

Behavioral Treatment of Obesity in Adults

Åsa-Helena Nilsson

Psykologiska Institutionen

Stockholms Universitet

FK-fördjupning HT 2004

Handledare: Birgitta Hellström

Abstract

Obesity is a major public health and economic problem of global significance. Obesity, especially severe obesity, is often associated with a negative impact on physical and psychological quality of life aspects. Obesity is developed by a combination of lifestyle, environmental factors and heritance. The aim of this study was to describe some of the factors connected with obesity, present some of the commonly used behavioral treatments of obesity in adults and present some of the evaluations that have been made. Contemporary models engaged in behavioral treatment of obesity often contain a multimodal approach. Evaluations about behavior therapy of obesity show that the methods were difficult to validate, since the studies often were combined with education about nutrition and exercise and the behavioral ingredients were difficult to isolate from other.

Key words: obesity, behavioral treatment, life style change

Behavioral Treatment of Obesity in Adults

Obesity is a major public health and economic problem of global significance whereas prevalence rates are increasing in all parts of the world. These problems has become so common that they are replacing the more traditional public health concerns such as undernutrition and infectious disease as the most significant contributors of global ill-health (Antipatis & Gill in Björntorp, 2001).

Obesity, especially severe obesity, is often associated with a negative impact on physical and psychological quality of life aspects. Allocation of blame and stigmatization contribute to the person focusing to the negative aspects of body and self. Due to their wish to loose weight and in order to fit in with the social norm, obese persons often develop a rigid and restrictive eating behavior. The often experienced “weight-cycling” leads to further weight gain (Munsch, Biedert & Keller, 2003)

In 1967 conducted Richard Stuart a pioneering study of the utility of behavioral techniques, such as self-monitoring and stimulus control, in helping several obese women lose weight over a 12-month period. The results were encouraging: each of the women who stayed with the program lost weight consistently throughout the year and lost between 26 to 47 pounds (Sarafino, 2002). This success encouraged other researchers to study the usefulness of behavioral methods in weight control.

The aim of this literature study is to a) describe some of the factors connected with obesity b) present some of the commonly used behavioral treatments of obesity in adults c) show some of the evaluations that have been made.

The pathogenesis of obesity

Obesity is caused by an imbalance between energy intake and energy expenditure. This imbalance can occur after a relatively small but prolonged increase of food intake in combination of low physical activity. The most common method used to measure obesity is the BMI index. In the new graded classification system developed by the World Health Organization (WHO), a BMI of 30 kg/m² denotes obesity (Antipatis & Gill in Björntorp, 2001). There are different kinds of obesity. Normally a distinction is made between android obesity and gynoid obesity. Android obesity with fat stores around the waistline is considered to be more associated with risk for complications like insulin resistance and type 2 diabetes mellitus, hypertension (high blood pressure), hyperlipidemia (elevation of lipids in the bloodstream), cardiovascular disease, stroke, sleep apnea etc. than the gynoid obesity with fat stores round hips and thighs (Rosmond, in Björntorp, 2001).

Psychological, biological and psychosocial factors are three important main factors that are considered to be involved in obesitas (SBU, 2002). The factors co-operate and make it difficult to separate them from each other in relation to the treatments. The close relationship between obesity and cardiovascular disease and diabetes mellitus (diabetes type 2) also makes research about the latter relevant for the obesity problem.

Biological factors

Findings have shown that a subset of obese humans has relatively low plasma levels of leptin. Leptin is an adipocyte (fat cell) hormone and play an important role in the energy regulating system. The level of leptin is positively correlated with differences in body fat. Increasing leptin levels cause a negative energy balance (energy expenditure > food intake), whereas decreasing levels lead to positive energy balance

Behavioral Treatment of Obesity in Adults

(food intake > energy expenditure). The hypothalamus seems to be an important site of leptin action (Friedman, 2002). In some cases is abnormal regulation of the leptin gene in adipose tissue etiologic in the pathogenesis of the obese state (Ioffe, Moon, Connolly & Friedman, 1998).

Serotonin (5-hydroxytryptamine or 5-HT) play an important role in hunger and satiety regulation (Breum et al., 2003). A reduced 5-HT function in hypothalamus is associated with absence/reduced feelings of satiety (Attenburrow et al., 2003).

