

Obesity – Problems and Interventions

This report reviews the scientific evidence on Obesity – Problems and Interventions. It is one in a series of scientific reports published by SBU (The Swedish Council on Technology Assessment in Health Care).

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The Summary and Conclusions are endorsed by the SBU Board of Directors and the SBU Advisory Committee.

Obesity – Problems and Interventions

A Systematic Review

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GIGGI UDÉN
Malmö University

Summary and Conclusions of the SBU Report on:

Obesity – Problems and Interventions

A Systematic Review

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Report prepared by:

Nils-Georg Asp
Per Björntorp
Mona Britton
(Project Manager)
Per Carlsson
Thomas Kjellström (Chair)
Claude Marcus

Christina Nerbrand
Ingmar Näslund
Ewalotte Ränzlöv
(Project Assistant)
Stephan Rössner
Lars Sjöström
Jan Östman

Other contributors:

Sven-Ove Hansson
Martin Henriksson
Egon Jonsson
Jan Karlsson

Daniel Richter
Marianne Sullivan
Rolf Wahlström

Manuscript reviewed by:

Göran Berglund
Staffan Lindeberg

Birgitta Strandvik

English translation by:

Ron Gustafson

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SBU Summary and Conclusions

Background

In recent decades, the percentage of people with obesity has increased markedly in many countries. This trend is observed in most European countries, North America, and several South American and Asian countries.

In Sweden, the number of obese people has nearly doubled during the past 20 years and now totals nearly 500 000. The increased prevalence of obesity applies to both men and women in all age groups. Despite this increase, the prevalence of obesity in Sweden compared to most other countries is relatively low, 8% of the adult population and approximately 6% of children and adolescents. In the United States, for example, the total percentage of the population with obesity is somewhat over 20% while the rates in England, Germany, and Poland exceed 15%.

Definition of Obesity

The cutoff points for normal weight, overweight, and obesity are presented in the “Facts” box. The definition of obesity that is used most often in a research context is based on body mass index (BMI). Obesity is defined as BMI 30 or more. The measure is based on the combination of height and body weight. In general, men have higher a BMI than women, and in Western nations BMI increases with increasing age in both males and females.

The BMI measure has some deficiencies, particularly as regards obesity in children. It underestimates the degree of overweight in short children and overestimates overweight in tall children. Furthermore, BMI does not consider the relative percentage of fat and muscle, nor does it reflect the distribution of

fat in the body. Clearly, this is a weakness, particularly since research in recent years has shown that the risks for obesity-related diseases are substantially higher when fat is located around the torso and in fat depots in the abdomen. Waist circumference is a simple and informative measure that reflects total abdominal fat. Another common method is to determine waist circumference in relation to hip circumference, ie, the waist-to-hip ratio. Both methods are beginning to appear in clinical practice. The measures used most often in the studies reviewed in this report are BMI, or weight reduction in kilograms, or weight reduction as a percent of original weight.

FACTS

BMI (body mass index) = body weight in kilograms divided by height in meters squared. For example

$$\frac{90 \text{ kg}}{1.70\text{m} \times 1.70\text{m}} = 31 \text{ kg/m}^2 = \text{BMI} > 31$$

Overweight BMI 25–29.9
Obesity BMI ≥ 30

At the following heights, the lowest weights for obesity are:

160 cm → 77 kg
170 cm → 87 kg
180 cm → 97 kg

Age-adjusted BMI limits are used in children. For example, for a 10-year-old girl the BMI cutoff points would be 20 for overweight and 24 for obesity.

The report defines obesity as BMI 30 or more. Severe obesity is defined here as BMI 35 or more.

The definition of obesity is based on studies of risks for different obesity-related diseases. The risks for serious complications increase markedly at a BMI around 30. There are arguments for, but also against, considering obesity as a disease, which is debated in scientific journals. The project group that worked on the SBU report defines obesity as a disease. A risk factor is, however, not

necessarily synonymous with disease. Obesity can exist even without serious complications or disabling conditions. The SBU Board of Directors, which is responsible for the introductory summary, has selected not to refer to obesity as a disease. This, however, is not intended to tone down the threat that obesity represents against public health. Risk factors for serious diseases should be prevented and treated regardless of whether or not they are perceived as a disease.

Causes of Obesity

Research in this field suggests that many different factors are involved in the development of obesity – eg, genetic, social, behavioral, and cultural, and that these factors interact with each other in different ways.

