers (n=1).

Discussion

The mean age of the group studied was 23.5 years (Table 1). This agrees with other researchers who report a mean age of 24 years (Fairburn & Cooper, 1984; Johnson, C. L.; Stuckey, Lewis, Schwartz, 1982; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Pyle, Mitchell, & Eckert, 1981). Mean level of education was 13.5 years and indicates the individuals surveyed had at least some college education. These data are consistent with that of researchers who report that white, single women with at least some college education account for 70 percent or more of bulimic individuals studied (Fairburn & Cooper, 1982; Halmi,

Falk, & Schwartz, 1981; Johnson, C. L., Stuckey et al., 1982; Pyle et al., 1981; Russell, 1979).

Body mass of these bulimic women appears similar to that reported by researchers for other bulimic women. Mean QI was 2.28 with a standard deviation (SD) of 0.35. Touyz, Beumont, Collins, and Cowie (1985) studied bulimic patients and reported their QI as 2.22 with a SD of 4.3 and Killen and associates (1986) reported a mean QI of 2.2 for tenth grade females with binge-eating and purging behaviors, no SD was given. Comparison of mean QI to a percentile distribution for white females ages 4 to 79 years (Glueck et al., 1980) placed the women aged 15 and 16 in this study at the 80th percentile, aged 17 to 19 at the 60th percentile, aged 20 to 29 at the 30th percentile, and aged 30 to 39 at the 44th percentile ranking. The QI of the bulimic women of this study did not demonstrate the normal increase in QI with age that is reported for the women in the general population.

Fifty percent of the study participants (n=13) reported their primary occupation as student and had a mean age of 19.5 years (Table 2). Thirty-one percent (n=8) reported their primary occupation as wage earner and had a mean age of 29.1 years. These data are very similar to that of Fairburn and Cooper (1984) who report 57.1 percent of their patients (N=35) were students and 28.6 percent were in paid employment. However, data from this study are almost directly inverse from that of Pyle and associates (1981) who report the majority (n=23) of their 34 bulimic patients were wage earners, and a smaller number were students (n=6). The high number of students in this study may be related to a

heightened community awareness through educational efforts of the RCED and referrals made by the Counseling and Testing Center, University of Wisconsin - La Crosse, and referrals made by Viterbo College. Researchers have reported the incidence of bulimia among college age women to range from 13 to 32 percent, and this in combination with the large college population in La Crosse may account for the high percentage of individuals who reported themselves to be students (Halmi et al., 1981; Rosen, McKeag, Hough, & Curley, 1986; Stangler & Printz, 1980).

The median duration of binge-eating before participants in the study entered into treatment was 4.4 years (Table 3). This figure closely parallels data from other researchers who report bulimic individuals generally have a four-year history of bulimia prior to seeking help (Fairburn & Cooper, 1984; Johnson, C. L., Stuckey et al., 1982; Mitchell et al., 1985; Pyle et al., 1981). The longest reported time in treatment was 21 months and is a reflection of the 1984 opening date of the RCED.

Binge-eating behavior was reported by 96.2 percent of the study participants (Table 4). This was an expected result since all individuals in the study were currently receiving treatment for the diagnosis of bulimia according to the Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. ([DSM-III], 1980). The reported frequency of binge-eating in this study ranged from zero to five episodes per day. Only one individual who had been in treatment for 10 months, reported that she had not had an episode of binge-eating during the six months

prior to the survey. Overall, the frequency of binge-eating episodes reported by the participants of the study agrees with other researchers reports. Binge-eating frequencies are reported to vary greatly, ranging from less than once every two weeks to several times a day (Mitchell et al., 1985; Pyle et al., 1981).

Vomiting behavior was reported by 46.2 percent of the participants of the study. This number is markedly lower than that of 88.1 percent reported by Mitchell and associates (1985), and 91.8 percent reported by Fairburn and Cooper (1982) and may be a reflection of the time in treatment. However, 33.3 percent of the individuals who used vomiting for weight-loss indicated they also used laxatives, diuretics or diet pills. This agrees with other researchers who report this occurs in 30 to 60 percent of bulimic individuals who use self-induced vomiting (Fairburn & Cooper, 1984; Mitchell et al., 1985).