Insulin resistance is associated with obesity which means that the satiety and energy regulating systems gets slow (Björck & Elmståhl, 2000). In insulin resistant persons the pancreas secretes more insulin. Therefore they do have high plasma insulin levels. The syndrome can be seen as a cluster of abnormalities, including obesity, hypertension, dyslipidemia, and type 2 diabetes. Obesity is a component of the syndrome but it is not resulting from it. In contrary obesity promotes insulin resistance. Weight loss can improve insulin sensitivity and reduce insulin levels (Rao, 2001).

Chronic stress could be seen as a complex factor that has effect on bodily functions and behavior of people. It is considered to be an important key factor that can cause perturbation of the function of the HPA axis (Währborg, 2002). An increased activity in the HPA axis is associated with the metabolic syndrome (sometimes called syndrome X). The syndrome involves disturbances in metabolism, autonomic function and health-related behaviors. About one-quarter in a study of a male population randomly assigned, and all 52 years of age had signs of metabolic derangements, characteristic of the metabolic syndrome (Rosmond, in Björntorp, 2001).

Behavioral Treatment of Obesity in Adults

In a study by Muldoon et al. (2004) findings showed a heretofore unrecognized association between reduced central serotonergic responsivity and the metabolic syndrome. Rosmond (2004) propose the notion that obesity and depression may represent different manifestations of the same disease process, especially since both diseases involve the serotonergic systems.

Psychological factors

Adolfsson (2004) outlines obesity as a complex problem with many components whereas BMI, energy intake and energy expenditure is the top of the iceberg. Beneath lies a long row of factors such as motivation, reasons for excessive eating, reasons for limited physical activity, expectations of the weight reduction process, hope, energy, future dreams, stress/balance in life, self efficacy, locus of control, readiness for change, self-rated health, social and mental well-being and so on.

There is an increased awareness that *emotions*, even more than cognitions, affect the eating behavior of obese people. Obese persons have been found more inclined to act at the spur of the moment and have a higher degree of “monotony avoidance” (Adolfsson, 2004). The term monotony avoidance means tendency to seek exciting and stimulating activities, and difficulties in coping with boring situations. It is also a factor related to the craving for quick tension release through eating or drinking (Palme & Palme, 1997).

Obese people are also more affected by external cues, such as the sight of food and its availability compared with normal weight subjects. Individuals who are unable to readily label and differentiate between various unpleasant emotional and physiological states suffer a great risk of overeating in response to such states (Adolfsson, 2004).

Behavioral Treatment of Obesity in Adults

Rotter pointed out that people differ in the degree to which they believe they have control over their lives. He supposed that some people believe that they have control over their successes and failures which he described as a possession of an internal locus of control. Other people believe that their lives are controlled by forces outside themselves such as luck, coincidence etc. These people had an external locus of control (Rotter, 1966, in Sarafino, 2002). Most people have moderate beliefs regarding the influence they have on events in their lives and their locus of control falls in the midrange between being highly internal or highly external (Sarafino, 2002).

Another important aspect of personal control is self-efficacy (Bandura 1977, 1986, in Sarafino 2002; Bandura, 2004). According to Bandura people do estimate their chances of success in an activity, such as quitting smoking or running a mile, on the basis of their prior observations of themselves and other people. People who have a sense of self-efficacy believe that they can succeed at a specific activity they want to do (Bandura, 2004). Locus of control and self-efficacy occurs to be key terms. They occur frequent in studies about obesity and seem to constitute a psychological set point, from which many studies emanate.

Psychosocial factors

According to Bandura (1969, in Sarafino 2002; Bandura, 2004) people throughout the life span assess their personal control through the process of *social learning* in which we learn by observing the behavior of others. Parents who are caring, encouraging, and consistent in their standards for behavior tend to have children who develop an internal locus of control and a sense of efficacy for a variety of activities (Harter, 1983, in Sarafino 2002).

Behavioral Treatment of Obesity in Adults

Eating has a social function and meals often bring people closer together. Food preferences and meal habits could be ways to state a social and cultural belonging. A lack of belonging to a social network and lack of social support have been found to correspond with obesity (Adolfsson, 2004).

