

## Interdisciplinary overweight outpatient management in pediatrics

Sara Moline<sup>a</sup>, Julie Fudvoye<sup>a</sup>, Anne-Simone Parent<sup>a</sup>, Charline Waxweiler<sup>b</sup>, Anne-Cécile Dewandre<sup>a</sup>, Céline Lagasse<sup>c</sup>, Marie-Christine Seghaye<sup>a</sup>, Marie-Christine Lebrethon<sup>a</sup>

<sup>a</sup>Pediatric department, University Hospital of Liège, Liège, Belgium

<sup>b</sup>Clinical Psychology department and Pediatric department, University Hospital of Liège, Liège, Belgium

<sup>c</sup>Dietetics department, University Hospital of Liège, Liège, Belgium

sara.moline@student.uliege.be

### Keywords

pediatric, obesity, interdisciplinarity

### Abstract

Childhood obesity is a major health concern around the world and requires a multidisciplinary approach with medical evaluation, diet evaluation, physical activity and sedentary evaluation and psychologist evaluation. However, this management is challenging and shows limited success.

It is therefore essential to include parents or the larger family structure in the interventions programs, to consider the impact on the quality of life, to manage the manner in which overweight children perceive their own weight and to fight against weight stigma.

In this article, we present the interdisciplinary overweight outpatient management set up in our overweight patient's clinic, based on an approach from a health-centered rather than a weight-centered perspective.

### Introduction

Childhood obesity represents a major concern worldwide (1). Its management is a challenge for all teams in charge of this population including children and their family. Such interventions have shown only limited success (2). The management involves a medical and genetic evaluation in order to identify causes and complications of this disease (3). However, this affection results from multifactorial obesogenic factors (4). Clinicians must consider the short term risk of physical and psychological complications and the long term risk for the patient to remain adults with obesity with lifestyle-related morbidity and mortality (5). Most studies and guidelines recommend to focus treatment on physical activity (PA), diet and behavioral change to promote a decrease in body mass index (BMI) (3,6-10). It also seems important that the first step is to understand the pathway leading to obesity and the family involvement in physical activity and dietary behaviors (11). This management needs to adapt strategies and take the patient age into account since advice will be different from toddlers to teenagers. The team will need to know the key reasons for parents and children/teenagers to come to the overweight clinic and participate to an intervention program avoiding the risk of attrition (12-14). So the management of overweight patients requires a multidisciplinary approach with diet evaluation, physical activity and sedentary behavior evaluation and psychological evaluation. In children and at the beginning of puberty, BMI may decrease with maintaining weight as linear growth proceeds and lifestyle modification may reduce fat mass, increase lean mass and improve cardiovascular fitness. However, most intervention programs have been found ineffective (3,15). This may be due to targeting children only without involving parents or the larger family structure, or to focusing only on weight reduction. Such programs do not take into account the improvement in quality of life (3,15). Programs also often fail to address overweight children perception of their own weight (3). Weight stigma is an additional phenomenon that can affect youth with overweight and lead to harmful behavioral and psychological effects with a decrease in their overall quality of life. Sources of stigma may come from peers, family, educators and media as well as healthcare professionals (16). The term "obesity" is an emotionally charged word for most children and adolescents and it would be preferable to use the term "overweight" in clinical practice (7).

### Overweight, physical activity and sedentary behavior

Children who are overweight often lack motivation in sports in general. They often suffer rejection by their peers due to the lack of skills or pain (17). However,

exercise is a safe activity in children/teenagers and recommendations include at least 60 minutes per day of moderate to vigorous intensity physical activity (MVPA) with an emphasis on aerobic types of exercises (walking, bicycling, swimming, etc) as well as strengthening exercises at least 3 days a week (18). For children less than 5 years old, at least 180 minutes of any physical activity at any intensity throughout the day is recommended (19). Physical activity is any bodily movement produced by contraction of skeletal muscles that results in energy expenditure above resting levels. Moderate exercise allows talking but not singing and vigorous exercise makes it impossible to sing and difficult to talk. In exercise physiology terms, expended energy (EE) should correspond to at least 3 metabolic equivalents tasks (MET) with a MET representing EE for a subject at rest, sitting. Physical fitness is the ability to carry out daily tasks with vigor and alertness without inducing fatigue and with ample energy to enjoy leisure-time and unforeseen circumstances. Sedentary behavior is defined as any waking behaviors characterized by an energy expenditure (EE) equal or lower than 1.5 MET.