Obesity can develop through a combination of genetic, lifestyle, and environmental factors. The strong role played by genetic factors in this context has been demonstrated in studies of twins and adopted children. Regardless of whether single-egg twins grow up in the same home or in different environments, as adults their body weights and fat deposits are similar despite differences in the dietary habits and levels of obesity in the adoptive parents. Adopted children develop obesity in the same way as their biological parents rather than their adoptive parents. The genes that regulate this are basically unknown. Various genetic conditions can, however, help explain why some individuals become obese, but not others who live under the same conditions.

The increase in the prevalence of obesity in Sweden in recent decades cannot, however, be explained by genetic factors, but depends on changes in lifestyle factors, diet, and physical activity. The risks for becoming obese are greater in societies where there is ample, 24-hour access to fat and energy-rich foods and where the demand for physical activity is low.

Social factors can also influence the development of obesity. Obesity is substantially more common among children and adults who live under disadvantaged socioeconomic conditions.

Health Risks of Obesity

Being slightly overweight does not necessarily cause health problems. With obesity, at least before 64 years of age, there is an increased risk for disease and premature death. The risk increases with increasing levels of obesity, particularly abdominal obesity. The most common obesity-related complications are type 2 diabetes, high blood pressure, myocardial infarction, gallstones, sleep apnea, joint problems, some cancers, pregnancy-related problems, and infertility.

Impact on Quality of Life

Obesity, particularly severe obesity, often has a negative impact on quality of life in both a physical and psychological context. Studies of people with obesity have shown that the health-related quality of life can be very low.

The general stigma against obesity, which can lead to negative and prejudicial attitudes against obese people, often results in major personal suffering and a burden of guilt. No one wants to be obese. The condition is largely genetically driven and triggered by a combination of social, cultural, and community factors which the individual, particularly at a young age, finds difficult to combat.

Economic Aspects

A comprehensive review of international studies addressing the costs of obesity and related complications suggests that the direct healthcare costs may be approximately 2% of the total expenditure for health and medical services. This corresponds to a cost of approximately 3 billion SEK per year in Sweden. In addition, there are the indirect costs due to absence from work and early retirement, which are at least equally high as the direct healthcare costs.

Report Design and Content

This report reviews the scientific evidence concerning mainly the medical interventions against obesity. The report presents the results found in studies of various strategies for preventing and treating obesity. The evidence presented in the report was obtained through a systematic review of the international scientific literature on the subject. The introductory chapter on the background of obesity as a health problem and the chapter on ethics, however, are not based on a systematic literature review but on a synthesis of other reviews and studies, information from textbooks, questionnaires, and statistical data.

By searching various databases of scientific literature published from 1966 to 2002, the project group identified 2600 publications that addressed some aspect of interventions against obesity. The systematic review process found that most of these publications were either irrelevant or did not meet the standards established for definition, scientific rigor, and reliability. Some studies used definitions of obesity other than $BMI \geq 30$. Nevertheless, these were included in cases where it was obvious that many of the study subjects would meet the BMI-criteria for obesity.

Ultimately, around 300 studies were used to form the conclusions of the report. However, not all are equal in scientific quality. The conclusions were graded (ie, given an Evidence Grade of 1, 2, or 3) based on the strength of the evidence presented, ie, depending on study design, the number of subjects included, followup time, and dropout.



The evidence grades reflect the following:

Evidence Grade 1: Strong scientific evidence. When at least two studies present evidence of high value.

Evidence Grade 2: Moderate scientific evidence. When one study presents evidence of high value and at least two studies present evidence of moderate value.

Evidence Grade 3: Limited scientific evidence. When at least two studies present evidence of moderate value.

Preventive Interventions Against Obesity

Studies that have investigated the possibilities to influence body weight in a population have so far included relatively limited interventions. Often, the studies have been part of a campaign to reduce high blood pressure, smoking, blood cholesterol levels, and other cardiovascular risk factors. The programs are based on information concerning the importance of suitable diets and increased exercise and other health information directed at a particular group or region. Concurrently, changes in the variables are measured and assessed in a control group or a reference area that did not receive the information. Often, mass media are used for campaigns and newsletters are used for reminders. In some instances, the programs involve professional organizations, voluntary associations, and workplaces. Those recruited for the intervention groups and the control groups are usually examined at the outset of the study and later at specific followup intervals for several years.

