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Obesity – epidemiology, pathogenesis, therapy and prevention

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Executive Summary

This study warns against the growing tendency to blame specific foods for the so-called "obesity epidemic" in the Western World. The study shows that obesity is caused by a variety of factors such as lack of exercise and overeating and finds that naming specific foods 'good' and 'bad' might lead to disturbed eating patterns, especially in people who are overly occupied by healthy eating.

The study recommends a varied diet in order to avoid a long term deficit of macro- and micronutrients. A healthy diet should include moderate levels of fat, an emphasis on carbohydrates, and be rich in fiber. The study also emphasizes the need to combine balanced eating with healthy exercise habits in order to prevent obesity.

The study concludes that the only healthy way to lose weight is to eat less and exercise more. Eliminating specific foods will not yield the desired results and may even be unhealthy in the long term. Public health policy-makers should therefore avoid targeting specific foods or categories of food.

Introduction

Overweight and obesity are seen as the main health problem of this century. It is the worldwide most rapidly growing health risk. This problem affects almost all western industrialised nations, and increasingly also the economically prospering societies in formerly poorer countries.

Latest studies show a steady almost linear increase in prevalence of obesity. Assuming this remains unchanged, by 2040 half the adult population will be obese, and the median BMI value will be 30 kg/m^2. This value was 26 kg/m^2 in the year 2000 and 21 kg/m^2 in 1950 (Oster et al., 2000; Bergström et al., 2001; WHO 2000; Prentice 1998).

Definition

The Body-Mass-Index (BMI = bodyweight (in kg) / height^2 (m^2)) is used for assessment. According to WHO the following categories are applicable for adults:

- < 18.5 for underweight
- 18.50 – 24.99 for normal weight
- 25.00 – 29.99 for overweight grade I
- 30.00 – 39.99 for obese / overweight grade II
- and over 40.00 for obese / overweight grade III (WHO 2000).

This categorisation is based on the U-shaped relationships between BMI and mortality, which were determined as a result of a meta-analysis of 17 cohort studies of non-smoking, healthy men (WHO 2000; Troiano et al., 1996).

International comparisons are made difficult by the fact that various BMI and/or age classifications have been used.

BMI-percentiles are used for the assessment of bodyweight in children, whereby the 90th percentile is the borderline value for the definition of overweight and the 97th percentile is used as the borderline value for the definition of obesity.

As the single criteria in the assessment of bodyweight, the height-weight-index has only limited use, since it provides no information regarding composition or distribution of body fat. Nevertheless it is a good measure for the classification of overweight, since a correlation between BMI and body fat, calculated from body density is proven. This lies between 0.7 and 0.8 (Elmadfa and Leitzmann 1998).

Besides the BMI, waist circumference should also be included, in the evaluation of risk, foremost because of its ease of measurement, and use as a control parameter during the course of therapy (Pouliot et al., 1994; WHO 2003). This reflects the mass of intra-abdominal fat and is as such an anthropological measure of the amount of visceral fat (Kortelainen 2001).

How much should one weigh?

Body-Mass-Index is used for the definition of body weight (BMI = bodyweight in kg divided by height in metres squared)

Normal weight: BMI between 18.5 and 24.9 kg/m^2
Overweight: BMI between 25.0 and 29.9 kg/m^2
Obesity, severe overweight: BMI between 30.0 and 39.9 kg/m^2
Morbid obesity, extreme overweight: BMI over 40.0 kg/m^2

How high should the fat percentage be?

Women: between 20 and 30%
Men: between 10 and 20%

How high should the waist circumference be?

Women: less than 102 cm
Men: less than 88 cm

Epidemiology of obesity in the adult population

Worldwide there are already more than 250 million obese people (this represents 7% of the adult population), and the tendency is rising. Almost half a billion people worldwide are overweight or adipose (Rössner 2002). Overweight and obesity are endemic in the western industrialised nations.

Estimates for Europe state that more than half the 35 – 65 year olds are overweight (BMI: 25.0 - 29.9 kg/m^2) or severely overweight (BMI: over 30.0 kg/m^2). The prevalence of obesity in Europe lies in the range of 10 – 20% for men and 10 – 25% for women. The highest prevalences are found in southern Europe and in the Eastern European countries (Seidell 1997; Kiefer 2001). In the European Union Norway has, with a value of 6.3%, the lowest proportion of severely overweight people and Great Britain, with a value of 21.2%, has the highest proportion (Figure 1), whereby it should be noted that, contrary to other countries, BMI calculations in Great Britain and Germany are based on measured data (Eurostat 2002).