Meta-analysis of randomized trials, suggest that exercise intervention for adolescents with overweight or obesity improves body composition, particularly by lowering body fat with moderate improvements in HOMA-IR (homeostatic model assessment for insulin resistance) and systolic blood pressure but these late findings should be interpreted with caution since methodological heterogeneity is high (20). It has also been suggested that aerobic exercise and combined aerobic exercise and strength training are associated with reduction in BMI z-score in overweight children and adolescents with improvement of adiposity outcomes such as fat mass and percent body fat. However, the overlapping 95% prediction intervals across treatments suggests that some participants would benefit while others would not (21). Exercise is also important for overall physiological health. In addition to improving metabolic profile in children, exercise has been linked to improvement in cognitive function, concentration and self-confidence as well as better socialization (3 22).

Intervention strategies also need to target sedentary behaviors. TV watching for more than 1 hour per day in young children has been associated with a high consumption of fast foods, sweets, chips and pizza and lower consumption of fruits and vegetables (23).

In our overweight outpatient clinic, we aim at helping children and their families to gradually and safely increase physical activity (favoring activities such as swiss

ball, swimming, bicycle and walking) and limit sedentary behavior. Physical activity is not limited to sport, it is important to adapt it to everyone's abilities, needs and desire so that children acquire a taste for it and feel comfortable in practicing. Daily physical activity should be as varied as possible and reach 60 minutes every day. That can be obtained by accumulating short durations over the day: walking or biking to school or getting off the bus one stop earlier, gardening, walking up the stairs, going shopping on foot, walking the dog, playing outside. The pleasure of practicing is the condition for sustainability of the commitment to an active life style.

In summary, physical activity and reduction of sedentary behavior can achieve and maintain weight loss, but with better result in combination with nutritional advice (3,6,8).

### Overweight and nutritional advice

Eating behavior is under the control of the homeostatic or metabolic system (hormonal signals) and hedonic system (external sensory information processing, reward processing, cognition and executive function). The integration of those central and peripheral signals depends on individual genetic/epigenetic predispositions (24). Food marketing targets children/adolescent via a variety of media and food products most commonly advertised are candy, snacks, cereal and soft drinks which are obesogenic (11,25). In our society, hedonic food intake has taken an important position explained by the rewarding properties of food (4). Likewise, many children are exposed to food as a reward for "good" behavior, strengthening the hedonic system. In European adolescents, emotion-driven impulsiveness is related to the type of snacking (sweet and fatty) and not to the energy intake of the food itself (26).

So assessment begins with an understanding of the child and family's dietary pattern before any modifications are proposed. The family needs to learn to define snack periods rather than something used to combat "boredom" and identify emotional hunger. Parents and children will learn the mechanisms of food preference and dislike. Repeated exposure to a variety of food and flavor facilitates a varied diet (27).

Diet needs to be adapted to meet specific needs at each period of growth. Counseling and recommendations must be made within the context of the family's culture, living environment and socioeconomic status (13).

So the main goal is to encourage healthy eating behavior using food pyramid, food plate, food energy density, the importance of macro and micronutrients, nutritional composition of food and drink, control of portion size, strategies for eating out, preparation of healthy food and feeding frequency. Advice will need to be personalized. Family meals appear to play an important role in promoting positive dietary intake among children. Nutritional education will focus on fruit and vegetable intake, healthy snacks, reducing intake of sugar-sweetened beverages and/or fat and portions sizes.

In our overweight outpatient clinic, the dietician, based on what the family has explained, will try to target dietary errors and guide the patient and his family toward more appropriate choices. This is always discussed with the young and his family to hope that the proposals will be better accepted and maintained over time. Each case is unique, but all children and adolescents will be informed of the goals to be achieved on the basis of the food pyramid during these consultations. Nothing is forbidden, but some food is often consumed in excess by young people (sugary drinks, sweets, meat ...) and others in insufficient quantities (water, vegetables, fruits ...). It is useful to evaluate their current knowledge and what can be improved. Regular follow-up is offered to them to discuss what has been put in place at home, but also about the possible difficulties encountered in order to help them maintain their efforts in changing eating habit.

### Overweight, psychological past and support

Self-esteem and body image are lower in children and adolescents with obesity compared with healthy weight peers (28). A recent meta-analysis shows that pediatric obesity treatment with both dietary and physical activity components improves self-esteem and body image in the short and medium term (28). Improvement in weight-related outcome appears important to achieve improvement in weight-loss but not self-esteem. However, a very interesting paper has recently proposed a self-regulation failure hypothesis based on a dual process model perspective. According to this model, underlying mechanisms of impulsivity in childhood obesity explain that the weight lost during treatment is

often regained subsequently. Thus in order to obtain better long term results, it is important to support the child with a regular psychological follow-up.