Sixty-two percent of the study participants reported using dieting as a weight-loss method. The mean frequency of dieting reported was 34.6 times/month. Although dieting, per se, was not a bulimic behavior studied by other researchers, there are data that appear related. Mitchell and associates (1985) studied fasting behaviors and eating patterns of bulimic women in treatment (N=275). Ninety-two percent of the patients in their study reported fasting; only 21.3 percent reported eating two or more normal meals a day; 18.7 percent reported eating one normal meal a day; 38.9 percent reported eating a normal meal once or several times a week; and 21 percent reported eating normal meals less than once a week or not at all. Other researchers report that most

bulimic individuals cycle between episodes of binge-eating and fasting (Boskind-White & White, 1983; Gross, 1983; Pyle et al., 1981; Russell, 1979). Considering the above research findings, a lower percentage of participants in this study reported dieting than would be expected. This may be a reflection of time in treatment or a failure by the study participants to recognize the dieting aspect of their eating behaviors.

Exercise was reported as a weight-loss method by 84.6 percent of the participants of the study, with a mean frequency of 29.5 times per month, which could be interpreted as daily. Mitchell and associates (1985) reported that 91.4 percent of bulimic patients (N=275) used exercise as a method of weight control, and 69 percent exercised between several times a week and several times a day. However, no duration data were reported. Fairburn and Cooper (1982) reported that 61.3 percent of bulimic individuals (N=499) used exercise to compensate for overeating. Pyle and associates (1981) reported that 76.5 percent of bulimic individuals (N=34) used daily exercise to control their weight. Clearly, the data of this study lie within reported ranges.

The number of different exercise modes most commonly used were two and four (Table 5). With the exception of those individuals who used two modes of exercise, total duration and RPE increased with the increase in number of exercise modes used. The mean total duration of all individuals who exercised was 556 minutes/week or 9 hours and 20 minutes/week at a mean RPE of 14. The American College of Sports Medicine ([ACSM], 1986) guidelines for exercise indicate that exercise duration of 20 to 30 minutes at least 3 days/week, at an intensity of

≥65 percent of maximal heart rate are the recommended minimums for developing and maintaining cardiorespiratory fitness. Generally, the individuals of this study were well over the minimum exercise duration recommended by ACSM for cardiorespiratory conditioning and maintenance. However, since an RPE of 12 to 13 corresponds with 60 percent of heart rate range (Borg, 1982), the individuals of this study were just at the normal conditioning and maintenance intensity range recommended by ACSM. Because results of this study rely on subjective reports, indirect measures, and small n within each category, caution must be used in interpretation of the data.

The most commonly used modes of exercise were walking (n=15) 57.5 percent, running (n=6) 23.1 percent, bicycling (n=8) 30.8 percent, aerobics (n=9) 34.6 percent, and weight lifting (n=7) 26.9 percent (Table 6). Total duration was greatest in the category of walking at 300 minutes/week. Bicycling duration was 205 minutes/week, aerobics duration was 150 minutes/week, running duration was 99 minutes/week, and weight lifting duration was 95 minutes/week. The individuals who reported they participated in walking and bicycling had an overall mean RPE of 14.0. The highest overall reported RPE of 15.1 was among those individuals who participated in aerobics. QI was similar across the modes of running, bicycling, aerobics and weight lifting, and ranged between 2.24 for bicycling and 2.27 for running and weight lifting. Those individuals who walked had the highest QI at 2.35. This higher QI is representative of a greater weight to height ratio and could be explained in two ways. Either the individuals who walked had a greater

percent body fat or greater percent lean body weight than the individuals within the other exercise modes. No physiologic measures were obtained in this study and no conclusive interpretation can be made from these data. However, statistical analyses using Spearman rho correlations between QI and duration of each exercise mode, QI and total duration, QI and RPE, and total duration and RPE found no significant relationships at the .05 level of probability (Tables 7 and 8).

