



Obesity Prevention in Childhood and Adolescence

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Abstract: Empirical research shows that there is no social awareness nor do the known and widespread therapeutic and preventative measures of obesity bring about a significant change of the prevailing situation in a positive direction. From a medical point of view obesity and its consequences have been thoroughly researched and the relevant prevention and therapeutic measures are known. The purpose of this study was to approach, analyse and ultimately present obesity preventive measures in children and adolescents, as well as the state of progress of science today. The method adopted for the study was a review of the relevant literature. In the course of the study, it turns out that obesity is not a purely medical problem, but the causes are mainly due to social changes in behaviour, especially in terms of movement and diet. Prevention and treatment of overweight and obesity are closely interdependent. An important argument for prevention is that our health care system is never able to assist all obese patients. It is therefore extremely important for the public health system to develop primary prevention programs and strategies. Primary prevention should pay special attention to children and young people because the chance of overweight children becoming overweight adults is very high. It is important that the measures are adapted to the development of children and young people, and that they take into account their needs. It seems that prevention and treatment in this target group could be more successful than in adults, because children and young people are more receptive to interventions. Their nutritional and motor behaviour is not as well established as in adults. For this reason, they may be able to respond more easily to preventive measures that aim to change their behaviour in terms of nutrition and movement. Timely change in eating habits, regular exercise, and possibly medical and psychological counselling, prevent the slightly overweight from becoming obese. Particularly parents should be careful to provide for their children a well-balanced diet and adequate motor activities. Prevention should begin as early as possible. This is especially true for children and young people who have an increased risk of obesity due to family predisposition.

Keywords: Obesity prevention, Childhood and Adolescence

1. INTRODUCTION

From a medical point of view obesity and its consequences have been thoroughly researched and the relevant prevention and therapeutic measures are known. Nevertheless, empirical research shows that there is neither social awareness nor the known and widespread therapeutic and preventative measures against obesity bring about a significant change of the prevailing situation in a positive direction. The purpose of this study is primarily to present the preventive measures against obesity, as well as the state of progress of science today. Subsequently, it is proven that obesity is not a purely medical problem, but the causes are mainly due to social changes in behaviour, especially in terms of movement and diet. Based on this, strategies that take this theory into account are being developed for the primary prevention of obesity among children and young people. The plan considers important social sectors such as education, medical research, the media and the economy. Obesity prevention in recent decades has not been very successful. The rates of this disease have increased more, and the number of people affected has not decreased. Although drastic measures are generally known, it is obviously difficult for many people to permanently maintain their weight at a normal level. The development of obesity is a process in which many factors play a role. Therefore, prevention should be applied in many ways in order to act effectively and actively.

2. METHODOLOGY

The present research is a bibliographic review study, presenting the critical points of the existing knowledge about prevention of obesity in childhood and adolescence. There is no specialized and comprehensive work on this subject in the relevant international literature. This work endeavours to

cover this gap, and will perhaps also be a useful aid for those who in the future will attempt similar efforts. The main aim of the bibliographic review is to frame the study within the "body" of the relevant literature. The review of the current study concerns clearly formulated questions and uses systematic and explicit criteria for critically analysing a body of published papers by summarizing, sorting, grouping and comparing.

3. PREVENTION STAGES

In principle, prevention is divided into three stages, which depend on the time of the intervention:

General Prevention and Health Promotion

This stage mainly refers to primary prevention. This includes measures that aim to prevent overweight and obesity occurring in society in advance.

Selective Prevention

This stage refers mainly to secondary prevention, targeting specifically among the population potential risk groups that due to genetic, biological and other causes are particularly in danger. Another risk group is children and young people who are already undergoing treatment for overweight.

Directed Prevention

Directed prevention is mainly tertiary prevention. Measures are addressed to children and young people who are already overweight, with a high risk for their health, or obese (WABISCH & KUNZE, 2003).

In the context of this study, the main focus is on primary prevention. Although therapeutic measures are briefly presented, the maximal duration of their action is achieved by the permanent change in the behaviour of children and young people. Thus, in the future, the creation of risk groups can be reduced in the first stage of development. In particular, this includes measures that positively influence the environmental factors of children and young people. Only consistent changes in behaviour can prevent permanent weight gain. When it concerns prevention, great importance is given to the behaviour with regard to eating and drinking as well as to the motor behaviour. Because children aged between seven and twelve do not have a sufficient understanding of complex correlations and their personality is not so strong that they can make conscious behavioural changes on their own, prevention measures should be particularly suited for children and they should be transmitted in an appropriate way. The material should be presented in the form of a game, particularly for the target groups, and it should be transmitted in an interesting way, since information through entertainment affects children and young people emotionally and is more strongly transmitted than plain information (STOLZENBERG et al., 2007).