Studies on the effects of preventive interventions for children and adolescents are often designed to involve certain schools in providing education, advice, and encouragement toward good dietary habits and physical activity, while other schools are used as control groups.

Preventing Obesity in Adults

Twelve studies met the quality standards outlined in the report. In these studies, the goal was to prevent cardiovascular diseases.

Limited attention was given toward counteracting the incidence of obesity. Only two of the studies are based on high-grade evidence. Five studies are based on poor evidence, mainly because the observation periods were too short or participation in the intervention program was low. The Norsjö study (Sweden) did not report any favorable effects regarding the onset of obesity. Similar results were found in five large North American studies. Two of these studies, however, showed that the weight increase that usually occurs in many populations was somewhat less pronounced in cities with the intervention program in contrast to the control cities. In a region in Israel, an ambitious prevention program resulted in a lower prevalence of overweight.

Favorable effects on the prevalence of obesity have not been observed in most population-based prevention programs that have been scientifically assessed.

Preventing Obesity in Children and Adolescents

Thirteen controlled studies were found on this topic. Seven of these provided high- or moderate-grade evidence, and all involved school children aged 5 years or older. Most included programs to promote physical activity and good dietary habits. Some of the studies also included elements targeted directly at parents. The effects were studied in followup after 2 to 5 years.

Only two of the studies used the most relevant way to measure outcome, ie, the percentage of children with overweight and obesity. One of these studies found no difference between the trial group and the control group. In the other study, a reduction was achieved in the percentage of overweight girls, but no change was reported among boys in the trial groups. The other studies monitored the mean BMI. This declined in two of the studies, but was not influenced in the other three studies. These conclusions were based on moderate-grade evidence. Overall, a positive result was achieved in three studies, but no effects were reported in four of the seven best studies concerning preventive interventions in children and adolescents. Hence, reliable conclusions cannot be

drawn. Several studies noted improved blood lipid levels and lowered blood pressure in the trial groups.

In summary, most of the studies on preventive interventions against obesity have not reported any favorable effects. However, there are examples of programs in both adults and children where up to several kilograms in mean weight reduction has been achieved in the trial areas. Apparently, moderate success in influencing the mean weight in a population can have a major effect on the prevalence of obesity. Therefore, it is particularly important to use well-executed studies to design and assess new strategies adapted to the Swedish population, eg, through better intervention for establishing good dietary habits in pre-school and school-aged children and by increasing the interest in physical activity in children and adults. Interventions at the national level (eg, tax and price policies) also need to be tested as a means to reduce the incidence of obesity.

Treating Obesity

The fundamental element in all treatment for obesity in both children and adults is changing to a diet with less energy intake. It is essential to limit the fat content. Dietary counseling is often combined with recommendations to exercise regularly to increase energy expenditure. Drugs can be considered as complementary treatment in adults. Treatment using special protein formulas results in a major reduction in energy intake and thereby more pronounced weight reduction in the short term than with other methods.

Weight reduction achieved in this way can have an important impact on an individual's quality of life, morbidity, and future risks. The problem, however, is that obesity often returns. Studies show that most people have regained to their original weight after 5 years.



However, in some groups of obese patients favorable results have been maintained for several years, particularly if the initial weight reduction was substantial.

To be successful, obesity treatment requires a long-term commitment, and patients must be highly determined and involved. It is a matter of treating a chronic condition that threatens health – not about making cosmetic changes. However, no special measures are needed if the risk is insignificantly higher, such as in people over age 65 years. Earlier treatment strategies have assumed that short-term interventions could have permanent effects. A real problem, however, is to maintain the weight loss which has been achieved during shorter periods, often through different methods and a great deal of effort. It is uncertain whether long-term treatment and followup will yield better and more permanent results than the methods that have been studied to date. It is essential to apply and assess different types of long-term treatment. Stomach surgery is a treatment alternative that can be considered in cases of severe obesity since both substantial and permanent weight loss in this patient group.

Treating Obesity in Adults

Dietary Treatment

Dietary treatment involves counseling on the amount and proportions of foods, energy restrictions, limiting fat content with or without energy restrictions, or vegetarian diets. Dietary treatment can also focus on meals and their timing or on replacing meals with dietary products. Twenty-five studies that met the established criteria showed that weight reduction of between 3 kg and 10 kg can be achieved through energy-reduced diets for a 1-year period (Evidence Grade 1). Dietary counseling can be provided to individuals or groups by dietitians or other dietary

experts. Replacement of one or more main meals with special products, such as milk or soy-based drinks like those used in VLCD (Very Low Caloric Diets) or “bars” with good nutrient content, can enhance weight reduction (Evidence Grade 2). The few studies that followed weight trends for a longer period, up to 5 years, reported a return to the original weight in most cases (Evidence Grade 2).

