

## Management of Overweight and Obesity in Children in Western Algeria Aged 6 to 11 Years

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### Abstract

**Introduction:** Childhood obesity is a chronic disease that causes over-morbidity and excess mortality in adolescence and adulthood. Weight during childhood is a predictor of weight in adulthood; BMI at the age of 6 appears to be a predictor of BMI at 20 years of age. The probability of an obese child remaining in adulthood varies across studies from 20 to 50% before puberty. Obesity is life-threatening in the long term and probably reduces quality of life in adulthood and median survival. Overweight in the United States is 20 - 40% excess mortality and obesity increases the risk by a factor of 2 to 3. The increase in the prevalence of childhood obesity results mainly from part of the change in eating behavior with the development of food intake between meals and the high consumption of foods rich in sugars, on the other hand the decrease in physical activity in favor of sedentary leisure activities.

**Working Hypothesis:** Management focused on dietary education and encouragement of physical activity allows a reduction of fat mass and therefore complications related to this disease.

**Objective:** To stabilize the weight of the child when the body mass index is > 85<sup>th</sup> percentile, to decrease it when the BMI is  $\geq$  99<sup>th</sup>.

**Methodology:** Cohort study of obese children aged 6 to 11 living in western Algeria, directed by pediatricians and school health; Children with a BMI > 85<sup>th</sup> percentile will be included. The primary endpoint is BMI calculated every three months. It is estimated that it will include 1 to 2 patients per week. The patients will be seen every 3 months, they will follow a nutritional education, a management of the complications associated with obesity and a psychological care.

**Results:** The patients followed in number of 132. 60 correspond to the inclusion criteria. Sex ratio = 0.66. Psychological problem in 26 cases. Risk factors in 63.33%. Associated asthma 13.33%. Neurological pathology in 13.33%, iatrogenic obesity in 1 case. Suspicion of syndrome in 5 cases. Early fat rebound 11, 66%. Normal in 5%, undetermined 83%. Nibbling and high calorie diet 45%, bulimia 25%. Sedentary 46%. Severe BMI in 80%. HTA in 5 cases, Apnea and/or bulge in 3 cases, Insulin resistance in 3 cases, HDL Low cholesterol in 2 cases, DT2 in 1 case. Patients lost after 3 months 41%, after 6 months 28.33%, after 12 months 16.66%. Curve of BMI Stable 3%, Aggravated in 16%, yoyo effect in 10%, improved in 30%.

**Conclusion:** The risk factors found in two-thirds of patients, the management difficult because of the no-adherence of patients to dietary education.

**Keywords:** Obesity; Child; Complications; Management; ORAN

### Introduction

Overweight and obesity in children are defined by the WHO as an abnormal or excessive accumulation of body fat that can be harmful to one's health.

Obesity is a chronic disease responsible for over-morbidity and mortality. It promotes the occurrence of many diseases: either because of an excess of fat mass, or because of a chronic inflammatory state related to excess abdominal adipose tissue. The most frequent complications are cardiovascular and respiratory diseases, type 2 diabetes and osteoarthritis. Other diseases are associated with obesity, steatohepatitis, some cancers, kidney damage, venous disorders, gastrointestinal involvement, endocrine disorders with subfertility, etc. The psychological effects can be the result of a decrease in quality of life and lead to a depressive syndrome. Moreover, obesity increases the obstetric and surgical risks. An important fact is that most of these deleterious effects are reversible [1]. Direct economic costs for the health of obesity in Europe represent 2 to 8% of health expenditure and are therefore comparable to those of other diseases such as cancer [2].

Obesity has become a real problem of civilization. It is the extent of the disease that is being blamed today. The situation is so serious that in the United States, a recent study shows that alcohol, drugs or car accidents are now less of a threat to US life expectancy than obesity and overweight. The prevalence of obesity among children and young adults is increasing worldwide. 43 million children (including 35 million in developing countries) were considered overweight or obese; 92 million being at risk of overweight by WHO in 2010. 1.9 billion overweight and 600 million obese by WHO 2014. The United States is the country most affected by the epidemic: the prevalence of overweight in children are around 20%, and obesity 7%. France is in the European average, more than 10% of children aged 5 to 12 and 13.4% of adolescents [3,4]. In Algeria, the prevalence of obesity among children aged 6 to 11 in the 2010 - 2011 school year in the municipality of Oran is 13.1%; overweight alone affects 10% of children [5]; in Algiers, the study conducted in Bouzaréah in 2008, the overall prevalence of overweight (including obesity) among students aged 12 to 17 is 20% for WHO references [6].