Finally, prevention measures should be motivating and not boring. When it concerns children, prohibitions that may be linked with penalties should be avoided. This applies to both parents and teachers, doctors and other health care providers. A much better method is to provide them with alternatives and to increase their motivation, acting as a role model and beginning with them the relevant preventive measure. In each action, it is important to give realistic and achievable goals to children and young people with appropriate support and furthermore they should be regularly encouraged, praised and supported (STACHOW et al., 2003).

3.1. Movement

Sport and movement contribute, in the long term, significantly to weight loss and weight stabilization. In the short term they only bring about a small weight reduction. Calories consumption is often overestimated due to sports activity. Moreover, the efficiency of overweight people is often too low. Many times, the degree of burden that could contribute to weight reduction is not achieved. Research at Cooper Clinic has shown that a calorie restricted diet has more success regarding slimming in the short term than a sports activity. But if you combine a sports program with a diet, then a greater weight reduction occurs compared to just diet or just physical activity.

Therefore, movement is important for the long-term reduction and stabilization of a certain weight. It is an effective weapon in the fight against kilos: physical efficiency is increased, fat burned and moreover the risk for illness decreases. Mainly with simultaneous physical activity, the degradation of body mass without fat that associates with fat loss can be greatly reduced. The ratio of the tissue mass

metabolized changes with respect to the fat mass metabolized in favour of the first. As the energy balance is improved, more energy is consumed and less fat is stored when the muscle mass is developed. The physical activity of medium intensity and frequency has the greatest cardiovascular benefit. With an active lifestyle and additional sports action (three times for 30 minutes with 100-Watt endurance performance), it is easy to achieve weekly energy burning that exceeds the 2,000-kcal barrier, which is epidemiologically defined and is a legitimate target for preventive Medicine (BLAIR & HOLDER, 2002).

In a study of Pavlou, the importance of sport for fat-free body mass was examined in a group of obese people who at the time of the study had been on a low-calorie diet. Half of the subjects performed a motor program along with the diet, which consisted of three training sessions per week (walking, running) for a total of eight weeks. At the end of the survey, both groups had lost the same weight (athletic group: 11.8 kg, non-athletic group: 9.2 kg). However, the body fat percentage in this weight loss was much higher in the athletic group (11.2 kg) than in the non-athletic group (5.9 kg). Therefore, in the athletic group, 95% of the weight loss was attributed to body fat loss, while in the non-athletic group the percentage was only 64% (PAVLOY et al., 1985). In the context of slimming programs, sport contributes significantly to resistance to fatty degradation and muscle mass retention. Another reason to include sports in a slimming program is the positive effect of increased physical activity on the rate of the basic metabolism. Only with the reduction of calories the weight reduction rate with time decreases, that is, one loses weight less and less. This is due to the lower rate of the basic metabolism, which is the adaptation to maintain the energy of metabolism in view of the reduced calorie intake. There are research results that indicate that exercise can adversely affect the reduction of the basic metabolism rate. A low-calorie diet reduced the relative basic metabolism (by body weight) in twelve obese women by 4.4%. After an eight-week endurance workout, basic metabolism increased by 5% compared to the reduced level of basic metabolism. Consequently, the reduced rate of basic metabolism due to reduced calorie intake can be increased again with exercise. It is important to identify and deal with problematic cases in a timely manner. Children and young people who have a tendency to overweight or obesity should start early motor programs (BOES et al., 2002). At this point, studies between children of the 1st grade and children of the 4th grade play a major role. Thus, the Health Service for Children and Adolescents, carries out researches in schools, and can identify at this early stage children and young people with weight problems in order to offer specific motor programs via sports clubs. In the state of Brandenburg, the implementation is carried out by the Health Service for Children and Adolescents of the Welfare Services. The application of motor programs with the cooperation of sports clubs that have been developed is being implemented with the support of the State Sports Federation and the Association of Doctors Contracted with Health Funds in all Brandenburg areas.