Unlimited, carbohydrate-rich diets (ie, at least 50–55 energy percent from carbohydrates and a maximum of 30g energy percent fat, corresponding to 60–75g fat intake per day) can yield several kilograms weight reduction in 6 months. More pronounced energy restrictions, where fat intake is usually limited to 20–30 grams per day yields more rapid weight reduction, but is more difficult to tolerate for longer periods. Abundant amounts of fruit and vegetables contribute to low fat content and low energy density. A protein rich diet, with more fish, lean meat, and low-fat milk products, appears to promote weight reduction, probably mainly due to an increased satiety. Studies offer no support that lactovegetarian diets lead to better weight reduction than mixed diets of the same energy content.

Dietary fiber is a constituent element in the diet. Three studies – two providing on poor and one providing moderate evidence, assess the effects of special dietary fiber supplements. The difference between the treatment and control groups was, at most, a few kilograms over 6 to 12 months, but the conclusions are uncertain. There are no studies of long-term effects. In general, dietary advice in Sweden states that fiber intake should be increased due to other health-promoting effects, which also applies to weight reduction.

Very Low Calorie Diets

Low energy diets, Very Low Calorie Diets (VLCD) are protein-rich formulas manufactured mainly from milk or soy. Dietary recommendations are met by adding essential fatty acids, minerals, and vitamins. VLCD can be used for several weeks as the

only source of energy, or to replace some meals.

Common treatment periods using VLCD are 12 weeks or, in some cases, up to 16 weeks. Eight randomized studies have been identified. Initially, substantial weight reduction is achieved, often 15 kg to 20 kg, which is more than with conventional energy-reduced diets. There is a strong tendency to return to original weight after treatment concludes. Studies for 1 to 2 years, where VLCD has been used intermittently for shorter periods, reported a maintained weight reduction of a few kilograms more than with conventional dietary treatment (Evidence Grade 3).

Starvation was used during the 1960s and 1970s as a treatment for severe obesity. The method involves one or more weeks of total fasting, except for liquids, minerals, and vitamins. The scientific evidence for starvation treatment is weak, and this method is no longer used, mainly because muscle mass also declines during starvation.

Behavioral Therapy

Behavioral therapy is used as a component in various types of treatment, but it is difficult to isolate its effects. The effects of different types of behavioral therapy have been analyzed in three randomized controlled studies. In one study (high-grade evidence), various behavioral therapies in combination with different forms of dietary counseling/treatment led to weight loss that was moderate, but significantly greater than in the control group. In two other studies (moderate-grade evidence), no significant differences were found in weight loss after 1 to 2 years in comparison to the control groups. Firm conclusions, however, cannot be drawn.

Physical Activity

In the studies reviewed, increased physical activity has consisted mainly of walking and, to some extent, jogging in younger individuals. Four studies, whereof two provide good evidence, highlight the effects of physical exercise as a supplement to traditional dietary treatment. A major weight reduction, on average about 4 kg

within 1 year, could be achieved in exercise programs compared to the control group (Evidence Grade 1).

Increased physical activity as the only intervention against obesity is substantially less effective than normal dietary treatment (Evidence Grade 3).

It cannot be confirmed whether regular physical activity can counteract the weight increase that usually occurs within 1 to 2 years after successful weight reduction.

Pharmacological Treatment

In Sweden, two drugs are currently approved for weight reduction, orlistat (Xenical®) and sibutramine (Reductil®). This report reviews nine drug studies. Six of the studies address orlistat treatment and include approximately 2500 patients on active therapy. They are based on moderate evidence as regards the effects after 1 year of treatment. Two of the four studies, that report results after 2 years, provide poor evidence due to high dropout. On average, weight reduction after 1 year was 8 kg (6-10 kg) after treatment with orlistat and 5 kg (4-6 kg) in groups treated with placebo – on average 3 kg more with pharmacological treatment after 1 year (Evidence Grade 2).