Over the last 10 years the prevalence of obesity rose by 10 to 40% in almost all European countries (IOTF 2003). In Austria, according to the results of the microcensus of 1991 and 1999, there was an increase in prevalence of 7% amongst the adult population (Statistik Austria 2002).

In the USA the proportion of obesity (1999-2000) amongst adults between 20 and 74 years is 30.5% (men: 27.7%; women: 34.0%). 4.7% of adults have a BMI of over 40 kg/m^2 and a further 64.5% are overweight. There has been a continuous increase in prevalence since 1960 independent of sex, age, race or level of education (Flegal et al., 2002).

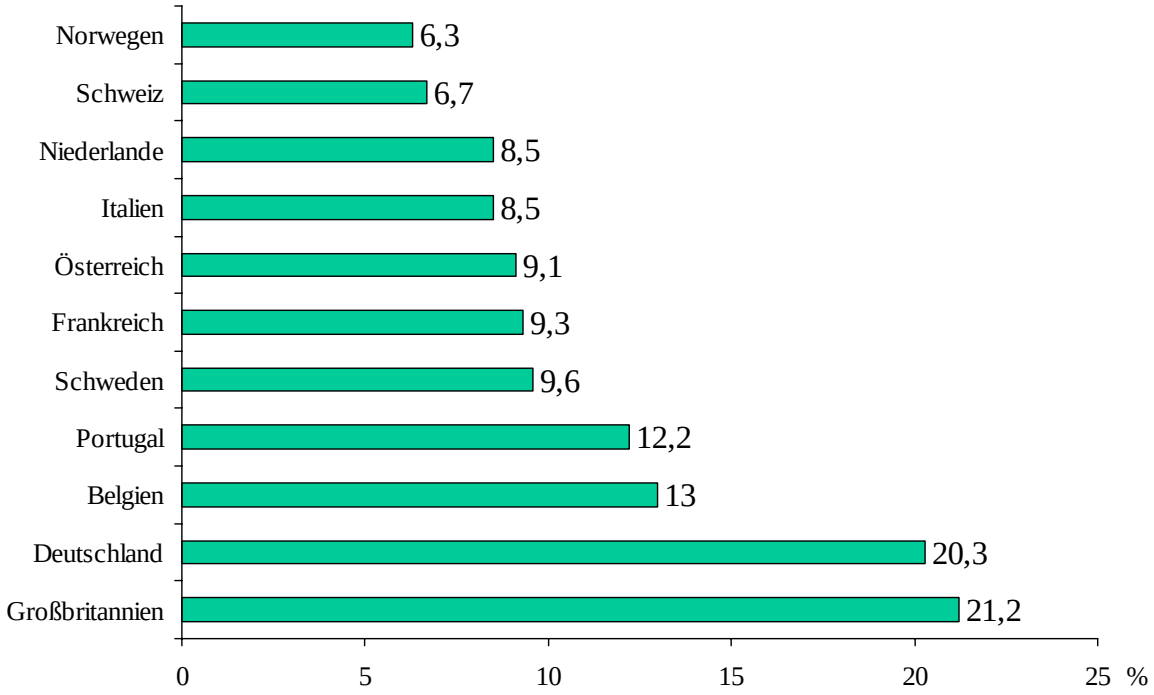


Figure 1: Prevalence of obesity in the European Union (in percent)

In 1998 18.3 – 24.5% of German citizens aged between 18 – 79 years were obese. 31.1 – 48.7% were overweight (BMI: 25.0 – 29.9) (Bergmann and Mensink 1999 according to: Deutsche Adipositas-Gesellschaft (The German Society of Obesity) et al. 2003).

From 1989/90 to 1994/95 prevalence of obesity rose in a southern German collective by 2% to 17% for men, and by 2.5% to 19% for women. The prevalence of abdominal obesity, defined here as waist circumference > 103 cm for men and > 92 cm for women, rose by 3.3% (men) and 3.6% (women) during the same time period (Liese et al 2001).

In Austria, according to results of the microcensus 1999 (for the total population over 20 years), 37% were overweight (BMI: 25.0 kg/m^2 to 29.9 kg/m^2) and 9.1% obese. There are no gender differences for obesity, however the proportion of men with BMI between 25 and 29.9 at 54.3% is considerably higher than for women (21.3%). In contrast, women have a larger proportion of underweight (3.3% versus 0.9% of men).

