NUTRITION, PHYSICAL ACTIVITY AND LIFESTYLE FACTORS IN CHILDHOOD OBESITY PREVENTION

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Obesity among children and adolescents affects, in varying degrees, countries of all economic levels. Although obesity affects all ages, the most dramatic increase has been among children. WHO estimates that there are 250 million obese people in the world, among which approximately 22 million are children aged less than 5 years. The medical consequences of childhood obesity extend into adulthood. Obesity during the teen years is associated with many adverse health consequences, which include greater risks of mortality as young adults. It can have a range of negative health consequences, including diabetes, heart disease, non-alcoholic steatohepatitis, obstructive sleep apnea, asthma, orthopedic complications as well as psychosocial problems such as depressive symptoms, poor body image and low self-concept. Strong prevention efforts are needed in order to decrease the obesity epidemic. Appropriate nutrition, physical activity and behavioral modification represent important strategies for prevention of obesity.

Key words: child obesity, nutrition, exercise, prevention.

INTRODUCTION

Obesity among children and adolescents affects, in varying degrees, countries of all economic levels. WHO estimates that there are 250 million obese people in the world, among which approximately 22 million are children aged less than 5 years\(^1\). According to Onis et al.\(^2\), worldwide, the prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010. The expected prevalence for 2020 is 9.1%. The highest prevalence for obesity and overweight is cited in the Pacific Isles and Saudi Arabia\(^3\). The prevalence of childhood overweight and obesity continues to be high and of public health concern in Europe\(^4,5,29,30\).

In Romania, according to a study carried out in Bucharest in 2011, there were identified, among children and adolescents aged between 6 and 18 years, 11.4% (WHO) obese children, the obesity prevalence being significantly higher among the boys versus girls\(^6\). Another study in western Romania\(^7\) found that the prevalence of overweight was 18.2% and for obesity was 7.2% among children aged 7 – 18 years, with a higher prevalence in boys versus girls and rural versus urban.

The medical consequences of childhood obesity extend into adulthood. Obesity during the teen years is associated with many adverse health consequences, which include greater risks of mortality as young adults\(^22\). Obesity can have a range of negative health consequences, including diabetes, heart disease, non-alcoholic steatohepatitis, obstructive sleep apnea, asthma, orthopedic complications as well as psychosocial problems such as depressive symptoms, poor body image and low-self concept\(^23-27\).

Figure 1 Trends between 1990-2010 and predicted ongoing rise 2010-2020 in the prevalence of BMI > +2 SD (equivalent to the 98th centile) in preschool children in developed and developing countries (adapted after\(^3\)).

MATERIALS AND METHODS

Three databases were searched (Scopus, Web of Science and Pubmed) for reviews and meta-analyses published 2010-2015 that focused on the effects of interventions targeting nutrition, physical activity as well as other lifestyle factors on childhood obesity prevention.

RESULTS AND DISCUSSION

Interventions for childhood overweight/obesity generally focus on dietary restriction and physical exercise. Some studies evaluated and compared the effects of different types of diets on weight loss and metabolic outcomes. Casaza K et al compared a moderately restricted carbohydrate versus a standard carbohydrate diet on weight/fat loss in obese peripuberal African American girls. Both diets determined significant weight/fat loss but the restricted carbohydrate diet showed improved glucose/insulin homeostasis. Megan L. Gow et al examined the effectiveness of weight management interventions comparing diets with varying macronutrient distributions on BMI and cardiometabolic risk factors in overweight or obese children and adolescents. This review included a search of seven databases for the period 1975-2013 and identified 14 randomized controlled trials conducted with 6-18 year old subjects; 7 trials compared low-carbohydrate diet versus conventional low-fat approach, 6 increased-protein diet versus isocaloric standard-protein diet, 1 increased-fat versus isocaloric standard-fat diet. All studies reported improvements in weight-related outcomes irrespective of the macronutrient distribution. A low-carbohydrate diet may lead to greater short-term weight loss, greater improvements in triglyceride and insulin levels.

Nazrat M Mirza et al showed that both low-glycemic load diet and low-fat diet determined significant reduction of BMI z-score and improved some aspects of metabolic syndrome in obese Hispanic youth. The ketogenic diet determined greater improvements in weight loss and metabolic parameters than the hypocaloric diet. Hypocaloric low-glycemic-index diets have beneficial metabolic effects, contribute to an amelioration of insulin sensitivity in obese children.