Three studies of sibutramine (approximately 1400 actively treated) all provide moderate evidence. After approximately 1 year, two studies with sibutramine show approximately 4 kg greater weight reduction than in the placebo groups. In the largest study, weight reduction after 2 years was more than 5 kg greater than in the control group (Evidence Grade 2).

The side effects associated with orlistat are linked to the active mechanisms of the drug. Diarrhea after intake of too much fat is an expression of deficient compliance with dietary advice. Sibutramine lowers blood pressure less than what would be expected by weight reduction. Other side effects include sleep disorders, mouth dryness, and constipation.

Both orlistat and sibutramine treatment show a documented weight reduction of 2 kg to 5 kg more than in the control group

in up to 2 years of treatment. Both drugs yield a weight reduction of at least 10% in one fourth to one fifth of the patients who started treatment compared to half as many in the placebo group. None of the published drug studies report a treatment time exceeding 2 years. The effects of obesity-related morbidity and mortality are unknown.

Surgery

Surgical treatment may be appropriate for severely obese individuals, but only after other treatment attempts have failed. BMI >40 is generally accepted as a cutoff point for surgery. In special cases, surgery can be appropriate even at a somewhat lower degree of obesity. Seventeen randomized studies and numerous long-term followups (at least 5 years) were assessed. Fifteen nonrandomized, comparative studies contribute to the conclusions as do some results from an ongoing nonrandomized, but controlled, matched study (the Swedish Obese Subjects – SOS study). The SOS study compares 2000 individuals treated by surgery with an equally large control group given routine treatment in primary care.

Over ten different surgical methods are available to treat obesity, and there are several variants of these methods. Of the surgical methods used in Sweden, gastric bypass has the strongest scientific documentation and the best effect on weight reduction (Evidence Grade 1).

Surgical treatment of individuals with severe obesity yields greater weight reduction than the nonsurgical methods that have been assessed in this patient group. Up to 5 years following surgery, weight reduction is 50% to 75% of the overweight prior to surgery, which means 30 kg to 40 kg in individuals weighing 125 kg and with a height of 170cm (Evidence Grade 1). A 10-year follow-up of the SOS study showed that the retained weight loss was, on average, 16% of the original weight. This corresponds to an average of 20 kg in permanent weight loss 10 years after surgical treatment. No weight loss was reported in the control groups.

Weight loss has a positive effect on health-related quality of

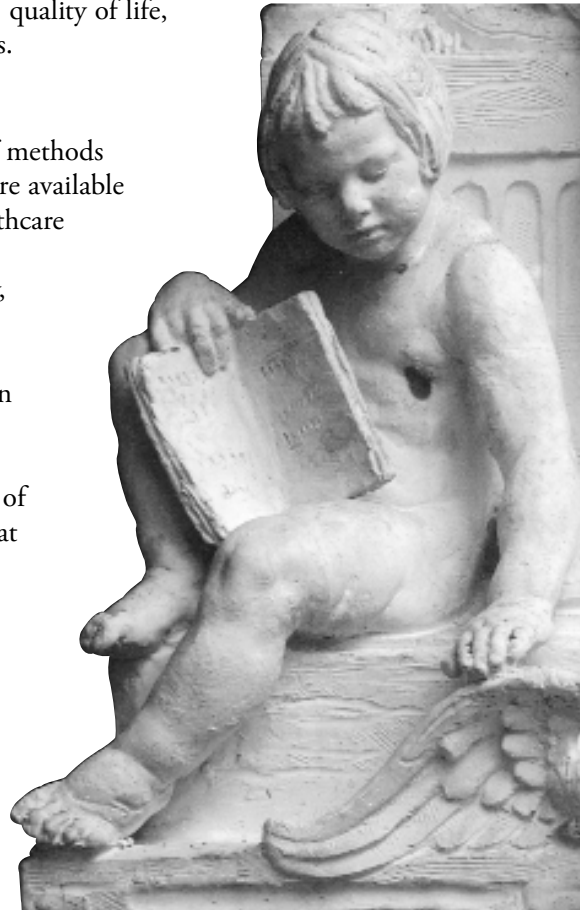
life (Evidence Grade 2). With major weight loss following surgery, the number of new diabetes cases falls dramatically, and blood sugar levels are nearly completely normalized in individuals with severe obesity and type 2 diabetes (Evidence Grade 1). It is not known whether weight reduction from surgery for severe obesity leads to reduced mortality or less morbidity from myocardial infarction and stroke. In any case, compared to the control groups, surgical treatment for obesity does not increase total mortality during 8 to 10 years. Mortality in conjunction with surgery in Sweden is below 0.5%, and complications during the first episode of care appear in up to 15%. In approximately 2% of new surgery cases, the complications are severe enough to require acute reoperation.