Overweight should be considered as a consequence, a symptom of a complex history of life events, familial interaction or socio-cultural backgrounds. More than a simple nutritional or behavioral rehabilitation, the psychologist in our overweight outpatient clinic works on management of some risk factors such as relation with peers, the question of the body and self-image, emotional experience,... Thus, psychological consultation is a space for development and introspection, to explore and use resources, to consider the food problem as a symptom.

### Overweight and parental support

Parents play a critical role in helping children to become well-adjusted adults (23). Parents can influence their children's dietary practices, physical activity, sedentary habits and body satisfaction by controlling availability and accessibility to foods, meal structure, food socialization practices and food-related parenting style.

However, some studies show that 48% of the parents incorrectly classify their child's weight and underestimate their child's weight status (29). Thus, it is essential for prevention and treatment that health care professionals help parents at high risk of misperception to correctly evaluate their child's weight status.

For example, the availability of soft drinks during meals and negative parental role modeling are important predictors for intake of sweet and fat foods in children from European country (30). Our obesogenic environment idealizes thinness and stigmatizes fatness, but paradoxically encourages excessive food intake, sedentary time and reduced physical activity (23). Therefore, parents should understand the interplay between genetic, environmental, and familial influences in disease expression.

Family-based interventions emphasizing reasonable and coordinated goals for both parents and children and incorporating positive reinforcement and tools to facilitate behavior change and increase problem solving capabilities appear most likely to succeed.

### Conclusion

Interdisciplinary outpatient overweight management has been described in the literature for several years even though the results in terms of weight loss are not always satisfactory. Although there is still no clear treatment strategy, it is important that the team develops interpersonal skills needed to work with children and parents and influence their behavior.

Effective interventions for prevention and treatment of weight-related problems should be approached using a health-centered rather than a weight-centered perspective. The management of overweight patients requires a regular multidisciplinary approach with diet evaluation, physical activity and sedentary behavior evaluation and psychologist evaluation. It is also essential to take the socio-family environment into account to improve long-term results.

#### REFERENCES:

1. NCD Risk Factor Collaboration. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128•9 million children, adolescents, and adults. *Lancet*. 2017 Dec 16; 390 (10113): 2627–42.
2. Wehrauch-Blüher S, Wiegand S. Risk Factors and Implications of Childhood Obesity. *Curr Obes Rep*. 2018 Dec; 7 (4): 254–259.
3. Styne DM, Arslanian SA, Connor EL, Farooqi IS, Murad MH, Silverstein JH, et al. Pediatric Obesity-Assessment, Treatment, and Prevention: An Endocrine Society Clinical Practice Guideline. *J Clin Endocr Metab*. 2017 Mar 1; 102 (3): 709–757.
4. van der Klaauw AA, Farooqi IS. The Hunger Genes: Pathways to Obesity. *Cell*. 2015 Mar 26; 161 (1): 119-132.
5. Bjerregaard LG, Jensen BW, Ångquist L, Osler M, Sørensen TIA, Baker JL. Change in Overweight from Childhood to Early Adulthood and Risk of Type 2 Diabetes. *N Engl J Med*. 2018 Apr 5; 378 (14): 1302-12.
6. Ellis LJ, Rees K, Brown T, Mead E, Al-Khudairy L, Azevedo L, et al. Interventions for treating children and adolescents with overweight and obesity: an overview of Cochrane reviews. *Int J Obesity*. 2018 Nov; 42 (11): 1823–1833.
7. Güngör NK. Overweight and Obesity in Children and Adolescents. *J Clin Res Pediatr Endocrinol*. 2014 Sep; 6 (3): 129-143.