In the context of a study in Berlin, it was found that school children who have a gymnastics lesson every day have less weight problems than those who have a gymnastics lesson three hours a week. This result confirms that the regular exercise of children can actually prevent overweight. The survey involved more than 1,400 school children in Berlin aged six to thirteen. Some of them attended a primary school with a very intensive gymnastics lesson. The other children went to schools where they had the usual gymnastics lesson three hours a week. A research team at Humboldt University in Berlin recorded the weight and height of the children. Based on the criteria of the research team on "Childhood and Adolescent Obesity", 8% of all children were overweight and 4% were obese. No differences were found between boys and girls. But the frequency of school sport had a significant effect on weight. Thus, 11% of the children who were in regular school sports were overweight, but only 7% of the children who had sports lessons daily were overweight. Similar differences were also found for obesity: 6% of the children who had a gymnastics lesson only once a week were obese. With daily exercise the percentage was only 4%.

Another goal is to improve body support, because often the muscular system is stressed by body weight. The low back aches, the legs form an X and joint diseases are expected. With movement muscles are developed. The active motor system (muscular system) is strengthened and thus relieves the passive (bones, joints, tendons, ligaments). We should not forget that sport increases body perception and awareness. With activity and movement children experience their efficiency. Their physical-motor actions express their attempt at independence. Physical experiences are experiences of the "ego" and can be considered as developmental stages of the individual. They lead from body consciousness to self-consciousness. Children and young people seek independence and trust. In their

own way, they try to shape their environment and contrast with it. In sports and games, they seek opportunities for the independent development and the variety of play and sport situations. The most important is that they have fun with movement; *it is best for children to do something that is not so proper medically, rather than not do something that is proper medically.*

Stimulating children and young people is important in order to address overweight in the form of play. The objective is not to monotonously burn fat. More suitable for children and better for their joints are ball games, bikes, skates, ice skating as well as skiing, swimming, horse riding and self-defence lessons. To facilitate the transition to a movement-oriented life, special sections for overweight children are offered (ZIROLI, 2003).

In summary, we can say that physical activity and sport can be considered prevention methods against obesity. Movement plays a decisive role in primary, secondary and tertiary prevention.

3.2. Medicine

Family doctors undertake an important role in preventing obesity. Patients need constant help. Prevention is particularly important and family doctors are the first to talk about it. They should advise parents and obese children and young people, and support them with proper guidance on nutrition and sports activities. General Practitioners and school doctors should not underestimate the problem of very overweight children. Obesity in childhood is a condition and should therefore be diagnosed as such and treated. The corresponding education and training in the field of Nutrition Medicine should elicit the necessary awareness. In addition, family doctors are well placed to speak with their patients when it comes to the possibilities of a reasonable medical treatment. The most well-known treatment options are now described:

Appetite suppressants: they are available in pharmacies but they have to be considered meaningless and, in normal cases, to be discarded. Due to the proven addiction they can cause and their serious side effects, for long they are not recommended for the tertiary prevention of obesity.

Laxatives are also not suitable for slimming since the obvious weight loss is only due to water loss. Prolonged use may also exhibit imbalance in metallic elements.

Preparations containing non-digestible substances act in accordance with the principle that an amount of substances that are not fully digested is taken with liquid before eating. The substances that are not completely digested cause swelling, so the sense of hunger in the stomach decreases and consequently the appetite for the food that follows is decreased. These preparations are considered harmless. However, they are not absolutely necessary, since choosing food that is rich in non-digestible substances is enough to provide a hearty but low-calorie meal on the table.

Two classes of substances for tertiary prevention (serotonin-noradrenaline reuptake inhibitors, lipase inhibitors) are currently authorized. Both categories of substances result, in addition to slimming, in the improvement of obesity-related disorders. Another drug (Rimonabant) has already been tested in the Belgian study "Rimonabant in Obesity (RIO-Europe) Study". From a new endogenous cannabinoid type 1 (CB1) receptor blocker, overweight people can benefit multifariously, when the drug is combined with a diet. According to the data collected in one year, in a study lasting two years, patients are significantly slimmer compared to those receiving the placebo. The stomach closes. Also, lipid values and blood glycaemic values are improved (PETERMANN & HAIRING, 2003).

Another method, which is combined with surgery, to achieve the weight reduction of overly obese individuals is to place an adjustable gastric ring. The stomach diminishes, since a part of it is separated by a strip. The patient can no longer eat so much and in the long run gets slimmer. This method is only applicable to pathologically obese (BMI > 40) and should not be used in children and young people (HEBE BRAND et al., 2004).

