

Childhood obesity: the epidemic of the third millenium*

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Abstract. *Background:* Italy is the European country with the most obese and overweight children and teenagers. Most of them have a family history of obesity and this condition may increase the risk of many diseases. *Methods:* This study involved 52 patients (32 females and 20 males) between 6 and 17 years of age with an average BMI of 31.5. The patients underwent a three-month treatment which included an overview of individual caloric intake and creation of a suitable diet, an exercise program and counselling sessions with a psychologist in order to support the patients and families. Anthropometric changes were evaluated at the end of the three months and during follow-up to assess the effectiveness of the treatment. *Results:* Before starting the treatment the average weight of the patients was 81.8 kg, after the treatment it decreased to 79.4 kg. Likewise, the average BMI of the patients was 31.3 before the treatment and 30.4 after the treatment. Both of these results are statistically significant. *Conclusions:* This study confirms the importance of teamwork in the treatment of childhood obesity and the importance of approaching the problem with the entire family. A real problem exists for patients who are strongly dependent on the habits, determination and flexibility of their family. In conclusion, the success of this treatment is strongly related to the psychological attitude of the family. (www.actabiomedica.it)

Key words: Childhood obesity, psychotherapy, nutrition

Introduction

Obesity is a condition caused by many different factors: genetics, metabolism, but also behaviour, culture, and the environment (for example excessive food intake and limited exercise).

Obesity and even simply being overweight increases the risk of cardiovascular disease, metabolic disorders (such as hypertension, type 2 diabetes, dyslipidemia), cancer and degenerative diseases (osteoarthritis).

Furthermore, obesity and being overweight increases the risk of other illnesses, such as sleep apnea, asthma, cataracts, benign prostatic hypertrophy, men-

strual cycle alterations and complicated pregnancies, as well as psychological disorders such as depression and social discrimination (1, 2).

Approximately 20-30% of deaths due to cardiovascular disease occur in subjects that are overweight or obese, and this is the first cause of death in the USA. The second cause of death is type 2 diabetes: more than 18 million people in the USA are affected by diabetes and about 80% of the cases are the consequence of the combined effect of being overweight or obese and the lack of exercise. The incidence of diabetes increases with age (3).

Excessive body weight is related to different types of cancer. Obesity itself is associated with a higher risk

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of death, greater than that of 14 different types of cancer, with a mortality rate of 14% in men and 20% in women (2).

Childhood obesity is rapidly increasing in the USA (30% of children and adolescent who are aged 5-17 years are overweight) and in Europe, with the highest prevalence rates (31-39%) of overweight children reported in Mediterranean countries. Italy has one of the greatest levels – 35% of children who are aged 6-9 years are overweight, decreasing to 15% in 14-17 year olds.

The aim of the study is to analyse the impact of a combined approach on childhood obesity. The patients underwent a three-month treatment which included an overview of individual caloric intake and creation of a suitable diet, an exercise program and counselling sessions with a psychologist in order to support the patients and families. Anthropometric changes were evaluated at the end of the three months and during follow-up to assess the effectiveness of the treatment.

General epidemiology

Obesity is a widespread problem, especially in North America and Europe but it is also increasing in Asia, Africa and South America. The number of obese and overweight subjects is highest in North America, but in Europe it has increased at a rate of 10% in the last decade. Presently the trend in this epidemic requires a greater share of health resources: there are about 300 million obese people in the world and this number is increasing (4).

The greater consumption of high-caloric foods, the reduced expenditure of energy, and/or the combination of both have led to a markedly positive energy balance with an increase in the average weight of the population and progressively in the number of cases of childhood and teenage obesity (5).

An example of this may be seen in the globalisation process which brought terrible consequences even in eating habits. Advertisements for foods that were once available only in rich countries can now be found in poorer countries (coke-colonisation), thus the rate at which obesity is increasing is higher in developing countries (6).

The Italian adult population is made up of 49% of people who have a proper weight, 36.5% who are overweight and 14.5% who are obese. Among those who are obese 10.9% have a BMI between 30 and 34.9, 2.8% have a BMI between 35 and 39.9 and 0.8% have a BMI greater than 40.