A tabulation of individuals who ranked each exercise motivation between numbers one and six identified three commonly reported categories (Table 9). Two of these categories, 'weight control' and 'improve body appearance', had relatively large numbers of individuals who ranked them their number one motivational factor for exercising. These data were not surprising. Researchers have consistently reported bulimic individuals to have an intense fear of becoming fat and a disturbed body-image (Larocca & Stern, 1984; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Segal & Figley, 1985). Clearly, the number one reported motivational factors of 'weight control' and 'improve body appearance' are reflective of these bulimic characteristics. 'Lift spirits/emotional well-being' was ranked number one by only two individuals but 84.6 percent of all participants of the study ranked it one of their top five motivational factors. Several researchers have documented depression and anxiety among bulimic individuals (Fairburn & Cooper, 1982; Lowenkopf, 1983; McCanne, 1985; Mitchell, 1985; Pyle et al., 1981; Weiss & Ebert, 1983). Since exercise is reported to increase happiness, and decrease anxiety (Carte, 1977; Merzbacher, 1979;

Sperling, 1986; Wilson, Birger, & Bird, 1981), exercising to lift spirits or for emotional well-being was an expected finding.

The categories 'prevent binge-eating', 'attract/impress men', and 'relieve guilt after binge-eating' were reported by less than half as many individuals to be motivational factors as the three previously discussed. This suggests that the use of exercise by this group is not viewed by them as directly related to their binge-eating behaviors. Seventeen individuals (65.3%) reported exercising for 'fun' and 'cardiovascular fitness' respectively. These categories were ranked numbers one through six more frequently than anticipated. The category of 'competitive sports' was reported by only four individuals as a motivational factor between one and six. The high number of female athletes utilizing bulimic behaviors for weight control reported in the literature (Rosen McKeag, Hough, & Curley, 1986) was not demonstrated in this group of bulimic women in treatment.

Cross-tabulations were performed among motivational factors and exercise modes (Table 10). Due to the large number of empty cells, the cross-tabulations were limited to the top three motivational factors and the top five exercise modes. The individuals who exercise for 'weight control' were least likely to practice weight lifting. The individuals who exercised to 'improve body appearance' were least likely to run and most likely to practice weight lifting. However, due to the small n within each cell, conclusive results cannot be drawn from these data.

The mean total duration and RPE did not differ greatly between those individuals who exercised for 'weight control' (529 minutes/week,

14.0) and those who exercised to 'improve body appearance' (545 minutes/week, 13.8) (Table 11). Duration of time spent exercising was well over the ACSM minimum recommended of 20 to 30 minutes at least three days per week for both of these categories. The individuals who rated 'cardiovascular fitness' number one exercised for the lowest total duration (398 minutes/week) and the individual who rated 'lift spirits/emotional well-being' number one exercised for one of the highest total durations (710 minutes/week). The RPE of these individuals was 15.0 in each category. QI was greatest for 'cardiovascular fitness' and lowest for 'lift spirits/emotional well-being'. However, caution must be used in interpretation of the data due to the small n.

An examination of exercise influences data shows that friends, television and magazines are the most frequently reported influences (Table 12). This agrees with the reports of other researchers who believe that socio-cultural forces strongly affect the individuals in our culture who are vulnerable to development of or currently have an eating disorder (Garner, Garfinkel, Schwartz, and Thompson, 1980; Schwartz, Thompson, and Johnson, 1982)

Summary

The results of this study found the bulimic participants were relatively normal representatives of bulimic women in treatment as described by other researchers. The most common motivational factors among the participants of the study who used exercise were "weight

control", "lift spirits/emotional well-being" and "improve body appearance". The socio-cultural influences of friends, television and magazines played a role in these individuals exercise practices.

The duration of the group exercise practices, in minutes per week, was well above minimum ACSM recommendations for conditioning and maintenance of cardiovascular fitness, but RPE was just within the accepted minimum. It is not known if the participants of the study were exercising at an aerobic level for long enough periods of time to provide an actual training effect. Since the mean group QI reflected a greater weight to height ratio, and bulimic individuals normally fall within the upper range of normal weight for height standards, it is questionable if the actual amount of exercise obtained was at adequate intensity to achieve benefit or to cause this ratio to be related to a high percentage of lean body weight.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was performed to describe the use of exercise by bulimic women in treatment. Twenty-six females diagnosed and currently receiving treatment for bulimia at the Regional Clinic for Eating Disorders participated in the survey. The variables of demographic data, exercise practices and motivational factors were examined for relationships. Ninety-six percent of the group reported binge-eating behaviors a mean frequency of 20.1 times per month. One individual who had been in treatment for 10 months stated she had not had an episode of binge-eating in the past six months. Forty-six percent of the group reported vomiting for weight control at a mean frequency of 26.1 times per month. Eighty-five percent of the group reported using exercise as a method of weight-loss. The percentages of these behaviors were similar to those of other researchers except for vomiting, which was slightly less frequent than was expected. The women of this study exercised primarily for weight control, to improve their body appearance, and to lift their spirits or for emotional well-being. Friends, television, and magazines were influential in current exercise practices. The mean exercise duration for these women was 556 minutes per week and well above the minimum of 20 to 30 minutes at least three days per week at 65 percent of maximal heart rate that is recommended by