The highest proportion of obesity is found amongst men between 45 and 65 years and women between 55 and 64 years (Figure 2). Compared to the beginning of the 90ies the proportion of obese men, in particular, over the age of 60 years has risen. For women, on the other hand, a strong increase, above all in the age group 20 to 24 years, was observed (Statistik Austria 2002).

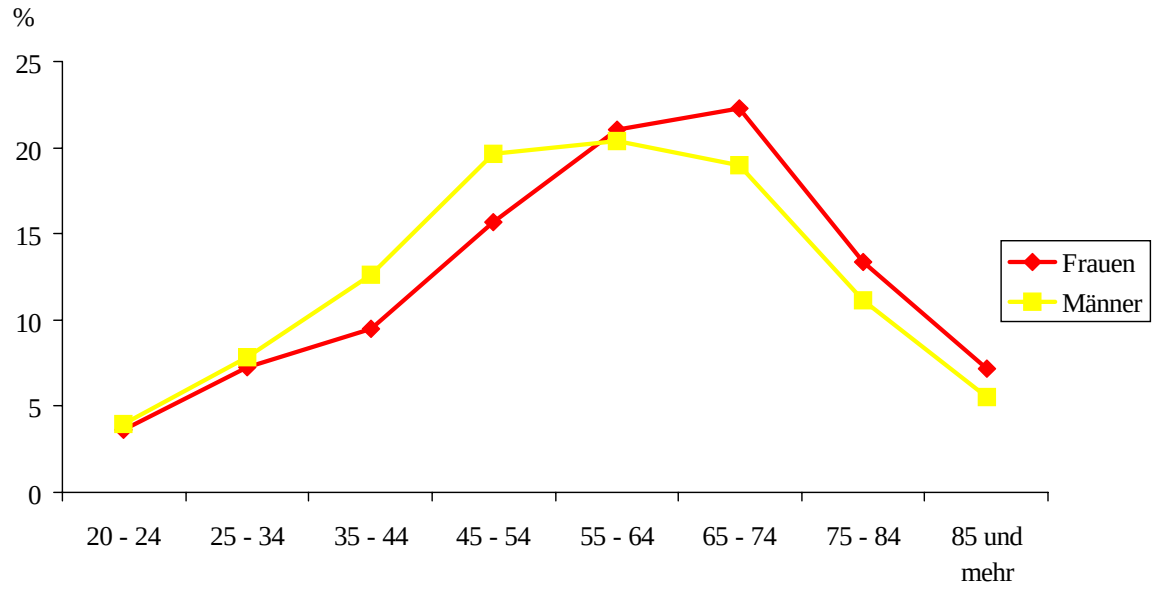


Figure 2: Percentage of obese women and men by age (after 17)

The prevalence decreases with increase in educational level. The lowest proportion of obesity is found amongst university graduates (3.9%), the highest amongst those with compulsory education (13.1%).

The proportion of severely overweight is highest in eastern Austria. 13.1% of people from Burgenland and a little over 10% of people in both Upper Austria and Styria have a BMI of over 30 kg/m^2. The federal states of Salzburg and the Tyrol have the lowest proportion of severely overweight people.

The porportion of obesity also decreases across Austria in line with the number of inhabitants in the communities. The highest prevalences are found in those communities with an aggregate quotient of over 15% (Statistik Austria 2002).

Lower prevalences are also found amongst those who exercise in their free time. In contrast to inactive people it has been found that prevalence of severe overweight amongst those taking part in sport and exercise is half as low in men and two thirds lower amongst women (Institut für Ernährungswissenschaften 2003).

Epidemiology of obesity in children and adolescents

Obesity is now also a problem amongst children and adolescents. Here too the extent of obesity and with it the number of extremely overweight children has risen strongly over the last few years. This trend is particularly alarming, since results from longitudinal studies indicate that with it the probability of obesity in adulthood strongly increases (Friedmann et al., 2001).

5.2% of 15 to 24 year olds in Austria are obese. In Italy only 1%, in Finland 1.2%, in Spain 1.4%, in Portugal 1.5% and in France 1.8% of those in this age group are severely overweight. The highest prevalences are found in Ireland and in Greece at 8.0% and 11.0%

respectively (Martinez et al., 1999). In the USA the extent has even been estimated as high as 20 – 27%.

