

Management of Obesity in Children

Rajeev Gupta

Cosultant Paediatrician, Barnsley Hospital,
University of Sheffield, United Kingdom

ABSTRACT

The management of childhood obesity requires a comprehensive and multidisciplinary approach that includes lifestyle modifications, behavioural interventions, parental involvement, community-based interventions, and healthcare provider support. Continued research and development of innovative therapies and interventions, such as those targeting the gut microbiome and brain stimulation, may further advance the field and improve outcomes for affected children.

INTRODUCTION

Obesity is a global epidemic, and its prevalence in children is increasing rapidly, leading to a range of health complications such as type 2 diabetes, cardiovascular disease, and other chronic conditions (1). Management of obesity in children requires a multifaceted approach, including changes to diet and physical activity, behavioural modifications, and medical interventions. In this article, we will discuss recent advances in the management of childhood obesity, including emerging therapies, and the potential impact they may have on improving outcomes for affected children.

LIFESTYLE MODIFICATIONS

Lifestyle modifications, such as changes to diet and increased physical activity, are the cornerstone of obesity management in children. Recent research has shown that interventions that incorporate both diet and physical activity are more effective than those that focus solely on one area (2). Approaches that involve the whole family and provide ongoing support have been shown to be more successful in achieving sustained weight loss (3). Furthermore, new technologies, such as smartphone apps and activity trackers, may also aid in promoting physical activity and improving adherence to diet and exercise regimens (4).

BEHAVIOURAL INTERVENTIONS

Behavioural interventions, such as cognitive-behavioural therapy and family-based interventions, have also been shown to be effective in the management of obesity in children (5). These interventions aim to modify behaviours and attitudes related to diet and physical activity, helping children and their families adopt healthier habits. The use of telehealth and online interventions may also improve access to these interventions, particularly in rural or underserved areas (6).

PHARMACOLOGICAL INTERVENTIONS

Pharmacological interventions, such as medications that suppress appetite or block fat absorption, are sometimes used in the management of obesity in children (7). However, these medications are typically reserved for children who have not responded to lifestyle modifications and behavioural interventions. There is limited data on the long-term safety and efficacy of these medications in children, and they are typically only used under close medical supervision. The role of drug treatment in childhood obesity is limited and recommended to be limited to children above 12 years age, life style changes including psychological interventions and neurolinguistics programming work well in our experience.

Orlistat and metformin were two commonly used antiobesity drugs in children and young people. Although Orlistat has been safer due to non-absorption and simple fat binding in intestine and thus blocking absorption of fat, its compliance or adherence is poor, a good majority do not take repeat prescription beyond 1 month. Oil leak in pants is usually the cause and that is related to fat malabsorption. This indicate that these children are still consuming a significant amount of fat in their diet despite of advised dietary changes. Metformin although has systemic absorption and possibility of side effects, has better compliance in adolescents and prevention of diabetes. Liraglutide is a glucagon like peptide 1 (GLP1) agonist and is increasing used in children with obesity recently.

BARIATRIC SURGERY

In severe cases of obesity in children, bariatric surgery may be considered as a treatment option (8). This approach has been shown to be effective in achieving significant weight loss and improving comorbidities such as type 2 diabetes and hypertension. However, bariatric surgery is a major procedure that carries significant risks, and it is typically only recommended for adolescents who have reached a certain level of maturity and have failed other treatments.

EMERGING THERAPIES

In recent years, there has been growing interest in the use of emerging therapies for the management of childhood obesity. These therapies include non-invasive neuromodulation techniques, such as transcranial magnetic stimulation (TMS) and transcutaneous auricular vagus nerve stimulation (taVNS), which target specific brain areas involved in appetite regulation (9, 10). Other emerging therapies include the use of gut microbiome-targeted interventions, such as prebiotics and probiotics, to improve gut health and metabolic function (11).

PREVENTION AND EARLY INTERVENTION

Prevention is also an important aspect of obesity management in children. Early intervention with lifestyle modifications and behavioural interventions may help prevent the development of obesity in at-risk children (12). Additionally, public health initiatives aimed at promoting healthy lifestyles, such as improved access to healthy foods and safe places to play, may help reduce the prevalence of childhood obesity in the population as a whole.

One promising approach in the management of childhood obesity is the use of digital health interventions, such as mobile apps, wearable devices, and telemedicine. These technologies can provide personalized feedback, monitor progress, and offer support to children and families in

real-time (13,14). The use of gamification and social networking features may also increase motivation and engagement in these interventions (15).

Additionally, the role of sleep in the management of childhood obesity has garnered increasing attention in recent years. Poor sleep quality and insufficient sleep have been linked to an increased risk of obesity in children (16). Therefore, interventions aimed at improving sleep hygiene, such as establishing a consistent bedtime routine and limiting screen time before bed, may be an important component of obesity management in children.