3.3. Education

Timely change in eating habits, regular exercise, and possibly medical and psychological counselling, prevent the slightly overweight from becoming obese. Particularly parents should be careful to provide their children with appropriate diet and adequate motor activity. Effective measures and strategies have long-term success for children if the children's parents are also included as a target group for behavioural change. A measure could be more successful if it can arouse the interest of children in healthy eating and provides adequate movement in the form of play, rather than offering constant advices. It is important for parents and teachers to motivate children. We are talking about

motivation when already acquired incentives (willingness for certain behaviour to last) can be expressed in certain situations, so that children start to face this situation. They have specific expectations and estimate the chances of success. They take into consideration the meaning and benefits of their possible active participation and decide to act. Then they think about the experiences they have gained, experience feelings and create the basis for consolidating or changing incentives that already exist or for acquiring new, other behaviours. Parents have an important role in the education of children and young people, because children accept the behaviour they experience from other family members and learn since they consider them role models. Parents act in two ways as **family manager models**. First, they need to show children new, positive eating and motor habits. As family managers, they also have to make as few experiments as possible with children. Parents can decide how much they will eat, how often they will move, and thus determine how consistent and successful their treatment will be (PETERMANN & HAIRING, 2003).

3.4. Politics

Just as parents have to deal with the issue of the overweight of their children, politics must do the same in the economy. The government and the opposition agree that something must be done against the obesity of children and young people. But the two sides disagree strongly about how. The cause is the government statement of Renate Kuenast, Minister of Consumer Protection, Food and Agriculture. The politician advocates advertising and stricter conditions for the food industry. At the same time, children and young people should be encouraged to be more active and to learn about the disadvantages of a unilateral diet with fast food. Everyone, from food industry representatives to the sport field, will work on the **Platform for Nutrition and Exercise**, because overweight and obesity cause an incidental cost of € 71 billion a year. The **green** politician finds it unacceptable to relate poverty, origin, education and overweight. No **new burden** may be created for the otherwise unprivileged. The World Health Organization (WHO, 1998) advises that in the fight against obesity governments should impose higher taxes on sugar, salt and saturated fat so as to prevent people from consuming these substances too much and to encourage them to a more healthy diet.

In the debate on good nutrition, food advertising for children is criticized in particular. Individual governments have to deliberate over this matter and ensure that food and drink advertising does not take advantage of children's inexperience or naivety. The strategy design is now being discussed by the member states. Observers expect that the lobby in the food and beverage industry will work well in their favour. The fact that food business groups have taken seriously the demands of the Minister for Consumer Protection Renate Kuenast and the claim of World Health Organization is evident, among other things, in the case of **Kraft Foods**. As regards Kraft Foods advertising for all regions, the new marketing policy of its headquarters applies worldwide. The basic principles for each region are in line with national legal provisions. Therefore, **Kraft Foods Deutschland** is no longer advertised in schools and media for children. There are no vending machines in the school yards, there are no promotional offers for children under six and there is only limited advertising for children up to 12 years old. Furthermore, on all **Kraft-Foods** packaging, nutrition information is more clearly depicted. In addition, on the Internet, **Kraft Foods** recipes are presented with tables that report their nutritional value. Also in United States, the pressure of politics is growing. In the future, calories and the percentage of sugar and fat should be reported on food products. In the restaurants, next to each dish, the number of calories should be depicted. In schools, nutritional information is provided, and in Arkansas the pupil's weight is scored (HINSCH, 2007). The International Obesity Task Force has created a list that classifies the total population of each country with respect to obesity, which sounds the alarm about this issue, mainly for industrialized countries.

Table1. Classification table based on obesity (FREDRIKS et. al., 2000)

Classification table based on obesity	
1 st place:	Greece
2 nd place:	U.S.A.
3 rd place:	Great Britain
4 th place:	Germany
5 th place:	Finland
6 th place:	Austria
7 th place:	Spain
8 th place:	Portugal

9 th place:	Belgium
10 th place:	Sweden
11 th place:	Italy
12 th place:	Holland
13 th place:	Denmark
14 th place:	France

We have a series of data from various European countries that advocate an increase in the occurrence of obesity among children and young people after the 1980s (FREDRIKS et al., 2000).

As will be shown later, in Germany, obesity is a numerically significant health disorder among children and young people, to which until recently insufficient attention has been given from Paediatrics and Adolescent Medicine. The Brandenburg State Health Service possesses data of the Brandenburg state concerning obese children starting school for the first time (about 6 years old) and for students of the 10th grade (about 16 years old). Among the 16-year-olds there is an increase in obesity. While in 2000 only 4.8% of boys and 5.2% of girls were obese, values up to 2003 are rising drastically to 6.0% for boys and 6.1% for girls. Among 6-year-old children, there appears to be a decrease or at least stabilization of values. In 2003, 4.3% of boys and 4.7% of girls were obese, in comparison to 4.9% of boys and 5.6% of girls in 2000. Therefore, the Service records a slight decrease in obesity among children who are going to school for the first time in relation to the year 2000 (ELLSAESSER et al., 2004). This development among children starting school can lead to complacency, but this is not a general trend. The Institute for Public Health Services of the Land of North Rhine-Westphalia came to similar results. Research has been carried out there too with children aged between nine and twelve.