In Great Britain the prevalence of obesity at the age of 24 months is 6.0% (overweight: 15.8%), at 49 months it is 7.6% (overweight: 20.3%) and aged 61 months it is 7.2% (overweight: 18.7%) (Reilly et al., 1999).

In the Kieler Obesity Prevention Study (KOPS) 12.4% of children studied between 1996 and 2001 were overweight (12% of boys and 13% of girls) (Czerwinski-Mast et al., 2003).

In Austria 16% of boys and 13 – 14% of girls aged between 3 to 10 years have a high body weight. The proportion of obesity is higher amongst boys of all age groups, particularly amongst apprentices. Here the prevalence is 11% amongst male adolescents and 4% amongst female adolescents (Table 1) (Institut für Ernährungswissenschaften 2003).

	Pre-school children[1)] (3 – 6 years) (n= 441)		Primary school children[1)] (7 – 10 years) (n=1.166)		Apprentices[2)] (15 – 18 years) (n= 100)	
	m	w	m	w	m	w
Overweight	10 %	10 %	11 %	10 %	13 %	6 %
Obese	6 %	3 %	5 %	4 %	11 %	4 %

Legend: [1)] measured data; [2)] self-reported data
Table 1: Prevalence of overweight and obesity in children and adolescents in Austria (from 20)

Weight situation in Austria and Germany

Austria:
*37% of Austrians are overweight (from the age of 20 years)
*9.1% of Austrians are obese (from the age of 20 years)
*10% of children between 3 and 10 years are overweight
*4.5% of children between 3 and 10 years are obese

Germany:
*31,1 – 48,7 % of Germans are overweight (from the age of 18 years)
*18.3 – 24.5% of Germans are obese (from the age of 18 years)
*12.4% of children between 5 and 7 years are overweight

Pathogenesis

Lifestyle factors, such as lack of exercise and overeating, are the most important factors leading to the incidence of obesity in industrialised nations. The influence of genetics is estimated at 30 – 70%, based on results of studies of twins and adoption. Up until now more than 70 geneloci have been identified as potential candidate genes. Altogether it can, however, be concluded that the development is, above all, a result of an interaction between genetic disposition and environmental factors (Lechleitner 2004).

A significant risk factor for obesity is lack of exercise. In western industrialised nations the amount of physical activity among adults and children is decreasing (Manson et al., 2004, Reilly et al., 2004).

Energy consumption is reduced as a result of lack of bodily exertion. Furthermore the body's composition changes in the sense that the metabolicly active muscle mass decreases. In conjunction with this metabolism and total energy consumption decrease, and a positive energy balance combined with an increase in body weight become more probable.
From the results of the Nurses' Health Study the authors estimate, that 30% of all cases of obesity could be avoided through a more active lifestyle, with a maximum of 10 hours television per week and exercise incorporating a minimum of 30 minutes fast walking per day (Hu et al., 2003).

Until now there are no reliable epidemiological data in the pathogenesis of obesity, as to which factors and to what extent, lead to overweight. Besides inactivity and a generally long term positive energy balance through high fat and/or high glycaemic carbohydrate consumption, unsuccessful attempts at diets also present a determinant for the development of overweight (Rössner 2002; Jebb 1997; Spiegelmann and Flier 2001; French et al., 2001; Drewnoswski and Specter 2004; Berkey et al., 2004; Schulz et al., 2002). Increasing portion sizes when 'eating out' as well as variety of foods on offer are, particularly for those people addicted to external stimulus, also a contributary factor (Ellrott 2003).

Fast food consumption and portion size

Up until now there are no studies, amongst the German speaking communities, relating to the developments in portion and packaging sizes and their potential influence on the development of obesity. The causal relationship between the consumption of larger portions and increased body weight have also not been established (Ellrott 2003; Rolls 2003). A series of international studies, however, point to a relationship between the portion size and energy intake.

The trend towards larger portion sizes exists worldwide. Above all pre-packaged foods with high energy value, soft drinks and fast foods are subject to this development.
In a Danish survey it was shown that, between 1990 and 2000, the energy content of a classic menu in a fast food restaurant increased from 984 kcal (size: normal) over 1,159 kcal (size: large) to 1,258 kcal (supersize) (Matthiessen et al., 2003 from: Ellrott 2003).