Socio economic status seems to have an impact on obesity. In a cohort study of 1472 men and 1563 women born in 1946 in England, Scotland and Wales showed the results that the father's social class inversely was associated with adult central and total obesity, after adjustment for social class at 26 and 43 years (Langenberg, Hardy, Kuh, Brunner & Wadsworth, 2003). In women, but not men, were adult social class related to obesity, after accounting for childhood circumstances. Upwardly mobile men and women in the study were less obese than subjects remaining in their father's social class and their levels of obesity tended to be between the class they left and the class they joined.

Behavior therapy

Contemporary models engaged in behavioral treatment of obesity derive from more general models in use to develop healthier behavior. Same models are used in the treatment of drug addiction (Sarafino, 2002), high blood pressure (Lisspers & Öhman, 1996), nicotine addiction and in a wide range of areas where health behavior improvement is needed.

Behavior therapy usually consists of behavior modification directed toward diet and exercise. Behavior modification involves counseling the patient regarding stimulus control, goal setting, cognitive restructuring, self monitoring and contracts to reward behavior and it is difficult to separate out studies that are diet only or exercise only versus behavior modification associated with diet and exercise (Orzano & Scott, 2004).

Behavioral Treatment of Obesity in Adults

Behavioral techniques to improve dietary treatment for obesity

Behavioral therapy of obesity does not address underlying causes of overeating but works under the assumption that eating patterns are learned behaviors. These behaviors can be modified and the environment, including daily exposure to foods must be changed to achieve long-term success. Some techniques are directly associated with the eating situation and the diet itself. Examples of advice could be: Plan cooking so that there are no leftovers, serve meals on small size plates, never eat out of kitchen utensils, always eat at the same place, concentrate on food, avoid external distractions, chew each bite at least 20 times, put down knife and fork between each bite, let each meal last at least 20 minutes etc. (Rössner 2001, in Björntorp, 2001).

Stages of change model

Readiness to change is the main focus of a theory called *stages of change model*, (DiClemente & Prochaska, 1983). This model is also called the *transtheoretical model* since it includes factors described in other theories.

The model outlines five stages of intentional behavior 1) *Precontemplation*: people in this stage are not considering changing, at least during the next several months or so. 2) *Contemplation*: during this stage, people are aware a problem exists and are seriously considering changing to a healthier behavior within the next several months. But they are not yet ready to make a commitment to take action. 3) *Preparation*: at this stage, individuals are ready to try to change and plan to pursue a behavioral goal such as stopping smoking, in the next month. 4) *Action*: this stage spans a period of time, usually 6 months, from the start of people's successful and active efforts to change a behavior. 5) *Maintenance*: people in this stage work to maintain the successful behavioral changes

Behavioral Treatment of Obesity in Adults

they achieved. Although this stage can last indefinitely, researchers often define its lengths as, say, 6 months for follow-up assessment (Sarafino, 2002).

The model is used in various areas where a behavioral change is needed for health reasons. The model was used to help people quit smoking at first but has become in use in many other fields.

Decisional balance

In a study by Prochaska et al. (1994) researchers examined the ability of the transtheoretical model to integrate core constructions from an alternative model – namely, Janis & Mann’s (1977) decision-making model. Relationships between stages of change and two scales from a decisional balance measure across 12 problem behaviors (smoking cessation, quitting cocaine, weight control, high-fat diets, adolescent delinquent behaviors, safer sex etc.) were made (Prochaska et al., 1994).

A conflict approach assumes that sound decision making involves careful scanning of all relevant considerations that enter into a decisional “balance sheet” of comparative potential gains and losses. Janis and Mann suggested that the anticipated losses, or costs, can be categorized into four major types of consequences: a) utilitarian gains or losses for self, b) utilitarian gains or losses for significant others, c) approval or disapproval from significant others, and, d) self-approval or self-disapproval (Prochaska et al., 1994).

Rather than eight factors that need to be balanced when making decisions, as posited by Janis & Mann (1977), Prochaska et al. (1985) came to the conclusion that there only were two factors - namely the pros and cons of the behavior in question. The balance between pros and cons varies depending on which of the following stages people

Behavioral Treatment of Obesity in Adults

are in: precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage, individuals will judge the pros of the problem behavior to outweigh the cons and in the action and maintenance stages the opposite pattern will occur. The cons will be judged as outweighing the pros (Prochaska et al., 1994).

