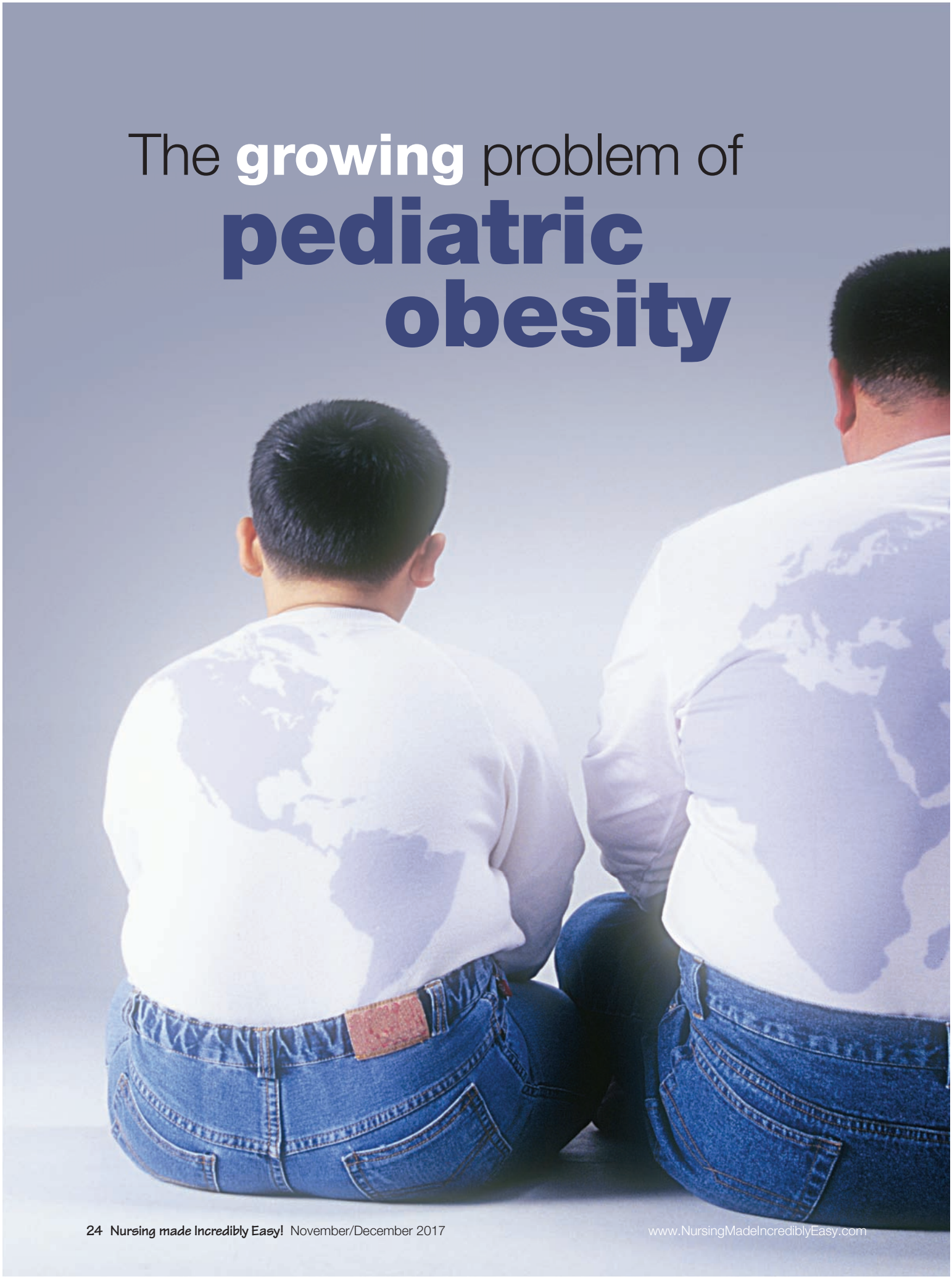
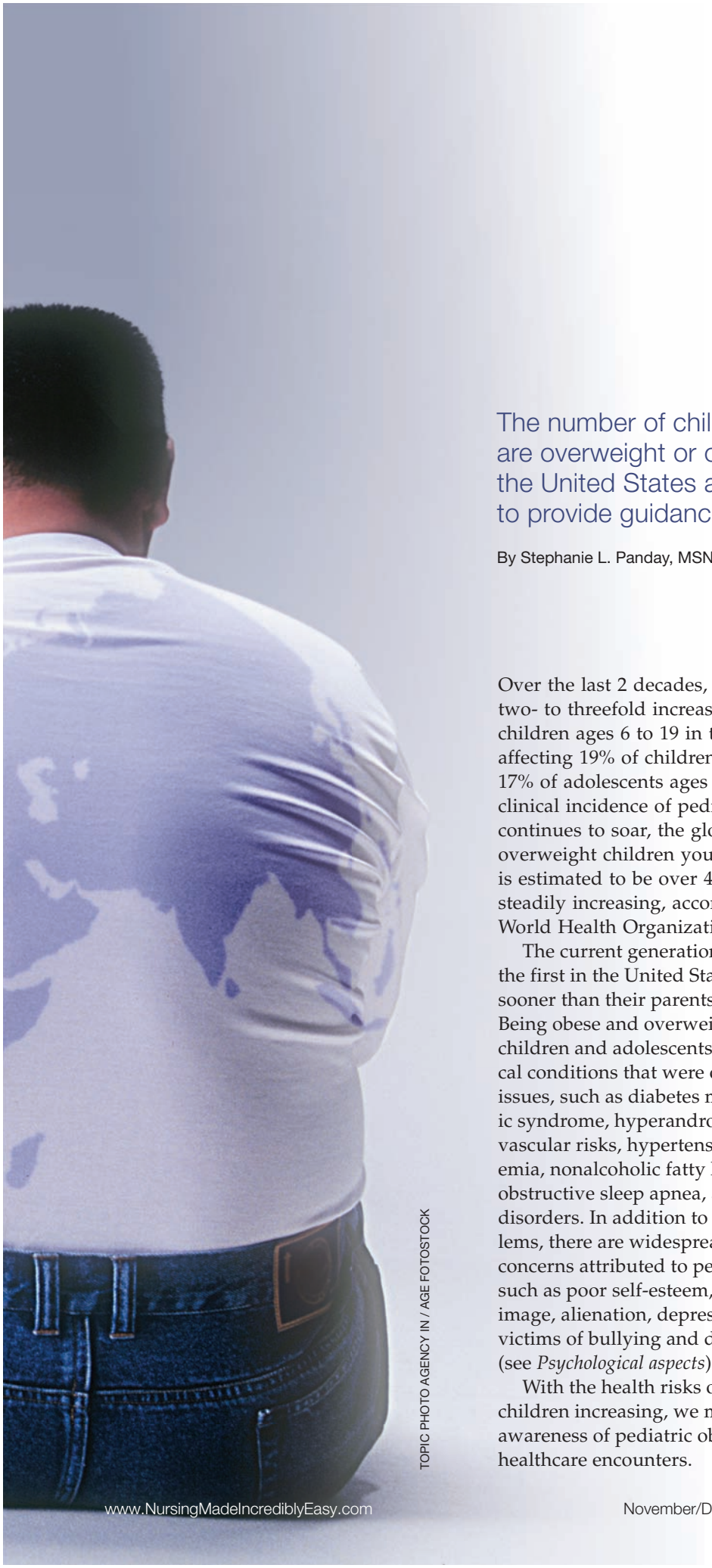
The **growing** problem of **pediatric obesity**