Numerous data now show that, from childhood, obese people have a higher risk of morbidity and mortality for the rest of their lives. Early weight reduction is likely to reduce this risk, but not eliminate it, while the persistence of overweight increases it. Childhood obesity is therefore a long-term life-threatening illness and likely reduces quality of life in adulthood and median survival. In the United States, being overweight can lead to excess mortality of 20 to 40% and obesity increases the risk by a factor of 2 to 3 [1,7].

Childhood obesity is a predictor of adult obesity. Weight during childhood is a predictor of weight in adulthood; BMI at the age of 6 appears to be a predictor of BMI at 20 years of age. The probability of an obese child remaining in adulthood ranges from 20% to 50% before puberty to 50% to 70% after puberty. The likelihood of persistence of obesity increases with its severity, age, and family history; however, the majority of obese adults were not obese before puberty.

The increase in the prevalence of childhood obesity results mainly from changes in dietary behavior with the development of food intake between meals and high consumption of foods rich in sugars. part of the decrease in physical activity in favor of sedentary leisure activities (television, video games) [4,8,9].

This finding justifies more than ever the implementation of a useful prevention and the development of effective treatments. It is generally recognized that comprehensive and coordinated interventions that support and facilitate exercise and healthy eating as part of a social determinants of health approach are the best way to prevent childhood obesity. This prevention has shown its limits when it is exercised at the level of the general population, it should be limited to children at risk [5,7].

The percentage of therapeutic successes is between 20 and 30% for most teams, the best results being obtained in the smaller children and the most compliant to the treatment [10].

Individual or group management, focused on changes in the behavior and lifestyle of the family and/or child and adolescent, combined with dietary education and encouragement of physical activity allow a weight reduction. Medication and surgery are currently not recommended for the management of childhood and adolescent obesity [11].

The result is our study, which aims to take overweight and obese children, to achieve a healthy adult or at least with the least complications and a satisfactory BMI.

### Work Hypothesis

The management of overweight children and obesity centered on dietary education and encouragement of physical activity allows a reduction of fat and therefore complications related to this disease.

### Objectives

#### Main

To stabilize the weight of the child when the body mass index is > 85<sup>th</sup> percentile, to reduce it when the BMI is  $\geq$  99<sup>th</sup> percentile by modifying in a lasting way the behaviors of the child and his family vis-à-vis diet and lifestyle, including fighting sedentary lifestyle through regular physical activity.

#### Secondary

- Establish an etiological diagnosis of obesity.
- Screening and treatment of complications of obesity.
- Preserve the psychological balance of the child.

### Methodology

#### Patients

Cohort study of obese children aged 6 to 11 living in western cities, oriented by school health and pediatricians. An explanatory letter on the creation of a specialized consultation on childhood obesity at the Amilcar Cabral clinic (Oran pediatric ward "C" CHU) will be sent to all the department heads and to the head of the department. school hygiene.

Children diagnosed obese or overweight in consultation or at school will be guided with a simple letter.

Children diagnosed during a hospitalization will be referred with a medical report.

The diagnosis of the disease will be established on the calculation of the Body Mass Index (BMI) or BMI is calculated by the formula  $[\text{Weight}/\text{Height}^2]$  in  $\text{kg}/\text{m}^2$ . And reported on the BMI curve.

Children with a BMI > 85<sup>th</sup> percentile will be referred.

The criteria for inclusion of patients:

- Age: 6 to 11 years
- BMI > 85<sup>th</sup> percentile
- Parental consent

The criteria of non-inclusion: Parents' refusal to join the study.

#### Methods

**Place:** The A. Cabral clinic, at the diabetes-nutrition consultation.

**Equipment:** Material needed for anthropometric measurements.

Medical record, and growth charts and BMI.

**Sphygmomanometer:** The necessary for the blood samples for etiological diagnosis and gravity.

**Staff:** A nurse, a nutritionist, a psychologist, a resident in pediatrics, a pediatrician.

### The course of care

#### The 1<sup>st</sup> consultation J1

Explain the follow-up protocol to the parents and the child and sign the informed consent.

Ask the parents with the child's participation to draw up a dietary record, on which will be mentioned daily for 2 days of the week and 1 day of the weekend, the daily physical activity in minutes, and the detail of the feeding in quantity and in time.

To appreciate the degree of obesity: According to the World Health Organization (WHO):

- BMI  $\geq$  85<sup>th</sup> percentile: overweight
- BMI  $\geq$  97<sup>th</sup> percentile: moderate obesity
- BMI  $\geq$  99<sup>th</sup> percentile: severe obesity

### Look for risk factors

#### Analysis of weight and size curves

**Family History:** Parental obesity, history of non-insulin-dependent diabetes, history of cardiovascular disease the personal antecedents: the birth weight, the associated pathologies, the co-morbidity which corresponds to the pathologies associated with the obesity.