According to a review conducted by Kelley A et al, exercise improves the percent body fat (BF%) but there is insufficient evidence that exercise improves BMI-related measures, body weight and central obesity in overweight and obese children and adolescents. The dose-response effects of exercise in the treatment of overweight/obese children and adolescents have not been elucidated, therefore it is recommended that practitioners follow the general recommendations for exercise in children and adolescents, that is, at least 60 minutes of physical activity each day.

Another review suggests that exercise improves BMI z-score as well as other body composition (body weight, BMI, BMI percentile, fat mass, %BF) and cardiovascular disease risk factors (tryglycerides, fasting insulin) variables. Some reviews indicate that there should be included other outcome measures of adiposity, such as %BF, lean body mass (LBM), BMI z-score. Dias KA et al showed that exercise training improves vascular function in overweight and obese children.

Mandy Ho et al compared the effects of dietary and exercise interventions and showed that children involved in 20-60 minutes of resistance training per week for 6 weeks achieved greater %BF loss than the diet-only group. The diet-only intervention led to greater reductions in levels of triglycerides and low-density lipoprotein cholesterol. At a subgroup analysis, the addition of aerobic exercise to dietary intervention led to greater improvements in high density lipoprotein cholesterol levels compared with diet and resistance training. Multi-component interventions seem to have superiority over single component interventions in adiposity reduction (greater BMI loss and %BF loss than diet-only group at 1 year from baseline).

A 2011 systematic review including publications up to May 2010 focused on the effectiveness of school-based nutrition education in reducing or preventing overweight and obesity in children and adolescents; most of the interventions with duration varying from 1 to 3 years demonstrated a reduction in the prevalence of overweight and obesity. Characteristics of the interventions that demonstrated effectiveness are: duration>1 year, introduction into the regular activities of the school, parental involvement, introduction of nutrition education into the regular curriculum, and provision of fruits and vegetables by school food services. The setting in which these interventions are implemented is considered to impact this global epidemic. Schools represent an important setting for implementing preventive strategies targeting childhood obesity.

School-based nutrition education is effective in reducing children's and adolescents' BMI, the most significant effects are seen in interventions that lasted between 1-2 years.

Beneficial effects of childhood obesity prevention programmes on BMI (strategies that focused on dietary or physical activity related factors) are found in most of the reviews, some of them targeting children aged 6 to 12 years.
Interventions that utilize both a physical activity and nutrition component may increase the effectiveness of school-based childhood obesity prevention programs. A recent systematic review that included 139 studies suggest that multi-setting studies demonstrate significant and beneficial results compared with single-setting interventions. Physical activity-only interventions delivered in schools with home involvement and diet-physical activity combined interventions delivered in schools with both home and community components to prevent obesity have a high SOE - strength of evidence.

Some reviews found that most interventions for childhood overweight/obesity have been found ineffective. Amini et al indicated that implementation of multi-component interventions did not necessarily improve the anthropometric outcomes. Not involving parents in the attempts to prevent or reduce childhood overweight, focusing solely on weight reduction with little emphasis on psychosocial influences, often failing to address the manner in which overweight children perceive their own weight are considered the factors that lead to these negative results. Behaviorally based interventions are considered the first line of treatment for overweight and obesity in children and adolescents.

The most effective interventions for pediatric obesity incorporate multiple components and hinge upon parental involvement. Social cognitive theory represents an important argument for parental inclusion in treatment. Martin et al. found six behavior change techniques that are effective in obesity management interventions provide information on the consequences of behavior to the individual, environmental restructuring, prompt practice, prompt identification as role model/position advocate, stress management/ emotional control training and general communication skills training) and one behavior change technique for obesity prevention interventions (prompting generalization of a target behavior). Resnikow K et al highlights that motivational interviewing delivered by providers and RDs to parents of overweight children led to significant reductions in BMI percentile. Berge et al. conducted a meta-analysis of family-based interventions targeting childhood obesity in the last decade. The majority of the studies included showed statistically significant changes in child BMI, after participating in a family-based intervention for weight loss. This meta-analysis suggests that the opposite sex parent may play a unique role in influencing child weight loss and sustainability of weight loss.

CONCLUSION

Appropriate nutrition, physical activity and behavioral modification represent important strategies for prevention of childhood obesity.

REFERENCES