Four percent of all European children are obese and this percentage is increasing. In Europe children between 8 and 11 years of age seem to have the highest risk of being overweight or obese, of these 10-20% are in Northern Europe and 20-35% are in Southern Europe.

Italy is the European country with the most obese and overweight children and teenagers, with an incidence of 11% between 6 and 17 years of age and a peak at 10 years of age.

There is a different distribution according to geographical region: in the North of Italy 7.9% of boys and 9% of girls are obese, in the Centre of Italy 9.6% of boys and 10.1% of girls are obese and in the South of Italy 15.7% of boys and 19.2% of girls are obese.

If we only consider children and teenagers who are overweight but not obese, the South of Italy has a greater prevalence, to be precise 23% of the population is overweight, of which 35% are between 6 and 9 years of age and 15% are between 14 and 17 years of age (7).

If we compare this data with the adult population, we observe that 36.5% of the population is overweight. Obesity has an incidence of 14.2 % among children and teenagers and 14.5% among adults.

If we consider one large group made up of both overweight and obese subjects, it amounts to 37.2% of children and 51% of adults. The South of Italy has the greatest prevalence with 41.8% of children and teenagers and 56.2% of adults being overweight or obese. The Centre and North of Italy have a prevalence of about 33% of children and teenagers and 45% of adults being overweight or obese (7).

Treatment: guidelines and recommendation for the treatment of childhood obesity

All patients should be encouraged to maintain a healthy weight by eating a nutritious diet and exercis-

ing regularly to balance energy intake and energy expenditure.

Lifestyle interventions have proven effective in preventing and treating obesity and its health consequences. However, to be most successful and sustain positive change over time, individuals' efforts must be facilitated and supported by a large physical environment.

Conventional treatment for childhood obesity is based on a non-pharmaceutical intervention, which focuses on these aspects:

- modest dietary restriction,
- an increase in physical exercise,
- a reduction in sedentary habits,
- and a change in behaviour. It should be used as a guideline for parents as well.

This study, carried out by Steinbeck KS et al, was done on children from 7 to 12 years of age (8).

Another study showed that increasing daily lifestyle activities can be just as effective as a structured aerobic exercise program in maintaining long-term weight loss. In this study, obese women were randomized to 16 weeks of treatment with a behavioral therapy program and a 1200 kcal/d diet with either structured aerobic exercise (three 45-minute step aerobic classes weekly) or instructions for increasing moderate-intensity lifestyle activities by 30 minutes per day on most days of the week (e.g. walking instead of driving short distances; using stairs instead of elevators). Initial weight loss was similar in both groups at 16 weeks (8.3 kg in the programmed group versus 7.9 kg in the lifestyle group, $P=0.08$) while a trend towards better maintenance of weight loss at 68 weeks was greater in the lifestyle activity participants compared to the group that received programmed exercise ($P=0.06$). These findings demonstrate that education that alters lifestyle activities is a reasonable alternative to programmed exercise for obese patients (9).

Treatment for obese children and teenagers at Auxology Institute

In accordance with the Italian guidelines for obesity published in 1999 (LIGIO'99, AA.VV.), children

and teenagers that were followed by the rehabilitation outpatient centre or day hospital were involved in a program focused on improving behaviour and nutrition combined with systematic psychotherapy for a total period of 12 weeks.

Anthropometric changes were evaluated in the short term and the effectiveness of an intensive treatment on lifestyle changes and on maintaining the new weight were also evaluated during follow-up (8).

Patients

Our study involved 52 patients (32 females and 20 males) between 6 and 17 years of age (average 14 years, standard deviation 2.6 years) with an average BMI of 31.5 and standard deviation of 5.1. The patients were cared for by a multidisciplinary team made up of dietitians, endocrinologists, physical trainers, and psychologists for a period of three months. The patients did not have any organic cause for obesity and were not under pharmacological treatment. Thirty-six of these patients had a family history of type 2 diabetes mellitus (69.2%), 33 had a family history of obesity (63.4%), and 26 had a family history of cardiovascular disease (50%).

The patients were seen with their parents every week for three months and took part in meetings with the team. While the children participated in an exercise program, the parents underwent a counselling session with a psychologist. At the end of the treatment period a follow-up appointment was given after three months, while the timing of the following appointments was chosen according to individual needs.