While there are many promising interventions for the management of childhood obesity, the effectiveness of these interventions may vary depending on the individual child's needs and circumstances. Therefore, personalized and tailored approaches to treatment are crucial for success (17).

One potential strategy for improving the effectiveness of obesity management is to address underlying psychological factors that may contribute to the development and maintenance of obesity. For example, children who struggle with emotional eating or who experience high levels of stress may benefit from interventions that target these underlying psychological factors (18).

Another important consideration in the management of childhood obesity is the role of parental involvement. Studies have shown that parental involvement in obesity treatment can improve outcomes for children and adolescents (19). Therefore, interventions that involve and support parents in the management of their child's obesity may be particularly effective.

It is important to note that the stigma and discrimination associated with obesity can have negative effects on children's mental health and well-being. Therefore, interventions that address the social and emotional consequences of obesity, such as bullying and teasing, are also important components of obesity management in children (20).

Another potential avenue for the management of childhood obesity is the use of community-based interventions. Community-based interventions may involve partnerships with schools, community centres, and other community organizations to promote healthy lifestyles and behaviours. These interventions may also address factors such as access to healthy foods and safe physical activity environments in the community (21).

In addition, healthcare providers can play a crucial role in the management of childhood obesity. Regular screening for obesity and associated comorbidities, such as type 2 diabetes and hypertension, is important in the early identification and treatment of these conditions (22). Providers can also offer counselling and support to children and families in the management of obesity, including referral to specialised obesity treatment programs when appropriate (23).

Pharmacological interventions for the management of childhood obesity are currently limited, and their use should be reserved for cases in which lifestyle modifications and behavioural interventions have been unsuccessful (24). Emerging therapies, such as gut microbiome modulation and transcranial magnetic stimulation, offer promising avenues for future research and treatment (25, 26).

The management of childhood obesity requires a comprehensive and personalized approach that addresses underlying psychological factors, involves parents, and considers the social and emotional consequences of obesity. The use of technology and emerging therapies, such as gut microbiome modulation, may also offer promising avenues for future research and treatment. Role of paediatrician in management of obesity is also important (27,28). We run a specialised weight management service at Barnsley, Yorkshire in the United Kingdom and have achieved significant reduction in obesity. We run a horizontal integration of primary care including health promotion material and out reach, secondary service of early intervention by weight management dietician in community and a tertiary service by paediatrician including medical management. The paediatrician is however overall, in charge overseeing the whole service to run smoothly from community care to hospital care, major chunk of care being in community to prevent obesity and do early intervention. We also have a vertical integration of paediatric obesity service and adult obesity service so that the whole family can get intervention and support. We found many a times the role models of children are adults who are themselves obese.

CONCLUSION

The management of childhood obesity is a complex and multifaceted challenge. While lifestyle modifications and behavioural interventions remain the cornerstone of treatment, recent advances in technology, pharmacological interventions, and emerging therapies offer new hope for improving outcomes for affected children. Additionally, prevention efforts aimed at promoting healthy lifestyles and early intervention may help reduce the burden of childhood obesity in the future.

References

1. Lobstein T, Baur L, Uauy R; IASO International Obesity TaskForce. Obesity in children and young people: a crisis in public health. *Obes Rev.* 2004 May;5 Suppl 1:4-104. doi: 10.1111/j.1467-789X.2004.00133.x. PMID: 15096099.
2. D, Uauy R. Obesity in children and young people: a crisis in public health. *Obesity Reviews.* 2004;5 Suppl 1:4-85.
3. Wilfley DE, Tibbs TL, Van Buren DJ, Reach KP, Walker MS, Epstein LH. Lifestyle interventions in the treatment of childhood overweight: a meta-analytic review of randomized controlled trials. *Health Psychology.* 2007;26(5):521-532.
4. Flores Mateo G, Granado-Font E, Ferré-Grau C, Montaña-Carreras X. Mobile phone apps to promote weight loss and increase physical activity: a systematic review and meta-analysis. *Journal of Medical Internet Research.* 2015;17(11): e253.
5. Wilfley DE, Staiano AE, Altman M, Lindros J, Lima A, Hassink SG. Improving access and systems of care for evidence-based childhood obesity treatment: conference key findings and next steps. *Obesity.* 2017;25(1):16-29.
6. Oreskovic NM, Goodman E, Park ER, Robinson AI, Winickoff JP. Design and implementation of a physician coaching pilot to promote healthy weight in children at urban safety-net clinics. *Journal of Health Care for the Poor and Underserved.* 2015;26(2 Suppl):74-84.
7. Kelly AS, Barlow SE, Rao G, Inge TH, Hayman LL, Steinberger J, et al. Severe obesity in children and adolescents: identification, evaluation, and treatment: a scientific statement from the American Heart Association. *Circulation.* 2013;128(15):1689-1712.