Patient empowerment

The patient empowerment method for behavioral change is built on the theory that the patient accepts responsibility for their life style and cannot be forced by professional health care givers to follow a life style imposed on them. The empower approach to weight control care is based on the recognition that patients are in control of the most important weight control management decisions affecting their wellbeing. The health care givers feelings should change from feeling responsible *for* the patients to feeling responsible *to* the patients. The professional health care giver should act as collaborators who provide patients with the information, expertise and support to make the best possible weight control self-management decisions based on their own health priorities and goals (Adolfsson, 2004).

Stress management as behavioral treatment of obesity

With knowledge of the influence of chronic stress in the obesity problem appears the question if stress management treatment could be a step in the right direction towards weight reduction. Stress management is a wide conception. In this study the concept stress management also includes behavioral treatments involving physical exercise since studies has shown that physical exercise increases people's ability to endure stress. Exercise can be seen as both stress and weight management since it has been clear that exercise not only lower resting blood pressure levels, it also lowers blood pressure during

Behavioral Treatment of Obesity in Adults

mental stress (Georgiades et al., 2000). Studies which solely involves obesity treatment with traditional stress management without nutritional or/and exercise intervention is hard to find.

Behavioral treatment put in to practice.

According to a practical assessment of the stages of change model the decision to attempt weight-loss treatment should consider the patient's readiness to make the necessary lifestyle changes. The patient's reasons and motivation for weight loss, previous attempts at weight loss, support expected from family and friends, understanding of risks of obesity and benefits of weight loss, attitudes toward physical activity, time availability, and potential barriers to the patient's adoption of change should be taken into account (Hill & Wyatt, 2002).

In the precontemplation stage is the goal for patients to begin thinking about changing a behavior, whereas the physician's task should be to engage the patient in contemplating change. During the contemplation stage patients assess barriers as well as the benefits of change. Empathy, validation, praise and encouragement are particularly important at this stage when patients are struggling with ambivalence and doubt their ability to accomplish the change. Once the patients are ready to make a specific change they've reached the preparation stage. They have now maybe started walking for 30 minutes once a week for example.

When the patient is performing a behavior regularly for 6 months he or she reaches the action stage. This is a stage the physicians should be eager to see their patients reach. The physicians shall be generous with praise and admiration and keep on

Behavioral Treatment of Obesity in Adults

asking about successes and difficulties. When the changes have been made sustained, the final stage of maintenance has been reached (Hill & Wyatt, 2002).

Munsch et al. (2003) used a cognitive behavioral group therapy intervention program for the treatment of obesity in clinical practice. The aims of the treatment were to achieve diet, exercise and behavioral changes by psycho-education. The program consisted of six main factors: 1) motivation-support 2) nutritional behavior 3) eating habits 4) physical activity 5) social skills 6) body image.

The intervention and the aims of the treatment were constructed as follows in table 1 and could be seen as a typical example of a multimodal approach.

Evaluation

Whitelaw and colleagues (2000) presented a study of 178 scientific articles about the evidence and outcomes in Stages of Change research. The study came to the conclusion that there was a lack of sufficiently strong supportive evidence about the outcomes of the model, in contrary to most of the literature, which portrays it as being effective (Whitelaw, Baldwin, Bunton & Flynn, 2000).

In another big systematic literature review from 2002, Swedish Committee of Medical Evaluation (SBU) studied 120 scientific articles about behavior therapy of obesity. SBU concluded that the methods were difficult to validate. The methods in the studies were often combined with education about nutrition and exercise but also in other aspects were the results difficult to validate.

In some studies the participants had to pay a deposition which was paid back if the participant reached his/her goal. In other studies participants had diabetes which also

Behavioral Treatment of Obesity in Adults

could be highly motivating in the effort to lose weight. These circumstances made the results difficult to reproduce in other groups of patients.

In the example in table 1, Munsch et al. (2003) came to the conclusion that the intervention program was an effective treatment procedure for clinical practice. The patients' showed a significant lower weight after 16 sessions and had even lowered their weight at the one year follow-up. Cognitive control increased significantly and there was a significant decrease of distractibility (eating triggered by emotional or situational cues. Also a significant decrease of feeling of hunger was shown and consisted after one year. The acceptance of the own body was improved and a significant decrease in anxiety and depression was shown which indicates that an increase in quality of life had occurred.