An American survey reports increases in portion sizes by 93 kcal per portion for salty snacks, by 49 kcal per portion for fizzy drinks, 97 kcal for hamburgers and 68 kcal for french fries over a timescale from 1977 to 1998 (Nielsen and Popkin 2003).
The german edition of National Geographic from August 2004 also reports increasing portion sizes. In 1954 the hamburger from a fast food chain weighed 79g and had 202 kcal, in 2004 the portion size has increased to 122g and 310 kcal. The french fries of 1955 (68g) provided 210 kcal. In 2004 these are now offered in portions of 198g (610 kcal). Whereas in the fifties popcorn was sold, in cinemas, in 0.75 liter packs (174 kcal), now 5 liter packs are available (1700 kcal) (Newmann 2004).

Energy density (kcal per unit of weight) as well as portion size are, independent of oneanother, associated with energy intake (Kral and Rolls 2004).

In an American study both women and men consumed significantly more energy (women: +74 kcal or 12%, men: +186 kcal or 23%) when offered a larger sandwich. No differences in appetite or feelings of fullness were reported (Rolls et al., 2004a).
In a similar study in a self service restaurant energy intake increased significantly by 172 kcal (+43%) for the starter and by 159 kcal for the whole meal, through the offer of a 52% larger portion of pasta as a starter at the same price (Diliberti et al., 2004).
In a further American study in which subjects were offered potato chips in various package sizes (28 – 170g) prior to a standard evening meal, those who received the largest packets in total including evening meal and snack, consumed 143 kcal more compared with those who received the smallest packets (Rolls et al., 2004b).

Besides physiological factors, such as, stomach enlargement and emptying, cognitive and orosensory influence factors are also being discussed as potential mechanisms in the relationship between portion size and energy intake (Kral and Rolls 2004).
The regulation of quantity of food results from inner and outer stimulii. Inner stimulii such as hunger and feelings of fullness determine food consumption in babies and small children. During the process of socialisation these are increasingly replaced by outside stimulii, which include portion size and availability of foodstuffs (Ellrott 2003). Herewith the outside stimulus is more significant in the regulation of quantity of food than energy content. The inner stimulus of fullness is replaced by the outer stimulii of portion size and availability. In a Dutch study obese women selected larger portions of meals with higher energy density and smaller portions of foods with low energy density (Ellrott 2003; Westerterp-Plantega et al., 1996).
The additional energy intake provided by larger portions is not compensated for in the following meals (Rolls et al., 2004b; Ellrott 2003).

Besides the relationship between the increase in portion sizes and energy intake, there is also a relationship between consumption of fast foods and increased energy intake or increased body weight.
In an American study the frequency of fast food consumption correlated to a higher intake of energy and fat as well as a higher body weight in adult women (French et al., 2000). In adolescents there is also a relationship between consumption of fast food and energy and fat intake (French et al., 2000).

A strong link exists between dietary habits and body weight in 2 – 5 year old American children. This can be explained by differences in energy intake due to portion size in 17 – 19% (McConahy et al., 2004).

According to results of the Kieler Obesity Prevention Study (KOPS), 25.3% of overweight, but only 18.6% of underweight children consumed fast food a minimum of once a week. Altogether no significant differences in the consumption of any single food group, between overweight, normal weight and underweight children were established (Müller 2000).

Countless studies document the link between portion size and energy intake. The wide choice of large, energy dense, food portions can lead to a positive energy balance (Kral and Rolls, 2004). The WHO identifies the increase in portion sizes as a possible aetiological factor in the worldwide obesity epidemic (WHO 2003). The causal relationship between the increase in portion size and an increased body weight could, however, not be substantiated up until now (Ellrott 2003; Rolls 2003). Over and above this, relationships also exist between consumption of fast food and intake of energy, fat, as well as, body weight (French et al., 2000; French et al., 2001).

The film “Super Size Me” shows, in a particularly drastic way, the process of getting fat through a permanent and, in this case, an excessive, high calorie diet. In his comments on

the film Prof. Dr. Helmut F. Ebersdobler, President of the German Society of Nutrition, notes that, through its' intentionally aggressive depiction, it is thought provoking and can even be helpful, since even though the final decision rests with the consumer, the possibility exists that the fast food industry will take up the gauntlet and respond to the film with the comment: "In this film you can see how it should not be done, namely permanently one-sided and over-consumption of food. We also offer healthy alternatives, which you should choose more often." (Ebersdobler and Müller 2004).