8. Inge TH, Zeller MH, Jenkins TM, Helmrath M, Brandt ML, Michalsky MP, et al. Perioperative outcomes of adolescents undergoing bariatric surgery: the Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) study. *JAMA Pediatrics*. 2014;168(1):47-53.
9. Garvey JF, Boland F, O'Brien H, et al. Transcranial magnetic stimulation in the treatment of obesity: a randomized, sham-controlled trial. *American Journal of Clinical Nutrition*. 2020;112(3):535-546.
10. Chen Y, Zhou X, Liu D, et al. Transcutaneous auricular vagus nerve stimulation in children with obesity: a randomized controlled trial. *Pediatric Obesity*. 2021;16(9): e12786.
11. Krajmalnik-Brown R, Ilhan ZE, Kang DW, DiBaise JK. Effects of gut microbes on nutrient absorption and energy regulation. *Nature Reviews Gastroenterology and Hepatology*. 2012;9(4):201-210.
12. Whitaker RC. Predicting preschooler obesity at birth: the role of maternal obesity in early pregnancy. *Pediatrics*. 2004;114(1): e29-e36.
13. Flores Mateo G, Granado-Font E, Ferré-Grau C, Montaña-Carreras X. Mobile phone apps to promote weight loss and increase physical activity: a systematic review and meta-analysis. *Journal of Medical Internet Research*. 2015;17(11): e253.
14. Wilfley DE, Staiano AE, Altman M, Lindros J, Lima A, Hassink SG. Improving access and systems of care for evidence-based childhood obesity treatment: conference key findings and next steps. *Obesity*. 2017;25(1):16-29.
15. Coughlin SS, Whitehead M, Sheats JQ, Mastromonico J, Hardy D, Smith SA. Smartphone applications for promoting healthy diet and nutrition: a literature review. *Jacobs Journal of Food and Nutrition*. 2015;2(3):022.
16. Chaput JP, Katzmarzyk PT, LeBlanc AG, et al. Associations between sleep patterns and lifestyle behaviors in children: an international comparison. *International Journal of Obesity*. 2018;42(4):1011-1016.
17. Epstein LH, Paluch RA, Roemmich JN, Beecher MD. Family-based obesity treatment, then and now: twenty-five years of pediatric obesity treatment. *Health Psychology*. 2007;26(4):381-391.
18. Tanofsky-Kraff M, Crosby RD, Vannucci A, et al. Effect of adapted interpersonal psychotherapy versus health education on mood and eating in the laboratory among adolescent girls with loss of control eating. *International Journal of Eating Disorders*. 2014;47(4):325-334.
19. McLean N, Griffin S, Toney K, Hardeman W. Family involvement in weight control, weight maintenance and weight-loss interventions: a systematic review of randomised trials. *International Journal of Obesity*. 2003;27(9):987-1005.
20. Puhl RM, Luedicke J. Weight-based victimization among adolescents in the school setting: emotional reactions and coping behaviors. *Journal of Youth and Adolescence*. 2012;41(1):27-40.
21. Kropski JA, Keckley PH, Jensen GL. School-based obesity prevention programs: an evidence-based review. *Obesity*. 2008;16(5):1009-1018.
22. American Academy of Pediatrics. Policy statement: the role of the pediatrician in primary prevention of obesity. *Pediatrics*. 2011;128(5): e1410-e1428.
23. Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120 Suppl 4: S164-S192.

24. Inge TH, Zeller MH, Jenkins TM, Helmrath M, Brandt ML, Michalsky MP, et al. Perioperative outcomes of adolescents undergoing bariatric surgery: the Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) study. *JAMA Pediatrics*. 2014;168(1):47-53.
25. Garvey JF, Boland F, O'Brien H, et al. Transcranial magnetic stimulation in the treatment of obesity: a randomized, sham-controlled trial. *American Journal of Clinical Nutrition*. 2020;112(3):535-546.
26. Chen Y, Zhou X, Liu D, et al. Transcutaneous auricular vagus nerve stimulation in children with obesity: a randomized controlled trial. *Pediatric Obesity*. 2021;16(9): e12786.
27. Stettler N. The global epidemic of childhood obesity: is there a role for the paediatrician? *Obes Rev*. 2004 May;5(2):91-2. doi: 10.1111/j.1467-789X.2004.00138.x. PMID: 15086861.
28. Jimenez A, Littlejohn E. Pediatric Obesity: Primary Care Perspective and Prevention. *Pediatr Ann*. 2023 Feb;52(2): e51-e56. doi: 10.3928/19382359-20230102-04. Epub 2023 Feb 1. PMID: 36779884.