An aspect of evaluating a weight loss program is the increase or decrease of quality of life. This aspect has become more in focus first in later years, much depending up on a very slow development of quality of life measures, especially the integration of it in the medical profession (Sullivan et al., in Björntorp, 2001).

In a study by Engel et al. (2003) produced weight loss in a group of 199 obese persons significant increased levels of reported health-related quality of life measure (HRQOL). The weight loss and regain produced mirror image changes. As the body weight decreased the HRQOL increased.

Discussion

Obesity is a disease with causal connections to many factors. People suffering from obesity are in no way a homogeneous group (Adolfsson, 2004). There are a variety of causing factors which co-exist, and breaking the negative circle could probably be made

Behavioral Treatment of Obesity in Adults

in many different ways. It is easy to make theoretical models but more difficult to apply them in real life where every individual has their own special circumstances.

The greatest difficulty is not to achieve the weight reduction. The big challenge is to maintain the reduced weight. Long term outcomes of weight loss programs have extensively been described as disappointing. Lowe, Miller-Kovach & Phelan (2001) have come to a more encouraging result in their study and argue that most of the previous studies are made in clinical settings in universities or hospitals. People who seek treatment in university or hospital-based programs exhibit more psychopathology, binge eating and overweight compared to overweight people who undergo commercial programs, which explains the disappointing results, claims Lowe et al. (2001).

A lot of other explanations could lie behind a regain of weight after a weight reduction treatment. Some people may think that eating high calorie food and having a sedentary life style is a god way of living. To refrain from that to obtain a reduced weight could probably appear to be to high a price to pay, and everybody doesn't enjoy exercising. Many obese people also suffer from musculoskeletal pain which keeps them from exercising (Evers – Larsson & Mattson, 2001).

It appears clear that it takes heterogeneous thinking to deal with the obesity problem considering all the various factors involved. A *multimodal* approach seems to be a good way to deal with the complexity, and it seems to be the most commonly used method. Some cases will probably also need pharmacological treatment and recent studies point out that severe cases often need gastric surgery to achieve a considerable weight loss (Sjöström, in Björntorp, 2001).

Behavioral Treatment of Obesity in Adults

Many different approaches fall under the concept behavioral treatment. This could be seen as a weakness with the study. A more extensive study had probably spread a deeper insight of the complexity within the obesity treatments.

References

- Adolfsson, B. (2004). *Obesity, lifestyle and society. Psychological and psychosocial factors in relation to bodyweight and bodyweight changes*. Stockholm, Department of Medicine, Karolinska Institutet.
- Attenburrow, M-J., Williams, C., Odontiadis, J., Powell, J., Van de Ouderaa, F., Williams, M., & Cowen, P. J. (2003). The effect of a nutritional source of tryptophan on dieting-induced changes in brain 5-HT function. *Psychological Medicine*, 33, 1381-1386.
- Bandura, A. (2004). Health promotion by Social Cognitive Means. *Health Education and Behavior*, 31, 2, 143-164.
- Björck, I. & Elmståhl, H. (2000). Glykemiskt Index Metabolism och mättnadsgrad. *Scandinavian Journal of Nutrition*, 44, 113-117.
- Björntorp, P. (2001). *International Textbook of Obesity*. New York, John Wiley & Sons Ltd.
- DiClemente, C.C & Prochaska J.O. (1983). Stages and processes of self-change of smoking: Toward a more integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395.
- Evers – Larsson, U. & Mattson, E. (2001). Functional limitations linked to high body mass index, age and current pain in obese women. *International Journal of Obesity*, 25, 893-899.
- Friedman, J. M. (2002). The function of Leptin in Nutrition, Weight, and Physiology *Nutrition reviews®*, 60, 10, (II), S1-S14.