**Environmental Factors:** Socio-economic level, environment, geographical, family status, school environment.

**Physical Activity:** Lifestyle and sedentary lifestyle, structured physical activity, physical activity with the family.

#### The diet

The big mistakes (breakfast missing or insufficient, taste too much in quantity or number, nibbling between meals, regular consumption of sugary drinks, can be resumed at the table frequently.) Also noted eating disorders (bulimia, a compulsive tendency).

**Qualitative Errors:** Consumption of foods with high caloric density on a regular basis.

**The Child himself:** We have to find out if there is motivation, what are the reasons for his motivation; How is the child presented psychologically? Stress also plays a significant role in the development of obesity, even though few studies are devoted to it.

#### The complete clinical examination

Look for signs that point to syndromic or iatrogenic obesity, assess pubertal stage, waist circumference and skinfold.

Note the chronological age (expressed in years and months) from the date of the examination.

Reconstitute the growth curve. The weight, height and BMI of the day of the examination are plotted against the reference curves.

### Look for complications

#### Clinics

Dental caries, arterial hypertension, orthopedic abnormalities, superior femoral epiphysiolysis, axis defects (genu valgum appearance), spinal deformities (scoliosis, gibbosity).

#### Biological

Look for insulin-resistance and dyslipidemia by assaying the following parameters:

- Hb A1C
- HDL, VLDL, cholesterol

### Etiological diagnosis [12]

In the vast majority of cases, obesity is said “common”, resulting from the interaction of susceptibility genes with a risk environment. However, one must systematically look for arguments in favor of a secondary cause of obesity. Interrogation, curve analysis and oriented clinical examination make it easy to suspect secondary obesity. In the first place, the study of the growth curve makes it possible to evoke an endocrine or syndromic cause in the face of a slowdown or the absence of acceleration of contemporary growth in general of the installation of obesity. Uncommon obesities are either endocrine (hypothyroidism, GH deficiency, hypercriticism] or syndromic, monogenic (leptin or receptor gene mutation) or iatrogenic (drug intake).

Biological diagnosis by TSHus, FT4, urinary cortisol, stimulated GH assay, and genetic survey for syndromic obesity.

### Psychological interview

Assess the motivation of the child and his family.

To detect stress in the patient: Screen for anxiety, depression, low self-esteem and a low quality of life and refer the patient to mental health professionals as needed.

Retrieve the diet card to make a detailed analysis of the daily life of the child (diet and physical activity).

### The 2<sup>nd</sup> consultation J15

Specific treatment of children whose obesity is of endocrine origin.

Initiate the therapeutic management of other types of obesity according to the risk factors collected at the 1<sup>st</sup> and 2<sup>nd</sup> consultations

### Treat obesity

Most of the treatment of childhood obesity is based on dietary management, the other means used being only complementary.

#### Food

Children must receive sufficient contributions to cover the needs necessary for their growth. The dietary treatment of childhood obesity is based not so much on caloric restriction as on the restoration of a balanced and correctly distributed diet on the nycthemeron.

Normocaloric intake for age if spontaneous intakes were very high.

The daily distribution of meals must be harmonious; in practice, this means increasing calorie consumption during breakfast, reducing ingesta at the end of the day and limiting it to 4 meals a day, that is to say, abolishing snacking. The distribution of nutrients must be balanced for each meal and slightly hyperprotein (16 to 18% of proteins). Lightened products and sweeteners (aspartame) should be avoided because one of the goals of the diet is to rehabilitate the taste of the child and in particular the deshabitué sweet taste, while these products would rather tend to perpetuate his bad habits. It is important to note that these dietary advices should be present not as dieting, but as examples of a normal diet to gradually adopt and to continue the whole life. This is a real food rehabilitation.

The behavior of families must also be assessed, especially in the difficult case where other siblings have a normal weight and therefore do not justify any particular dietary restrictions [13].

### Psychology [14]

To improve the well-being of obese children, recommendations from the Canadian Pediatric Society (CPS) have been followed:

- Counsel children and families about their practices, so that they accumulate the amount of daily physical activity recommended and limit their sedentary behavior.
- Explore psychosocial issues when giving advice to overweight patients and their families.

Focus on motivational interviewing to help families adopt and maintain lifestyle changes, including:

- Encourage all caregivers to attend orientation sessions.
- Identify sources of stress in the patient's family and make referrals to mental health professionals as needed, either when providing lifestyle counseling or before.
- Detect stress in the patient, screen for anxiety, depression, low self-esteem and reduced quality of life, and refer the patient to mental health professionals as needed.
- To identify patients who are being bullied and recommend appropriate resources and supports.