the American College of Sports Medicine (ACSM) for conditioning or maintaining cardiovascular fitness. The mean rate of perceived exertion was 14. This was just above the minimum of 12 to 13 recommended by ACSM for cardiovascular conditioning and maintenance. Because data collected relied on subjective reports of duration and intensity, no conclusions could be made regarding the level of aerobic work these women were practicing.

Conclusions

Within the limitations of this study, the following conclusions can be made:

1. Bulimic females in treatment exercise primarily for "weight control", to "lift their spirits or for emotional well-being", and to "improve body appearance".
2. The mean amount of time spent exercising was 556 minutes/week, well above the American College of Sports Medicine (ACSM) recommended minimum of 20 to 30 minutes per week at 65 percent of maximal heart rate for cardiovascular conditioning and maintenance.
3. The mean rate of perceived exertion during exercise was 14.0, just over the minimum of 12 to 13 recommended by ACSM to achieve cardiovascular conditioning and maintenance.
4. Friends, television, and magazines are influential in the exercise practices of bulimic women in treatment.

Recommendations

Based on the results of this study, the following recommendations are made for further study:

1. Study and compare the exercise practices of bulimic males and bulimic females.
2. Study and compare bulimic individuals exercise practices with a control group of nonbulimic individuals.
3. Incorporate diet and exercise logs into the study for analyses of actual caloric intake, time spent, heart rate and type of activities practiced. Compare these data with physiological measures of exercise performance and body composition for more statistically measurable conclusions.
4. Analyze body-image and self-concept in bulimic individuals pre- and post-participation in an exercise class utilizing ACSM guidelines.

REFERENCES CITED

American College of Sports Medicine. (1986). Guidelines for exercise testing and prescription (3rd ed.). Philadelphia: Lea & Febiger.

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, D.C.: Author.

Anderson, A. E. (1984). Nutrition and behavior. New York: Plenum.

Bauer, B. G. (1984). Bulimia: A review of a group treatment program. Journal of College Student Personnel, May, 221-227.

Bennett, W., & Gurin, J. (1982). The dieter's dilemma. New York: Basic Books.

Blatt, S. J. (1975). The validity of projective techniques and their research and clinical contribution. Journal of Personality Assessment, 39(4), 327-343.

Blinder, B. J., Freeman, D. M. A., & Stunkard, A. J. (1970). Behavior therapy of anorexia nervosa: Effectiveness of activity as a reinforcer of weight gain. American Journal of Psychiatry, 126, (8), 77-82.

Borg, G. A. V. (1982). Psychophysical bases of perceived exertion. Medicine and Science in Sports and Exercise, 14(5), 377-381.

Boskind-White, M., & White, W. C., Jr. (1983). Bulimarexia: The binge/purge cycle. New York: W. W. Norton.

Bruch, H. (1973). Eating disorders: Obesity, anorexia nervosa and the person within. New York: Basic Books.

Buck, J. N. (1966). The house-tree-person technique: Revised manual. Beverly Hills: Western Psychological Services.

Carter, R. (1977). Exercise and happiness. Journal of Sports Medicine, 17, 307-312.

Casper, R. C., Eckert, E. D., Halmi, K. A., Goldberg, S. C., & Davis, J. M. (1980). Bulimia: Its incidence and clinical importance in patients with anorexia nervosa. Archives of General Psychiatry, 37, 1030-1035.

Cauwels, J. M. (1983). Bulimia: The binge-purge compulsion. Garden City, New York: Doubleday.

Chalmers, J., Catalan, J., Day, A., Fairburn, C. (1985). Anorexia nervosa presenting as morbid exercising. The Lancet, Feb. 2, 286-287.

Delaney, D. W., & Silber, T. J. (1984). Treatment of anorexia nervosa in a pediatric program. Pediatric Annals, 13(11), 860-864.