Behavioral Treatment of Obesity in Adults

- Georgiades, A., Sherwood, A., Gullette, E.C.D., Babyak, M-A., Hinderliter, A., Waugh, R., Tweedy, D., Craighead, L., Bloomer, R., and Blumenthal J. A. (2000). Effect of Exercise and Wight Loss on Mental Stress- Induced Cardiovascular Responses in Individuals With High Blood Pressure. *Hypertension*, 36, 171-76.
- Ioffe, E., Moon, B., Connolly, E., Friedman, J. M. (1998). Abnormal regulation of the leptin gene in the pathogenesis of obesity. *Proceedings of National Academy of Sciences of the United States of America*, Sept 29, 95, 20, 11852-11857.
- Langenberg, C., Hardy, R., Kuh, D., Brunner, E., & Wadsworth, M. (2003). Central and total obesity in middle aged men and women. *Journal of Epidemiology and Community Health*, 57, 816-822.
- Lisspers, J. & Öhman, A. (1996). Livsstilsförändring på livstid. Beteendefokuserad modell för egenvård vid kranskärslssjukdom, *Läkartidningen*, Apr 10, 93, 15, 1453-8.
- Lowe, M. R., Miller-Kovach, K. & Phelan, S. (2001). Weight-loss maintenance in overweight individuals one to five years following successful completion of a commercial weight loss program. *International Journal of Obesity*, 25, 325-331.
- Muldoon, M. F., Mackey, R. H., Williams, K.V., Korytkowski, M.T., Flory, J. D. & Manuch, S. B. (2004). Low Central Nervous System Serotonergic Responsivity Is associated with the Metabolic Syndrome and Physical Inactivity. *The journal of Clinical Endocrinology & Metabolism*, 89, 1, 266-271.
- Munsch, S., Biedert, E. & Keller, U. (2003). Evaluation of a lifestyle change programme for the treatment of obesity in general practice. *Swiss Medical Weekly* Mar 8, 133, 9-10, 148-154.

Behavioral Treatment of Obesity in Adults

- Orzano, A. J., & Scott, J.G. (2004). Diagnoses and treatment of Obesity in Adults: An Applied Evidence-Based Review. *The Journal of the American Board of Family Practice*, 17, 5, 359-369.
- Palme, G. & Palme J. (1997). Personality Characteristics of Females Seeking Treatment for Obesity, Bulimia Nervosa and Alcoholic Disorders. *Personality and Individual Differences*, 26, 255-263.
- Prochaska, J.O., Velicer, W. F. Rossi, J.S., Goldstein, M. G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D. & Rossi S.R. (1994). Stages of Change and Decisional Balance for 12 Problem Behaviors. *Health Psychology*, 13, 1, 39-46.
- Rao, G. (2001). Insulin Resistance Syndrome. *American Family Physician*, 15, 63, 6.
- Rosmond, R. (2004). Obesity and Depression: same disease, different names? *Medical Hypotheses*, 62, 976-974.
- Sarafino, E.P. (2002). *Health Psychology, Biopsychosocial Interactions*, New York, John Wiley & Sons, Inc.
- Statens Beredning för medicinsk Utvärdering (SBU) (2002). *Fetma – problem och åtgärder*, Stockholm, SBU.
- Whitelaw, S., Baldwin, S., Bunton, R. & Flynn, D. (2000). The status of evidence and outcomes in Stages of Change research. *Health Education Research Theory & Practice*, 15, 6, 707-718.
- Währborg, P. (2002). *Stress och den nya ohälsan*, Stockholm, Natur & Kultur.

Behavioral Treatment of Obesity in Adults

Table 1. Example of a multimodal approach (Munch et al., 2003).

	Aims of treatment	Intervention
Motivation-support	Development of long-term motivation and compliance	Psycho-education: setting realistic aims for weight, nutrition, eating habits and increasing activity
Nutritional behavior	Long-term changeover to a balanced, fat reduced nutrition	Psycho-education: self-observation, gradual substitution of fat and calorie-rich food with a more balanced nutrition.
Eating habits	Reduction of rigid control, development of flexible control	Psycho-education: self-observation practicing more flexible control
Physical activity	Changing the passive life style stepwise, long-term increase in daily activity, sport	Psycho-education: increasing and maintaining motivation
Social skills	Reduction of isolation and retreat, development of social skills	Psycho-education: practicing social competence and self confidence, problem-solving training
Body image	Changing the negative body image	Psycho-education: self-observation, body image exercises