Among overweight and obese children only 17.7% had parents who were not obese or overweight, 24.8 % of the patients had an obese or overweight father, 25.4% had an obese or overweight mother, and 33.9% of patients had both an obese or overweight mother and father.

Dietetic intervention

Dietetic intervention started with an accurate overview of food intake and physical exercise, time

spent at school and in sedentary activities, and anthropometric measurements.

A diet with a slight caloric intake restriction (after evaluating the fat mass according to the Italian guidelines), that was divided into breakfast, whole-meal food (with an adequate fibre intake) such as mid-morning and mid-afternoon snacks, and two main meals was created. This diet was re-evaluated at the end of the treatment. The patients were asked to keep a diary recording daily caloric intake with the help of their parents. The dietician and endocrinologist went over the diary weekly. Information was given on the food groups of the food pyramid with the help of magnetic pictures. In addition they learned how to evaluate portions of food through its weight (both parents and children), and also the correct ways of preparing food (parents) in order to reduce fat and calories without changing the taste of the final product. They also learned strategies to cope with tempting situations (parties, restaurants and so on).

Physical exercise

The exercise program included aerobic activities for an hour a week combined with exercises aimed at strengthening muscles through the help of games (for example with a ball).

The patients were encouraged to practice daily thirty or forty minute walks, to use the stairs instead of lifts, and to prefer outdoor games to indoor activities. They also choose and practiced a sport (for example swimming) at least twice a week.

Psychological intervention

Psychological intervention was based on the following tests: EDI (Eating Disorder Inventory) tests, an instrument that permits an auto evaluation of symptoms, EFS (Edinburgh Family Scale) which measures the ability of the family to cope with stressful situations, and ANIT-A-36 which identifies personality from a neutral point of view. The treatment included: family counselling sessions that identified psychological aspects connected to weight increase,

psycho-educational groups which helped children share their problems related to obesity, and psycho-educational groups which helped parents identify the psychological consequences of obesity and plan strategies to support their children. A final meeting that evaluated the patient individually and together with the family was held.

Results

Examining the anthropometric changes in 52 patients before and after the three-week treatment we noticed a change in the average weight of the patients. At the beginning of the study the average weight was 81.8 kg with a standard deviation of 20.3 kg. After the treatment the average weight decreased to 79.4 kg with a standard deviation of 19.8 kg. This reduction is statistically significant. There was no change in the average height of the patients, as expected. A statistically significant reduction was also seen in the average BMI of the patients: 31.3 with a standard deviation of 4.7 before the treatment and 30.4 with a standard deviation of 4.6 after the treatment. There was a reduction in waist circumference which went from 99 cm with a deviation of 4.7 cm before the treatment to 96 cm with a deviation of 11.7 cm after the treatment.

Conclusions

This study confirms the importance of teamwork in the treatment of childhood obesity and the importance of approaching the problem with the entire family. The treatment gave good results in the short term. It is well known that the main problem in treating adult and childhood obesity is maintaining the results in the long term. This depends on individual commitment to treatment which is seen in patients that regularly come to their follow-up appointments.

A real problem exists for patients who are strongly dependent on the habits, determination and flexibility of their family. After 6 months of follow up half of the children and teenagers did not come to their appointments. It is not possible to say whether this dropout depends on an inability to continue the treat-

Table 1. Anthropometric variables in 52 patients before and after three months of treatment

	Before	After	P
Weight	Kg. 81.8 ± 20.3	Kg. 79.4±19.8	0.0001
Height	160.4±10.8	160.4±10.8	NS
BMI- SDS	3.1±0.7	2.9±0.7	0.0001
BMI	31.3±4.7	30.4±4.6	0.0001
Waist Size	99.0±12.7	96.0±11.7	0.0001

ment or if it is caused by treatment failure. Among those who dropped out of the study and were subsequently contacted by phone, 48% reported maintaining the results they had achieved or even losing additional weight. Of course, this information should be carefully considered as it could also be inaccurate.

In conclusion, the success of this treatment is strongly related to the psychological attitude of the family.

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