Specifically identifying as a problem one-sided foodstuffs or meals, as well as, specific food choices on offer (such as fast food) is, seen from the viewpont of social medicine, not advisable since with it follows a categorisation into "good" and "bad". In principle there are no "good" or "bad" foods. This classification can very quickly lead to disturbed eating patterns, particularly in people who are overly occupied by healthy eating (= orthorexia nervosa). Unfavorable products (high energy content, high fat and/or high sugar content) should be consumed in smaller measures and less often (Kinzl et al., 2004).

Development

Reasons for the development of overweight are manyfold. Not only genetic, but also, a series of psycho-social factors (e.g. eating behaviour, special living circumstances) are responsible for the positive energy balance and the resulting increased form of fat storage.

Since the proportion of overweight people has risen constantly in all industrialised nations over the last few years, one can assume that personal lifestyle has a strong influence, since the genetic pool amongst the general population has not changed over this time period. The main causes are the overall lack of exercise in all age groups and an energy intake not appropriate to need. This arises from the consumption of very energy, fat or sugar rich foods. Also responsible are, amongst other things, the constant availability of food in ever increasing portion sizes.

Therapy

The foundation of professional obesity therapy is the combination of nutrition, exercise and behaviour. The aim is a reduction of initial weight by 10 – 15%.

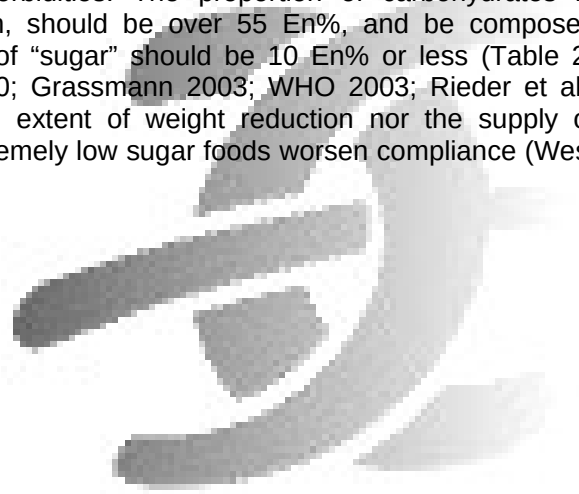
Today the basis of nutritional therapy is the dissemination of nutritional knowledge and an individual reduction in energy intake, independent of food composition (Hauner 2003; ADA 2002). The aim of obesity therapy is a reduction of initial weight by approx. 10% over a period of 6 months. This is achievable through a reduction in energy intake of 300 to 500 kcal/day, for people with a BMI of between 27 and 34.9 kg/m^2, and of 500 to 1000 kcal/day, for people with BMI of over 35 kg/m^2. As a guideline, daily energy intake should be 1000 to 2000 kcal for women and 1200 to 1500 kcal for men (NIHLB 1998). The amount of fluctuation results from variations in the use energy, age and genetic factors (upTodate 2004).

Weight loss through limiting energy intake cannot be exactly defined. Through a higher use of energy weight loss will increase with increase in level of BMI. After 6 months this will, with a constant energy deficit brought about by reduction in energy usage, stagnate again (NIHLB 1998).

An isocaloric replacement of individual energy supplying foods only influences the percentage energy supply of individual macronutrients, but does not influence weight reduction. At the moment the question as to whether limiting fat intake ("low fat diet") or carbohydrate ("low carb diet") in order to reduce calorie intake, is achievable, is still a controversial debate. Although initial studies show a more or less greater weight loss and better long term success after 12 months through a reduced carbohydrate diet compared with a reduced fat diet (St. Jeor et al., 2001; Samaha et al., 2003; Stern et al., 2004), they are, however, not recommended due to lack of long term observations in particular regarding the effects of metabolic parameters and inadequate supply of micronutrients (St. Jeor et al., 2001; Brehm et al., 2003). A meta analysis of "low fat diets" shows on the other hand, that a 10% reduction in fat as a proportion of about 27 En% increases successful weight loss by 3.2 kg, and that low fat diets with a high proportion of complex carbohydrates have no detrimental effect with respect to cardiovascular risk factors (Lean and Lara 2004). Not suitable are, however, "very low fat diets", since through these no greater success in weight reduction can be achieved, but there exists a risk of inadequate supply of essential fatty acids and they have a lower compliance. "High protein diets" result in an inadequate supply of vitamins and minerals through a limited choice of foodstuffs, and can, amongst other things, lead to kidney disease and in the long term a reduction in bone density (Krauss et al., 2000; St. Jeor et al., 2001).