Fairburn, C. G., & Cooper, P. J. (1982). Self-induced vomiting and bulimia nervosa: An undetected problem. British Medical Journal, 284, 1153-1155.

Fairburn, C. G., & Cooper, P. J. (1984). The clinical features of bulimia nervosa. British Journal of Psychiatry, 144, 238-246.

Fisher, S., & Cleveland, S. E. (1968). Body image and personality (2nd ed.). New York: Dover.

Fu, V. R. (1981). Analysis of children's self-drawings as related to self-concept. Psychological Reports, 49(3), 941-942.

Gandour, M. J. (1984). Bulimia: Clinical description, assessment, etiology, and treatment. International Journal of Eating Disorders, 3(3), 3-38.

Garfinkel, P. E., Moldofsky, H., & Garner, D. M. (1980). The heterogeneity of anorexia nervosa: Bulimia as a distinct subgroup. Archives of General Psychiatry, 37, 1036-1040.

Garner, D. M., Garfinkel, P. E., Schwartz, D., & Thompson, M. (1980). Cultural expectations of thinness in women. Psychological Reports, 47, 483-491.

Garner, D. M., Olmsted, M. P., Polivy, J. (1983). Eating Disorder Inventory. Odessa, FL: Psychological Assessment Resources.

Glueck, C. J., Taylor, H. L., Jacobs, D., Morrison, J. A., Beaglehole, R., & Williams, O. D. (1980). Plasma high-density lipoprotein cholesterol: Association with measurements of body mass. Circulation, 62(Suppl. IV) 62-68.

Gross, M. (1983). Aspects of bulimia. Cleveland Clinical Quarterly, 50(1), 19-25.

Halmi, K. A., Falk, J. R., & Schwartz, E. S. (1981). Binge-eating and vomiting: A survey of a college population. Psychological Medicine, 11, 681-686.

Huon, G. F., & Brown, L. B. (1986). Body images in anorexia nervosa and bulimia nervosa. International Journal of Eating Disorders, 5(3), 421-439.

Joesting, J. (1981). Comparison of students who exercise with those who do not. Perceptual and Motor Skills, 53, 426.

Joesting, J., & Clance, P. R. (1979). Comparison of runners and nonrunners on the body-cathexis and self-cathexis scale. Perceptual and Motor Skills, 48, 1046.

Johnson, C. L., & Larson, R. (1982). An anlysis of moods and behavior. Psychosomatic Medicine, 44, 333-345.

Johnson, C., Lewis, C., & Hagman, J. (1984). The syndrome of bulimia: Review and syntheses. Psychiatric Clinics of North America, 7(2), 247-273.

Johnson, C. L., Stuckey, M. K., Lewis, L. D., & Schwartz, D. M. (1982). Bulimia: A descriptive survey of 316 cases. International Journal of Eating Disorders, 2, 3-18.

Johnson, W. G., Schlundt, D. G., Kelley, M. L., & Ruggiero, L. (1984). Exposure with response prevention and energy regulation in the treatment of bulimia. International Journal of Eating Disorders, 3 (2), 37-46.

Killen, J. D., Barr Taylor, C., Telch, M. J., Saylor, K. E., Maron, D. J., & Robinson, T. N. (1986). Self-induced vomiting and laxative and diuretic use among teenagers: Precursors of the binge-purge syndrome? Journal of the American Medical Association, 255(11), 1447-1449.

Larocca, F. E. F. (1984). An inpatient model for the treatment of eating disorders. Psychiatric Clinics of North America, 7(2), 287-298.

Larocca, F. E. F., & Stern, J. H. (1984). Eating disorders: Self-help and treatment in Missouri. Missouri Medicine, 81(12), 764-769.

Lowenkopf, E. L. (1983). Bulimia: Concept and therapy. Comprehensive Psychiatry, 24(6), 546-564.

McArdle, W. D., Katch, F. I., & Katch, V. L. (1981). Obesity and weight control. In Exercise Physiology: Energy, nutrition, and human performance (pp. 405-424).

McCanne, L. P. E. (1985). Correlates of bulimia in college students: Anxiety, assertiveness, and locus of control. Journal of College Student Personnel, July, 306-310.

Merzbacher, C. F. (1979). A diet and exercise regimen: It's effect upon mental acuity and personality, a pilot study. Perceptual and Motor Skills, 48, 367-371.