### Physical activity

Physical activity is indicated at all stages of childhood obesity management, with a high level of scientific evidence.

The recommended sports are endurance sports (walking, cycling, swimming) or sports that enhance the physical appearance of the young obese (judo). Should be avoided sports involving risk of plantar shock in these vulnerable subjects (tennis, basketball). The ideal duration devoted to the sport would be 3 hours per week [13].

To promote weight loss, it is strongly recommended that children have a regular sport activity. This poses problems. Injuries are more common in this area. Physical activity in these children requires a lot of energy and overloads the musculoskeletal system. This explains the increased frequency of micro traumatic lesions of epiphyseal growth cartilages: Osgood Schlatter disease at the anterior tibial tuberosity, or Sever at the large calcaneal process. The pain of mechanical type, awakened by the precise palpation of the affected area is sufficient to make the diagnosis. The treatment is based on the reduction of sports activities, which is not desirable in this area. Children should be told that there is no particular risk of continuing these activities, but that the pain is directly proportional to these activities. Propose analgesics, local anti-inflammatories, small means (shock absorbing soles in Sever's disease) to help them [15].

The following consultations every 3 months:

- Anthropometric assessment, BMI
- Physical examination
- +/- Balance sheet
- Nutritional education
- Psychological evaluation if particular profile at the beginning
- Evaluation of dietetics and physical activity on the reduction of BMI.

The main outcome measure is BMI

Exit study criteria:

BMI  $\leq$  85<sup>th</sup> percentile

**Non-adherence to the study**

- Duration of study: 24 months
- Implementation of the project, supplies, beginning of inclusion in the study: October 2014.
- End of the study: October 2016.
- Data exploitation and results: April 2017.

**Expected results**

A reduction or stabilization of BMI.

**Results**

- The patients followed 132 in number.
- 60 cases meet the inclusion criteria.
- Exploitation of data from these 60 folders gives the following information: Sex ratio = 0.66
- Psychological problem detected in 26 cases. Regularly followed by the psychologist.
- Severe BMI in 80%
- The motivation to reduce BMI was found in all children.

Factors	%
Separated Parents	5
Death of one of the parents	3,33
Adopted child	1,66
Psychological problem	43,33
Family history (HTA, obesity, hypercholesterolemia, diabetes...)	63,33
<b>Birth weight</b>	
Macrosomia	11,66
Stunting	5
normal	48,33
Indeterminate	35
<b>Fat rebound</b>	
Early	11,66
normal	5
Indeterminate	83
<b>Dietary</b>	
Snacking/hypercaloric Diet,	45
Bulimia	25
Sedentary lifestyle	46
<b>Personal history and associated illnesses</b>	
Asthma	13,33
Neuro, epilepsy, seizure of Depakine	13,33
Corticotherapy	1,66

**Table 1:** Offending factors in the etiologies of obesity.

Other related diseases that are not related to obesity:

- Enuresis in 4 cases.
- Respiratory/skin allergy in 3 cases.
- Rheumatic carditis in 2 cases.

Complications	%
HTA	8,33
Apnea/Bulge	5
Insulin resistance	5
HDL cholesterol bas	3,33
T2D in 1 case	1,66

**Table 2:** Complications.

Common obesity in the majority of cases; suspicion of syndrome in 5 cases, iatrogenic by long-term corticotherapy treatment in 1 case.

The regular follow up to date at 13.33%, lost after 3 months to 41%, after 6 months to 28.33%, after 12 months to 16.66%.

Stable BMI curve at 3%, Aggravated at 16%, yoyo effect at 10%, improved at 30%.

### Discussion

The objectives of the follow-up have been well explained with a systematic psychological interview. The children disappear at the end of the 2nd meeting of dietary education in 41%. Parents at the first consultation are waiting for a miraculous treatment that causes them to lose weight quickly, which may be the cause of non-adherence to follow-up. All the patients lost sight of call by telephone and/or postal mail were not introduced.

Long-term outcomes for children who are followed regularly are unpredictable.

The percentage of very poor therapeutic successes is between 20 and 30% for most teams, the best results being obtained in the smaller children and most complaints to the treatment.

Most teams advocate group therapy after failure of a well-conducted individual therapy for 2 years, would it be possible to start from the beginning with group therapy to decrease the rate of lost sight and strengthen the adherence to education?

### Conclusion

The management of obese children is difficult, it is necessary to introduce preventive measures at a young age by the health organizations and to apply the program of WHO whose booklet was published in 2016.

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