In people with severe obesity, surgical treatment has positive, well-documented long-term effects on weight, quality of life, and morbidity from diabetes.

Alternative Medicine

A relatively large number of methods and agents to treat obesity are available outside of the ordinary healthcare system. Examples include acupuncture, aroma therapy, caffeine, hypnosis, chromium, and vinegar.

More than 500 articles on alternative treatment methods were identified. A thorough review was conducted of approximately 80 articles that described over 20 treatment alternatives. Eleven of the studies met the minimum criteria for scientific docu-



mentation. They included acupuncture, hypnosis, aroma therapy, and chromium-enhanced dietary supplements. Generally, evidence is lacking on the effects of using alternative methods to treat obesity.

Treating Obesity in Children and Adolescents

Twenty studies that met the minimum criteria were found on treatment with diet, exercise, and behavioral modification. Three studies compared the treatment groups to control groups that received no treatment.

The treatment groups reported a weight loss of approximately 10% while the control groups varied in weight between $\pm 3\%$ for the first study year (Evidence Grade 3). Five studies examined long-term followup 3 to 10 years after treatment. Some of these studies found some, albeit weak, retained weight loss, while this could not be observed in other studies. The evidence is insufficient to draw conclusions.

In extremely overweight adolescents, surgery has shown positive treatment results, but the deficiency of adequate studies makes it impossible to draw reliable conclusions. VLCD treatment can also be applied in children and adolescents, but the value of this treatment for longer than a few months cannot be assessed. Rapid weight loss can influence height growth, at least in a 1-year perspective. Studies have reported elevated self-esteem following successful treatment and lowered self-esteem following treatment failure.

Quality of Life

Probably the most important reason why obese individuals attempt to lose weight is the negative impact of obesity on the quality of life. This refers to how people feel and function in daily life and the effects that weight-loss treatment can have. Quality of life measurements can provide information on this issue, and we found 27 studies on the topic in the scientific literature.

Clearly, a lower quality of life is perceived by obese individuals compared to the population on average, eg, as regards physical

function, general health status, and vitality (Evidence Grade 1). The association is stronger than for other concurrent morbidity, with more pronounced obesity and if the individual seeks health care (Evidence Grade 2). In many cases, quality of life is lower in those with severe obesity than in patients with other severe, chronic diseases (Evidence Grade 3).

Quality of life improves with weight loss. The greater the weight loss, the better the quality of life (Evidence Grade 2). Substantial improvements have been measured in individuals with severe obesity who received surgery and maintained a substantial, long-term weight loss (Evidence Grade 2). Uncertain short-term effects on quality of life in less than 1 year are reported, but the evidence is insufficient to draw conclusions.

Effect of Weight Loss on Obesity-related Diseases and Conditions

Weight loss of 5 kg to 10 kg in obese or overweight individuals who also have type 2 diabetes results in improved blood glucose control, usually for 6 months to a maximum of 12 months (Evidence Grade 3). Thereafter, the effects are modest, which is partly attributed to the failure to maintain weight loss, but also to the natural course of diabetes. With the substantial and permanent weight reduction that can be achieved by surgery in individuals with severe obesity, a large percentage of patients have a normal blood glucose level and can discontinue taking medication (Evidence Grade 2).

Using a simple method (glucose tolerance test) it is possible to identify the obese individuals who are particularly at risk for developing type 2 diabetes. Two well-executed studies have shown that moderate weight reduction in combination with physical activity for 2 to 3 years can reduce by half the onset of type 2 diabetes (Evidence Grade 1).

In overweight or obese individuals with moderately elevated blood pressure, a weight loss of approximately 5% is sufficient to achieve a blood pressure reduction for approximately 6 months

(Evidence Grade 2). Routine treatment with antihypertensive drugs is, however, more effective even during this period. Despite permanent weight loss after surgery, there is no difference in blood pressure compared to untreated controls in long-term followup.