Mihevic, P. M. (1981). Sensory cues for perceived exertion: A review. Medicine and Science in Sports and Exercise, 13(3), 150-163.

Mitchell, J. E., Hatsukami, C., Eckert, E. D., & Pyle, R. L. (1985). Characteristics of 275 patients with bulimia. American Journal of Psychiatry, 142(4), 482-485.

Munoz, R. A. (1984). The basis for the diagnosis of anorexia nervosa. Psychiatric Clinics of North America, 7(2), 215-221.

Palmer, A. (1986, May 18). Teens learn lesson after eating disorder kills: Death shocks schoolmates into discussing illness. Salt Lake City Tribune, pp. B-1, B-4.

Peterson, D. S., & Barkmeier, W. W. (1983). Oral signs of frequent vomiting in anorexia. American Family Physician, 27(4), 199-200.

Peterson, J. L. (1984). Prevalence of bulimia within a university female student population. Unpublished master's thesis, University of Wisconsin-La Crosse, La Crosse.

Pyle, R. L., Mitchell, J. E., & Eckert, E. D. (1981). Bulimia: A report of 34 cases. Journal of Clinical Psychiatry, 42(2), 60-64.

Pyle, R. L., Mitchell, J. E., & Eckert, E. D., Hatsukami, D. K., & Goff, G. (1984). The interruption of bulimic behaviors: A review of three treatment programs. Psychiatric Clinics of North America, 7(2), 275-285.

Reed, G. R., & Sech, E. P. (1985). Bulimia: A conceptual model for group treatment. Journal of Psychosocial Nursing and Mental Health Services, 23(5), 16-22.

Rosen, L. W., McKeag, D. B., Hough, D. O., & Curley, V. (1986). Pathogenic weight-control behavior in female athletes. The Physician and Sportsmedicine, 14(1), 79-86.

Roy-Byrne, P., Lee-Benner, K., & Yager, J. (1984). Group therapy for bulimia: A year's experience. International Journal of Eating Disorders, 3(2), 97-115.

Russell, G. (1979). Bulimia nervosa: An ominous variant of anorexia nervosa. Psychological Medicine, 9, 429-448.

Sansone, R. A. (1984). Complications of hazardous weight-loss methods. American Family Physician, 30(2), 141-146.

Schwartz, D. M., Thompson, M. G. & Johnson, C. L. (1982). Anorexia nervosa and bulimia: The socio-cultural context. International Journal of Eating Disorders, 1(3), 20-36.

Segal, S. A., & Figley, C. R. (1985). Bulimia: Estimate of incidence and relationship to shyness. Journal of College Student Personnel, May, 240-244.

Social Sciences SSPS Inc. (1983). Statistical package for the social sciences: User's guide. Chicago: Author.

Sperling, D. (1986, April 28). Beat the blues while battling your bulges. USA Today, p. D-5.

Stangler, R. S., & Printz, A. M. (1980). DSM-III: Psychiatric diagnosis in a university population. American Journal of Psychiatry, 137(8), 937-940.

Stunkard, A. J. (1959). Eating patterns and obesity. Psychiatric Quarterly, 33, 284-295.

Sugarman, A. & Kurash, C. (1982). The body as a transitional object in bulimia. International Journal of Eating Disorders, 1(4), 57-67.

Szmukler, G. L. (1982). Anorexia nervosa: Its entity as an illness and its treatment. Pharmacologic Therapy, 16, 431-446.

Thomas, C. L. (Ed.). (1975). Taber's cyclopedic medical dictionary. Philadelphia: F. A. Davis.

Touyz, S. W., Beumont, P. J. V., Collins, J. D., & Cowie, I. (1985). Body shape perception in bulimia and anorexia nervosa. International Journal of Eating Disorders, 4(3), 259-265.

Weiss, S. R., & Ebert, M. H. (1983). Psychological and behavioral characteristics of normal-weight bulimics and normal-weight controls. Psychosomatic Medicine, 45(4), 293-303.

Willmuth, M. E., Leitenberg, H., Rosen, J. C., Fondacaro, K. M., Gross, J. (1985). Body size distortion in bulimia nervosa. International Journal of Eating Disorders, 4(1), 71-78.