Not included in current discussions, personal food preferences must, in the future, find a more significant place in the actual composition of fare in obesity therapy, since only then can compliance be increased and long term success be achieved.

Since it can be assumed that with both low fat foods and high fat food, there exists a danger of excessive energy intake accompanied by increase in fat storage, estimated AMDR (Acceptable Macronutrient Distribution Ranges) for primary prevention of obesity for fat intake for adults are given as 20 to 35 energy percent, and < 30 energy percent in therapy, especially where there are existing comorbidities. The proportion of carbohydrates in primary, secondary and tertiary prevention, should be over 55 En%, and be composed principally of polysaccharides. The intake of "sugar" should be 10 En% or less (Table 2) (Deutsche Gesellschaft für Ernährung 2000; Grassmann 2003; WHO 2003; Rieder et al., 2004), since within this range neither the extent of weight reduction nor the supply of vitamins and minerals is compromised. Extremely low sugar foods worsen compliance (West and De Looy 2001).

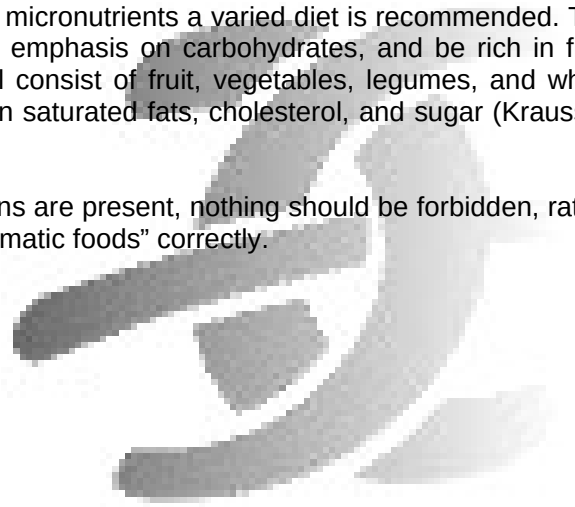


	Normal weight	Normal weight + additional risk factors	Overweight and obesity	Overweight and obesity + additional risk factors
Energy			- 300 to 1.000 kcal/d	- 300 to 1.000 kcal/d
Fat	15 – 30 E% SAFA: < 10 E% PUFA: 6 – 10 E% MUFA: Difference	15 – 30 E% SAFA: < 7 E% PUFA: 10 E% MUFA: Difference Note: Replacement of saturated fatty acids through carbohydrate and/or mono unsaturated fatty acids	15 – 30 E% SAFA: < 10 E% PUFA: 6 – 10 E% MUFA: Differenz	15 – 30 E% SAFA: < 7 E% PUFA: 10 E% MUFA: Differenz Note: Replacement of saturated fatty acids through carbohydrate and/or mono unsaturated fatty acids
Cholesterol	> 300 mg	> 200 mg	> 300 mg	> 200 mg
Carbohydrate	55 – 75 E% “Sugar”: < 10 % Note: Carbohydrate should primarily consist of whole grain products, fruit and vegetables	55 – 75 E% “Sugar”: < 10 % Note: Carbohydrate should primarily consist of whole grain products, fruit and vegetables	55 – 75 E% “Sugar”: < 10 % Note: Carbohydrate should primarily consist of whole grain products, fruit and vegetables	55 – 75 E% “Sugar”: < 10 % Note: Carbohydrate should primarily consist of whole grain products, fruit and vegetables
Fibre	20 – 30 g	20 – 30 g	20 – 30 g	20 – 30 g
Protein	10 – 15 E%	10 – 15 E%	10 – 15 E%	10 – 15 E%
Fruit and vegetables	<= 400 g / d	<= 400 g / d	<= 400 g / d	<= 400 g / d

Table 2: Nutrition guidelines in the prevention and therapy of obesity

To avoid a long term deficit of macro- and micronutrients a varied diet is recommended. This should include moderate levels of fat, an emphasis on carbohydrates, and be rich in fibre (West and De Looy 2001), and above all consist of fruit, vegetables, legumes, and whole grain products, together with a reduction in saturated fats, cholesterol, and sugar (Krauss et al., 2000).