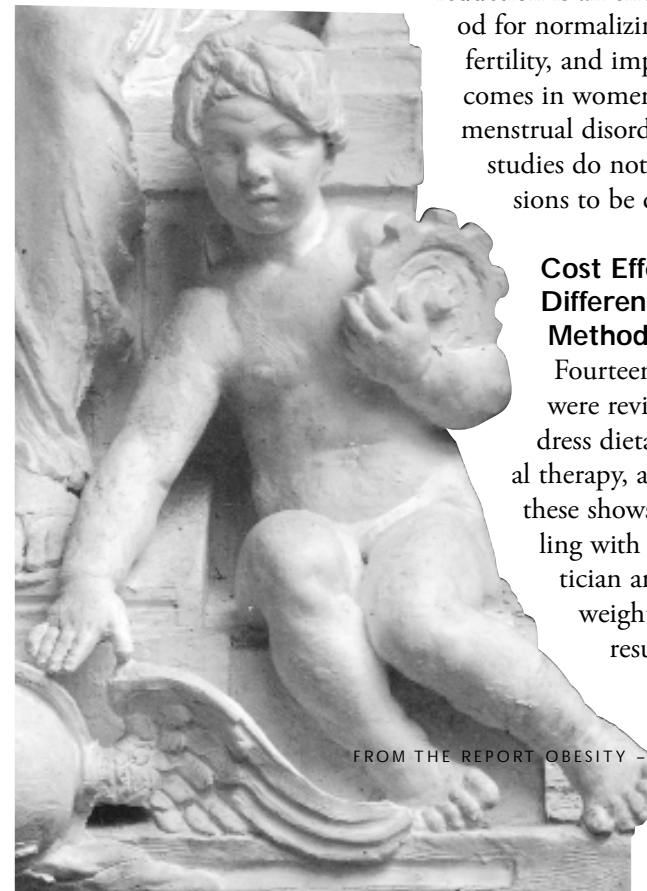
Effects on blood lipids are related to the extent of weight reduction. When accompanied by weight loss that can be maintained for more than one year, dietary treatment results in some increase in “good” HDL cholesterol which helps diminish the risk arteriosclerosis (Evidence Grade 3). A weight loss of 20 kg to 30 kg is required to reduce the blood level of cholesterol (Evidence Grade 2).

A reduction in sleep apnea has been reported following surgery for obesity. This effect has not been reported in studies of non-surgical treatment methods. Some studies suggest that weight

reduction is an effective treatment method for normalizing hormones, increasing fertility, and improving pregnancy outcomes in women with obesity and menstrual disorders. However, available studies do not permit reliable conclusions to be drawn.

Cost Effectiveness of Different Treatment Methods

Fourteen assessment studies were reviewed. Five studies address dietary treatment, behavioral therapy, and VLCD. One of these shows that dietary counseling with a dietician alone or dietician and physician resulted in weight loss at a low cost. The results apply after 1 year of



followup. Another study shows that behavioral therapy can reduce weight at a low cost. The cost for VLCD, or a combination of behavioral therapy and VLCD, appears to be somewhat higher.

Several health economic model analyses show that surgical treatment yields a reduction in weight at a relatively low cost. According to three Swedish studies the total cost for surgery and followup during a 4- to 6-year period after surgery are approximately 70 000 SEK higher than in the control group where no weight loss was reported. Related to the percentage of weight loss in the SOS study (16% after 6 years), the costs exceed 4000 SEK (1994 monetary value) per percent of weight reduction. No further conclusions can be drawn concerning the cost effectiveness of surgical treatment for obesity.

A health economic assessment has been published concerning pharmacological treatment using orlistat for obesity. This study considered improved life quality from weight reduction. The overall benefit experienced by patients from improved quality of life after 2 years of followup was converted to the number of years of full health, ie, quality adjusted life years. The results show that the direct costs slightly exceed 600 000 SEK per quality adjusted life year. This would suggest that pharmacological treatment with orlistat has relatively low cost effectiveness. However, due to the weak scientific documentation it is difficult to draw reliable conclusions.



Conclusions

❑ Incidence of obesity and its complications increasing rapidly

The number of obese individuals (both adults and children) has increased rapidly during the past 20 years. In Sweden, approximately 500 000 people are defined as obese. Obesity – particularly that localized to the abdomen – increases the risk for many serious diseases, eg, diabetes, cardiovascular diseases, and joint diseases. The association between obesity and some cancers is strong. Obesity – particularly severe obesity – also has a strong negative impact on the quality of life.

❑ Causes of obesity are only partly known

The development of obesity is largely dependent on genetic factors. This inherited predisposition for obesity is widespread in the population.