Wilson, V. E., Berger, B. G., & Bird, E. I. (1981). Effects of running and of an exercise class on anxiety. Perceptual and Motor Skills, 53, 472-474.

Wolf, E. M., & Crowther, J. H. (1983). Personality and eating habit variables as predictors of severity of binge eating and weight. Addictive Behaviors, 8, 335-344.

Woolf, H. B. (Ed.). (1975). Webster's new collegiate dictionary. Springfield, Massachusetts: G. & C. Merriam.

Zurcher, L. A. (1977). The mutable self: A self-concept for social change. Beverly Hills: Sage.

Zuti, W. B., & Golding, L. A. (1976). Comparing diet and exercise as weight reduction tools. The Physician and Sportsmedicine, 4(1), 49-53.

APPENDIX A
QUESTIONNAIRE

Please read the questions carefully and fill in the blank, circle the most correct answer or place a check where indicated.

1. Your current age:

_____years

2. Please circle the highest level of education you have completed:

High School 1 2 3 4

College or Technical School 1 2 3 4

Post-Graduate School (1) yes (2) no

3. List the highest degree you have attained:

_____

4. Circle the number of your main occupation today:

(1) student

(2) housewife

(3) wage earner

(4) other: please specify_____

5. Place a check next to the types of exercise you now use and complete the blanks with the time you spend doing each sport and distance if it applies (include estimates). In addition, indicate if you have ever been in competition in that sport and when.

_____(1) WALKING

minutes/walk_____

walks/day_____

days/week_____

distance/week_____miles or fractions of miles

_____(2) RUNNING

minutes/run_____

runs/day_____

days/week_____

distance/week_____miles or fractions of miles

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(3) BICYCLING

minutes/bike ride_____

rides/day_____

days/week_____

distance/week_____miles or fractions of miles

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(4) SWIMMING

minutes/swim_____

swims/day_____

days/week_____

distance/swim_____miles or fractions of miles

_____(5) TENNIS

minutes/day_____

games/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(6) RACQUETBALL

minutes/day_____

games/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(7) AEROBICS

minutes/class_____(total class length)

classes/day_____

days/week_____

_____(8) DANCING

minutes/workout_____

workouts/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(9) GYMNASTICS

minutes/workout_____

workouts/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(10) WEIGHT LIFTING

minutes/workout_____

workouts/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(11) TEAM SPORTS: please specify_____

minutes/workout_____

workouts/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

_____(12) OTHER: Please specify_____

minutes/workout_____

workouts/day_____

days/week_____

Competitively? (1) yes (2) no If yes, dates_____to_____

6. Place a check next to the reasons why you are most likely to exercise and rank all of those you checked in order of importance. For example: 1 is the most likely reason you exercise, 2 is the second most likely, and so on until all those checked have a number. Rank only those items checked.

Rank/Check

____/_____I exercise for fun.

____/_____I exercise for competitive sports.

____/_____I exercise for weight control.

____/_____I exercise for cardiovascular fitness.

____/_____I exercise to lift my spirits or for emotional well-being.

____/_____I exercise to keep myself from over eating or binge-eating.

____/_____I exercise to improve my body appearance.

____/_____I exercise to impress/attract members of the opposite sex.

____/_____I exercise in order to binge eat.

____/_____I exercise to relieve guilty feelings after binge-eating.

7. Using the scale provided, please rate your exercise intensity. Circle the number that applies most of the time.

6

7 Very, very light

8

9 Very light

10

11 Fairly light

12

13 Somewhat hard

14

15 Hard

16

17 Very hard

18

19 Very, very hard

20

8. How long have you been exercising at this level?

(1) 1 to 3 months

(2) 3 to 6 months

(3) 6 to 12 months

(4) 12 to 24 months

(5) more than 24 months: please specify_____

9. Do you feel that the amount of exercise you do is:

(1) too little

(2) about right

(3) too much

10. What influences are important in your current exercise patterns? Place a check next to those that apply and rank in order of importance. For example: 1 is the primary influence, 2 is the second most important influence. Rank only those items checked.