Fundamentally, when no medical indications are present, nothing should be forbidden, rather it should be learnt how to deal with “problematic foods” correctly.



Therapy

Reduction in energy intake and increase in energy usage are recommended in the treatment of overweight. The aim is a varied diet within the framework of flexible control, without forbidden foods or rules, and particularly taking into account personal food preferences.

Prevention of obesity

In view of the epidemiological situation and the risk of accompanying and resultant diseases it is, in future, particularly important to strengthen awareness of the problem, and develop Public-Health-Strategies for health promotion, to force target group oriented prevention measures, and offer those affected a professional therapy in accordance with evidence based guidelines.

The primary objective of obesity prevention is to stabilise weight, since, epidemiological data shows that the average body weight is continually rising amongst the adult population up to an age of 64 years (Deutsche Adipositasgesellschaft 2004; Bergmann and Mensink 1999). Nutritional guidelines are, in this instance, in line with general WHO guidelines for the prevention of chronic disease (WHO 2003) (Table 2).

With a BMI of over 25 kg/m^2 moderate weight reduction in all age groups should be aimed for, through sustained and effective supervision, and which, as many post examination results show, should be long term and interdisciplinary. With a Body-Mass-Index of over 30 the aim is to achieve a reduction in initial weight of 10 – 15% and to maintain this reduced weight (uptodate 2004).

A reduction of only a few kilogramms (-3.2 kg) in the general population could already reduce the occurrence of overweight from 25% to 15% and as a consequence positively influence health risks. A meta-analysis shows that this could easily be achieved via nutrition through a reduction in proportion of fat without a deliberate restriction in energy intake (Astrup et al., 2000). Reducing the proportion of fat in food by 1 En% in ad-libitum food intake already leads to a reduction in body weight of 1.6 g/d (Astrup 1999).

Due to the increasing prevalence of overweight and obesity in childhood and adolescence and the associated risk of prevailing obesity during adulthood, special strategies are required at an early age. Strengthening nutritional competence amongst children through imparting nutrition-related, science-based, knowledge and motivation towards the practice of health promoting, nutritional habits are essential. Suitable settings are nursery schools and schools, since here, continuous contact in a familiar environment is possible. Promising strategies include pointing out the social importance of food and drink, facilitating new cooking and eating rituals appropriate to the child's environment, trying out unaccustomed foods and changing food preferences by means of this learning process, as well as, the cognitive control of eating habits and using this in the practice of long term weight control (Westhöfer 2002; Winkler et al., 2004).

The "obesity epidemic" presents great challenges to the health system and research. The aim is to conceptualise target group oriented prevention programs at all levels and offer these across the board. Only population-wide strategies, which besides educational level and social status, encompass all methods of communication, promise a way out of the obesity epidemic. As a first step, however, the acceptence of the problem through experts and politicians is required together with a reduction in the unprofessional and often amateurish

treatments through the numerous, scientifically nonsensical weight loss diets and rigid dietary regulations (Müller et al., 2002).

Prevention

In order to get the problem of overweight under control, the aim is that people of normal weight maintain their weight and that overweight and obese people lose weight slowly and over a long period of time. This can be achieved by appropriate energy intake and regular exercise.

Conclusions

Epidemiological data from all countries, which have documented the prevalence of obesity, show a clear increase across all age groups over the last years. Recently, even in childhood and adolescence, a worrying increase in obesity has been observed. Prognoses make the assumption that this trend will continue.

Meantime, because of the endemic extent of overweight and associated morbidity and mortality, there is a need for effective support for all age groups, which, as the results of follow-up examinations show, must take place long term and be interdisciplinary.

The “obesity epidemic” also presents great challenges for the health system and for research. The aim is to conceptualise target group specific prevention programs at all levels and offer them across the board.

Since the main cause is considered to be a positive energy balance, there is, in future, a need for reduction in energy intake and an increase in energy usage. Particularly helpful in this respect are, not only reduced energy products, but also a return to “sensible” portion sizes, since these, in particular with people addicted to outside stimulii, drastically increase energy intake. Maxi-offers and super-size portions should not be available, just as “all you can eat” opportunities. Every restaurant, cafeteria, every cantine and every fast food outlet should offer more fruit and vegetables together with the appropriate advertisement, in order that each individual can choose for themselves, whether or not to reach for the nutritionally more valuable alternative.

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