8. Boff RM, Liboni RPA, Batista IPA, de Souza LH, Oliveira MDS. Weight loss interventions for overweight and obese adolescents: a systematic review. *Eat Weight Disord.* 2017 Jun; 22 (2): 211–229.
9. Weilhrauch-Blüher S, Kromeyer-Hauschild K, Graf C, Widhalm K, Korsten-Reck U, Jödickeg B, et al. Current Guidelines for Obesity Prevention in Childhood and Adolescence. *Obes Facts.* 2018; 11 (3): 263–276.
10. Valerio G, Maffei C, Saggese G, Ambruzzi MA, Balsamo A, Bellone S, et al. Diagnosis, treatment and prevention of pediatric obesity: consensus position statement of the Italian Society for Pediatric Endocrinology and Diabetology and the Italian Society of Pediatrics. *Ital J Pediatr.* 2018 Jul 31; 44 (1): 88.
11. Stein D, Weinberger-Litman SL, Latzer Y. Psychosocial perspectives and the issue of prevention in childhood obesity. *Front Public Health.* 2014 Jul 31; 2: 104.
12. Cuda SE, Censani M. Pediatric Obesity Algorithm: A Practical Approach to Obesity Diagnosis and Management. *Front Pediatr.* 2019 Jan 23; 6: 431.
13. Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, et al. Overweight in Children and Adolescents Pathophysiology, Consequences, Prevention, and Treatment. *Circulation.* 2005 Apr 19; 111 (15): 1999-2012.
14. Cote MP, Byczkowski T, Kotagal U, Kirk S, Zeller M, Daniels S. Service quality and attrition: an examination of a pediatric obesity program. *Int J Qual Health Care.* 2004 Apr; 16 (2): 165–173.
15. Carlone Baldino Garcia N, Lopes WA, Locateli JC, Ferraz Simões C, de Oliveira GH, de Souza Mendes VH, et al. Multidisciplinary obesity treatment program improved health-related quality of life and positively correlated with anthropometric and body composition but not with cardiorespiratory fitness parameters in adolescents. *Qual Life Res.* 2019 Jul; 28 (7): 1803–1812.
16. Palad CJ, Yarlagadda S, Stanford FC. Weight stigma and its impact on paediatric care. *Curr Opin Endocrinol Diabetes Obes.* 2019 Feb; 26(1): 19–24.
17. Sánchez-López AM, Menor-Rodríguez MJ, Sánchez-García JC, Aguilar-Cordero MJ. Play as a Method to Reduce Overweight and Obesity in Children: An RCT. *Int J Environ Res Public Health.* 2020 Jan 3; 17 (1): 346.
18. Piercy KL, Troiano RP, Ballard RM, Carlson SA, Fulton JE, Galuska DA, et al. The Physical Activity Guidelines for Americans. *JAMA.* 2018 Nov 20; 320 (19): 2020-2028.
19. Juana Willumsen ML, Bull F. Development of WHO Guidelines on Physical Activity, Sedentary Behavior, and Sleep for Children Less Than 5 Years of Age. *J Phys Act Health.* 2020 Jan 1; 17 (1): 96-100.
20. Stoner L, Rowlands D, Morrison A, Credeur D, Hamlin M, Gaffney K, et al. Efficacy of Exercise Intervention for Weight Loss in Overweight and Obese Adolescents: Meta-Analysis and Implications. *Sports Med.* 2016 Nov; 46 (11): 1737-1751.
21. Kelley GA, Kelley KS, Pate RR. Exercise and adiposity in overweight and obese children and adolescents: a systematic review with network meta-analysis of randomised trials. *BMJ Open.* 2019 Nov 11; 9.
22. Brambilla P, Pozzobon G, Pietrobelli A. Physical activity as the main therapeutic tool for metabolic syndrome in childhood. *Int J Obes.* 2011 Jan; 35 (1): 16-28.
23. Golan M, Crow S. Parents Are Key Players in the Prevention and Treatment of Weight-related Problems. *Nutr Rev.* 2004 Jan; 62 (1): 39-50.
24. Berthoud HR. Metabolic and hedonic drives in the neural control of appetite: who is the boss? *Curr Opin Neurobiol.* 2011 Dec; 21 (6): 888–896.
25. Liberali R, Kupek E, de Assis MMA. Dietary Patterns and Childhood Obesity Risk: A Systematic Review. *Child Obes.* 2020 Mar; 16 (2): 70-85.
26. Coumans MJM, Danner UN, Intemann T, De Decker A, Hadjigeorgiou C, Hunsberger M, et al, on behalf of the I.Family Consortium. Emotion-driven impulsiveness and snack food consumption of European adolescents: Results from the I.Family study. *Appetite.* 2018 Apr 1; 123: 152-159.
27. Ventura AK, Worobey J. Early Influences on the Development of Food Review Preferences. *Curr Biol.* 2013 May 6; 23 (9): R401-408.
28. Gow ML, Tee MSY, Garnett SP, Baur LA, Aldwell K, Thomas S, et al. Pediatric obesity treatment, self-esteem, and body image: A systematic review with meta-analysis. *Pediatr Obes.* 2020 Mar; 15 (3): e12600.
29. Warkentin S, Mais LA, Latorre MDRDO, Carnell S, Taddei JAAC. Factors associated with parental underestimation of child's weight status. *J Pediatr.* 2018 Mar-Apr; 94 (2): 162-169.
30. Hebestreit A, Intemann T, Siani A, De Henauw S, Eiben G, Kourides YA et al. Dietary Patterns of European Children and Their Parents in Association with Family Food Environment: Results from the I.Family Study. *Nutrients.* 2017 Feb; 9 (2):126