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The number of children and adolescents who are overweight or obese is increasing, both in the United States and worldwide. Here's how to provide guidance for patients and families.

By Stephanie L. Panday, MSN, ARNP, FNP-BC

Over the last 2 decades, there's been a two- to threefold increase in obesity for children ages 6 to 19 in the United States, affecting 19% of children ages 6 to 11 and 17% of adolescents ages 12 to 19. As the clinical incidence of pediatric obesity continues to soar, the global number of overweight children younger than age 5 is estimated to be over 42 million and steadily increasing, according to the World Health Organization (WHO).

The current generation of youth may be the first in the United States who dies sooner than their parents and lives sicker. Being obese and overweight is putting children and adolescents at risk for medical conditions that were once adult health issues, such as diabetes mellitus, metabolic syndrome, hyperandrogenism, cardiovascular risks, hypertension, dyslipidemia, nonalcoholic fatty liver disease, obstructive sleep apnea, and orthopedic disorders. In addition to medical problems, there are widespread psychosocial concerns attributed to pediatric obesity, such as poor self-esteem, distorted body image, alienation, depression, and being victims of bullying and discrimination (see *Psychological aspects*).

With the health risks of our nation's children increasing, we must increase our awareness of pediatric obesity during healthcare encounters.

Screening

Obesity is defined by the WHO as "an abnormal or excessive fat accumulation that may impair health." In children and adolescents, being overweight is having a body mass index (BMI) between the 85th and 95th percentiles, and obese above the 95th percentile. According to the CDC, the use of BMI-for-age charts for children and adolescents ages 2 to 20 is a reliable indicator to determine body fat.

In the primary care setting, there are guidelines for obesity screening. The American Academy of Pediatrics (AAP) recommends measurement of height and weight, along with plotted BMI percentiles, for annual well-child visits. BP screening should start at age 3. Screening for dyslipidemia, with a fasting lipid panel and hemoglobin A1C, is recommended once between ages 9 and 11 (or before if the child is greater than the 99th percentile BMI) and again between ages 17 and 21. Depression screening should start at age 12. Some childhood obesity cases can be linked to genetic anomalies, such as Prader-Willi, Bardet-Biedl, or Laurence-Moon syndromes; if suspected, the child should be referred for evaluation by a geneticist. Additionally, a thorough evaluation of medical history, a review of systems, a physical exam, and appropriate lab tests and/or sleep study testing should be done to rule out an organic cause, such as an endocrine disorder or obstructive sleep apnea.

Psychological aspects

The psychological aspects of childhood obesity are far reaching and can have devastating effects. Obese children often have low self-esteem and experience depression and anxiety. Their academic performance may suffer and these children are often stigmatized for being lazy and gluttonous. Children who are obese are frequently shunned by their peers and not included in group activities. They can have feelings of isolation and are commonly the recipients of name-calling, abuse, and bullying.

Nurses are in an excellent position to evaluate and provide guidance, making a positive impact in these children's lives. Don't give up an opportunity for early intervention, even if it's only an acknowledgement that a problem may be present. And when an obese child begins engaging in weight reduction, ongoing assessment of unhealthy weight loss practices, such as laxative or diuretic use, purging, and fasting, should occur because these can result in other psychological problems.

Treatment options

Treatment recommendations for pediatric patients who are overweight or obese include weight loss medications and bariatric surgery.

Medications

Recently, there have been six research studies of weight control medication use in the pediatric population. Four studies used orlistat and two studies used metformin. Orlistat is an inhibitor of pancreatic and gastric lipases, which are enzymes required for fat absorption. Metformin, more commonly used in the treatment of diabetes and metabolic syndrome, can help promote weight loss by decreasing food intake and promoting satiety.

In all four of the orlistat studies, administration of orlistat in addition to diet modification reduced BMI compared with placebo plus diet modification. In one 2005 study, the control group had a 0.31 increase in BMI and the interventional group had a 0.55 decrease in BMI at 54 weeks ($P = 0.001$). In a retrospective analysis of the same study group, the interventional group experienced more weight loss (≥ 5% or 2.44 times) compared with the control group at 12 weeks ($P = 0.0028$). Similar weight reduction results were found in two other studies, with BMI reductions in groups receiving orlistat by 2.5% to 4.09%, respectively.

Although, metformin isn't FDA approved for weight loss in pediatrics, studies are being conducted to determine its effectiveness in this realm. One study focused on metformin and either high carbohydrate or moderate carbohydrate diets and found that BMI (based on the 95th percentile) decreased in both diet groups by 6.8% [95% CI: -8.8 to -4.8], with

no statistical differences between groups. More profound results occurred in another study, in which the study design was a crossover trial with half of the group first receiving a placebo and the other half receiving metformin for 6 months, then crossing over to the other group for another 6 months. Metformin had a greater treatment effect over the placebo for reducing weight (-4.35 kg, $P = 0.02$) and BMI (-1.26 kg/m^2, $P = 0.011$).

Insulin resistance, insulin sensitivity index, lipid markers, and BP changes were the secondary outcomes used in the medication studies. Insulin resistance was found to be slightly decreased in the participants who took either orlistat or metformin, with neither drug being superior. The insulin sensitivity index showed a significant increase in metformin, with no correlative changes in dietary restrictions in one study and no statistical improvement in another. Lipid improvement was found in both orlistat and metformin versus placebo, with no changes noted if dietary restrictions were part of the study design. In addition, improvements in diastolic BP were seen with both orlistat and metformin, and showed no statistically significant changes in the systolic BP across all studies.