In genetically predisposed individuals, factors related to lifestyle (diet and exercise) and social, behavioral, cultural, and community factors determine whether or not obesity develops.

❑ It is difficult to prevent obesity

Most population-based prevention programs that have been scientifically assessed have not shown any favorable effects on the prevalence of obesity. However, examples exist of programs for both adults and children that have been successful, at least in the short term. New strategies to disseminate knowledge about the causes and risks of obesity and to change dietary habits and motivate people to increase physical activity need to be developed and assessed. Concurrently, there is a need for policy interventions at the societal level to reduce the prevalence of obesity.

❑ Scientific assessment of treatment methods for obesity shows that:

- changing dietary habits through successful dietary counseling (mainly reducing energy and fat intake) leads to weight loss, as a rule 3 kg to 10 kg during the first year (or 10% of body weight in children). The long-term effects are uncertain.
- regular exercise contributes to weight reduction.
- behavioral therapy in conjunction with changes in diet and exercise can yield further effects on weight if the supportive interventions are continued for a longer period. Approximately 20% achieve a permanent weight loss of 10% or more of the original weight.
- VLCD for 6 to 12 weeks yields a greater weight loss than a conventional low energy diet. In studies of VLCD for 1 to 2 years, where treatment often has been periodic, researchers have noted a maintained weight loss of a few kilograms more than in treatment with a balanced diet alone (VLCD = Very Low Calorie Diets, ie, protein-rich formula).
- pharmacological treatment with orlistat (Xenical®) or sibutramine (Reductil®) yields an average 2 kg to 5 kg weight loss beyond that achieved with diet and exercise counseling alone. In clinical trials, one fourth to one fifth of those who started pharmacological treatment lost at least 10% weight compared to half as many in the group treated with placebo.

- the major problem is that weight loss is usually not permanent. Within a few years most of those who initially succeeded in losing weight had returned to their original weight. Therefore, it is particularly important to develop and assess long-term treatment aimed at permanent weight reduction.
- surgical treatment, which can be appropriate for patients with severe obesity, lowers weight on average by more than 25% (eg, from 125 kg to 90 kg) up to 5 years after surgery. After 10 years, the retained weight loss is approximately 16%, or on average somewhat over 20 kg. This represents substantial gains in health and quality of life in these patients. However, surgical intervention carries some risk for complications and, in isolated cases, death.
- the scientific evidence for a wide range of alternative medicine methods is too weak to draw any reliable conclusions about the effects of these methods on obesity.

❑ **Risks related to obesity can be reduced**

The risks for obesity can be reduced through weight reduction, regardless of the methods used. Intervening against other risk factors – even if weight reduction is not successful – can reduce the risks associated with obesity. Examples of such interventions include increased physical activity, smoking cessation, and improved control of diabetes, high blood pressure, and elevated blood lipids.

❑ **Limited information about cost effectiveness**

The costs to society for obesity and the diseases associated with obesity are high. Information about the cost effectiveness of different methods is, however, limited. The cost effectiveness of preventive methods cannot be calculated due to

uncertainty concerning their effects. In treating obesity, the costs are relatively low for weight loss achieved through dietary counseling, behavioral therapy, dietary replacement formulas with low-energy content (protein formulas), and surgical treatment, but considerably higher for pharmacological treatment. Studies have not calculated cost effectiveness based on the observed reduction in morbidity or mortality or improvements in quality of life.

❑ **Prejudice against obesity must be opposed**

Those affected by obesity should not be treated with negative or prejudicial attitudes – many people are at risk for obesity, but no one wants to be obese. The lower quality of life that people with obesity experience is somewhat related to the attitudes of society. Increased understanding of the reasons for obesity and difficulties in treating it may help to reduce the prejudice against people with obesity that is found both in health services and in society at large.



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- SBU's assessments shall cover the medical aspects and the ethical, social, and economic consequences of disseminating and applying medical and dental technologies.
- SBU's assessments shall be compiled, presented, and disseminated in such a way that all affected parties have access to the information.
- SBU shall contribute, through informational and educational initiatives, toward ensuring that the knowledge gained is used to rationally utilize available resources in health care.
- SBU shall draw on national and international experience and research findings in the field and shall serve as a focal point for health technology assessment in Sweden. This effort shall be managed in a way that secures success and respect for the organization, both domestically and internationally.