Rank/Check

____/_____family

____/_____friends

____/_____television

____/_____magazines

____/_____doctor

____/_____coach or exercise instructor

____/_____other: please specify_____

11. How do you feel about your body?

(1) very poor

(2) poor

(3) good

(4) very good

12. Place a check next to the methods listed below that you use to lose weight. Indicate how often you use each of those methods by writing in a number and circling one of the four time frames provided. For example:

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____SELF-INDUCED VOMITING

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____LAXATIVES OR DIURETICS

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____DIET PILLS

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____RESTRICTIVE DIETING

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____ENEMAS

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____EXERCISE

_____times per (1) month (2) week (3) day

(4) other: specify_____

_____OTHER: please specify_____

_____times per (1) month (2) week (3) day

(4) other: specify_____

13. When did you begin binge-eating?

(1) 1 to 6 months ago

(2) 6 months to 1 year ago

(3) 1 to 1½ years ago

(4) 1½ to 2 years ago

(5) more than 2 years: please specify_____

14. Considering the last six months: Indicate how many times you have had an episode of binge-eating by writing in a number and circling one of the time frames provided.

_____times per (1) month (2) week (3) day

(4) other: please specify_____

15. Do you ever feel depressed after binge-eating?

(1) yes (2) no (3) no longer applies

16. Do you ever feel embarrassed after binge-eating?

(1) yes (2) no (3) no longer applies

17. Do you ever feel guilty after binge-eating?

(1) yes (2) no (3) no longer applies

please continue on next page. . .

18. Please draw a picture of your whole body:

APPENDIX B
INSTRUCTIONS FOR TEST ADMINISTRATORS

INSTRUCTIONS FOR TEST ADMINISTRATORS

1. Give the participant the cover letter and consent form to read. After they have read these, stress that their participation is voluntary and will in no way affect their treatment at the Regional Clinic for Eating Disorders. Assure them that anonymity will be maintained.

2. If asked, volunteer only that this is a study about women and exercise and that a summary of the study findings will be available at the clinic by the end of summer.

3. Give the participant the questionnaire only after they have read the cover letter and read and signed the consent form. For those participants under 18 years of age, parental consent must also be in writing on the consent form.

4. When the questionnaire is completed, scan for missed or unanswered questions.

5. On the bottom of the last page record the following:

   Height_____Weight_____

   Date treatment began_____

6. On the sheet provided at the front desk record the following:

   Patient Name_____

   Questionnaire Number_____

Consistency among test administrators is very important for accurate test results. Please follow the instructions as closely as possible. Thank-you for your time and efforts.

APPENDIX C
INTRODUCTORY LETTER

University of Wisconsin-La Crosse

1422 Winnebago
LaCrosse, WI 54601
April 29, 1986
784-2868

Dear Participant,

The role of women in society has changed greatly over the past few years. Studies show that adolescent and young women are among those most affected by these changes. Your participation in a local survey of women is needed to further understand the role exercise plays in our lives.

Should you decide to participate, the enclosed consent form and questionnaire will require approximately ten to fifteen minutes of your time. Individual data collected will be strictly confidential. No individual taking part in the study will be identified in the summary of findings.

If you decide to participate please read and sign the consent form, answer the questionnaire and return to clinic personnel.

Thank you for your time and effort. A summary of the group findings will be available for you to review at the clinic by summer's end.

Sincerely,

Barbara Stafslien

Barbara Stafslien
Graduate Student
Adult Fitness/Cardiac Rehabilitation

Gayle E. Brooks, Ph.D.

Gayle E. Brooks, Ph.D.
Director
Regional Clinic for Eating Disorders

APPENDIX D
INFORMED CONSENT

INFORMED CONSENT

I understand that the purpose of this study is to learn more about women and exercise.

I consent to participation in the study voluntarily. No pressure has been used to obtain my participation.

I understand the study consists only of a questionnaire, no other procedure or tests will be required.

I understand that participation in the study will not have any effect on therapy I am currently receiving at the Regional Clinic for Eating Disorders.

I understand that study results will be analyzed as a group, thereby maintaining individual anonymity.

I understand that results of the study will be made available to me upon request.

I understand that I may withdraw at any time.

Signed_____

Parent or guardian's signature if above signed is less than 18:

_____

Date_____

APPENDIX E
RAW DATA

Due to the sensitive and confidential nature of the study, raw data is not included. Raw data is available upon request from:

Barbara F. Stafslien
RR 1, Box 68
Makoti, ND 58756

Release of raw data is subject to approval by Dr. Gayle Brooks, Regional Clinic for Eating Disorders, La Crosse, WI.