Similarly alarming values are reported by DORDEL and KLEINE (2003) in a study with children aged eight to eleven years and BOES, OPPER and WOLL (2002) in research among children of the 4th grade.

Table2. Results of Selected Surveys on the spread of overweight in young people aged 9-12 years (KROMEYER-HAUSCHILD et al., 2001)

	Overweight (total) P ≥ 90	Overweight P ≥ 90 up to P < 97	Obesity ≥ 97
Loegd (2003) n = 8.060; 4 th grade pupils	16,2 %	10,5 %	5,7 %
Dordel, Kleine (2003) n = 358; 8-11 years old	16,5 %	10,6 %	5,9 %
Boes, Opper, Woll (2002) n = 366; 4 th grade pupils	19,4 %	12,3 %	7,1 %

In all three studies, over 16% of the children examined were overweight and about 6% obese. The importance of obesity is increasing worldwide. The World Health Organization (1998) describes obesity among children and young people as a worrying epidemic, and points to the assessment, which already in 1990, classified 18 million children under the age of five as overweight. The first observations on the significant increase in obesity of children and young people came from the United States. There, in the 1980s and 1990s, the prevalence of obesity increased - after a relatively stable proportion of overweight children over the entire population by the early 1980s. A comparison of the studies of the National Health and Nutrition Survey (NHANES I-III) revealed a doubling of the spread of overweight in children. According to the NHANES III study, which worked with collected data from 1988 to 1994, about 27% of children between 8 and 16 years of age are overweight and about 12% obese (TROIANO & FLEGAL, 1998).

Table3. Spread of overweight and obesity in children and adolescents aged 8-16 in U.S.A. (BENECKE & VOGEL, 2003)

	N	Overweight %	Obesity %
Total	4.113	27,2	12,4
Boys	2.021	29,0	13,8
8 – 10 years old	809	31,4	17,3
11 - 13 years old	660	28,3	11,9
14 – 16 years old	552	27,4	12
Girls	2.092	25,3	11,1
8 – 10 years old	759	24,5	11,8
11 - 13 years old	711	25,8	11,4
14 – 16 years old	622	25,7	10,0

NHANES data of the year 1999 show a continuous increase in the spread of obesity in both girls and boys. There are no major differences between the number of overweight and obese boys and girls, although more girls than boys try to reduce their weight again. This development continues in the United States. Current figures show that there is a steady increase in obesity in the U.S., in all national groups (BENECKE & VOGEL, 2003).

4. CONCLUSIONS

The steady increase in the spread of obesity necessitates preventive and therapeutic measures. Prevention and treatment of overweight and obesity are closely interdependent. An important argument for prevention is that our health care system is never able to assist all obese patients. It is therefore extremely important for the public health system to develop primary prevention programs and strategies. Of course, society is unable to prevent all cases of eating disorders and obesity. For this reason, particular attention should be paid to the development of highly effective prevention measures. Primary prevention should especially give consideration to children and young people because the chance of overweight children becoming overweight adults is very high. It is important that the measures are adapted to the development of children and young people, and that they take into account their needs. It seems that prevention and treatment in this target group could be more successful than in adults, because children and young people are more receptive to interventions. Their nutritional and motor behaviour is not as well established as in adults. Even though children and young people have already developed a body image defined by society, it is not yet as evident as in adults. For this reason they may be able to respond more easily to preventive measures that aim to change their behaviour in terms of nutrition and movement. Timely change in eating habits, regular exercise, and possibly medical and psychological counselling, prevent the slightly overweight from becoming obese. Particularly parents should be careful to provide for their children a well-balanced diet and adequate motor activities. Prevention should begin as early as possible. This is especially true for children and young people who have an increased risk of obesity due to family predisposition. In order to facilitate the acceptance and maintenance of a different behaviour of children and young people, consideration must be given to the socio-cognitive aspects of health behaviour. A healthy diet and regular physical activity, as a prospect of a permanent health benefit, obviously do not suffice as an incentive. On the contrary, short-term emotional aspects such as having fun, enjoyment, contact with other children and young people and feeling good should help consolidate the desired new situation. Particular emphasis should also be put on social support for parents, teachers and friends. In this way, the desired new behaviour can be maintained permanently. Finally, we are left with the hope and the desire that in the coming years the number of obese children and young people will drop significantly.

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