Only two of the medication studies reported adverse reactions. The most common complaints in one orlistat study were gastrointestinal in nature, reported in both the placebo and orlistat groups, but higher in the orlistat group. Most adverse reactions were reported only once, with a mild-to-moderate intensity rating. Listed in order of frequency, adverse reactions included fatty or oily stool, abdominal pain, fecal urgency, flatus with discharge, soft stool, increased defecation flatulence, and fecal incontinence. There was no correlation noted with decrease in BMI. In the placebo group, 3% of participants reported serious adverse reactions, whereas in the orlistat group, nine serious events were reported: pilonidal abscess, depression, asthma attack, seizure, surgical repair of deviated septum, appendicitis, cholelithiasis, adenoidal hypertrophy, and aseptic meningitis. The symptomatic cholelithiasis was believed to be directly related to orlistat and rapid weight loss.

In one metformin study, nausea was reported by two participants with a dosage of 1 g twice daily; when the dosage was reduced to 750 mg twice daily and slowly titrated back to 1 g, metformin was well tolerated.

Bariatric surgery

Bariatric surgery isn't typically covered by health insurance as a treatment option for children and adolescents. Inclusion criteria generally include an age requirement of over age 22. Although not common, research is ongoing to study the clinical outcomes for pediatric patients undergoing surgical weight loss treatment options.

Bariatric surgery was the focus of six recent studies, all of which used the National Institutes of Health (NIH) criteria for bariatric surgery: BMI greater than 35 kg/m^2 and one obesity-related comorbidity, or BMI greater than 40 kg/m^2. The surgical procedures used were laparoscopic sleeve gastrectomy (LSG), Roux-en-Y gastric bypass (RYGB), or laparoscopic adjustable gastric banding (LAGB).

LSG was performed in four studies with 146 participants. The mean presurgical BMI of the participants ranged from 38.5 to 46.7 kg/m^2 and the mean postsurgical BMI at 1 year ranged from 25.2 to 41.4 kg/m^2.

RYGB was used in two studies with 152 surgical participants. The mean presurgical BMI ranged from 46.2 to 45.5 kg/m^2 and the mean postsurgical BMI at 1 year ranged from 30.2 to 34.9 kg/m^2.

LAGB was used in two studies with 31 surgical participants. The mean presurgical BMI ranged from 41.4 to 45.3 kg/m^2 and the mean postsurgical BMI at 1 year ranged from 29.6 to 42.3 kg/m^2.

Although not common, research is ongoing to study the clinical outcomes for pediatric patients undergoing surgical weight loss treatment options.

There were greater comorbidities in the surgical studies, which can be attributed to the higher BMI of the study participants; however, the resolution or remission of presurgical comorbidities was profound across all studies. For instance, in two of the studies, participants who had presurgical hypertension or insulin sensitivity had complete resolution and showed marked improvement. In three studies, participants had 50% to 90% remission in the postsurgical groups. Obstructive sleep apnea was completely resolved in one study group and showed 70% remission in another study group at postsurgical follow-up. Other obesity-related comorbidities showed marked improvement or resolution, including type 2 diabetes, metabolic syndrome, hyperlipidemia, and fatty liver disease.

All six surgical studies had reports of adverse reactions. Major complications of suture line leak were reported in two studies, occurring with two patients, both of whom were successfully treated with laparoscopic procedures and endoscopic stent placement. There were two hematomas: one required drainage via laparoscopy and the other resolved without intervention. In one study, there were revisions of the gastric banding in eight patients during a 2-year period. Cholecystectomies were reported in three studies, in which acute cholecystitis developed in 11 patients.

Diet and exercise plan

Healthy lifestyle changes involve a family approach. Recreational screen time (T.V., computer time, and video games) should be limited to no more than 2 hours per day. Strive for a goal of 60 minutes of physical activity per day. An assessment of who shops and prepares meals for the child needs to be done, along with a food diary. This may identify that families are preparing high-fat convenience foods or incorrect serving sizes, regularly eating out at fast food restaurants, or offering high-sugar/high-fat snacks. The family may need education on label reading, preparing healthy meals, and making well-balanced food choices. Promote water and milk as beverages of choice, eliminate sodas, and keep daily juices to less than 4 oz for toddlers and less than 6 oz for older children. A good rule of thumb for a healthy, well-balanced diet is to eat five fruits and vegetables per day. One free resource to offer parents is www.choosemyplate.gov. Prescriptive referrals to dietitians may be covered by insurance.

Three of the surgical studies addressed quality-of-life outcomes. One study used the Moorehead-Ardelt Quality of Life questionnaire, which compared self-esteem; social, sexual, and physical activity; and work capacity with pre- and postsurgical status. A very good quality of life was reported by 60% of patients and a good quality of life by 40% of patients. Another study used the Short Form Health Study, or SF-36, that rated eight domains (physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health) at 1-year post-op. There were significant improvements reported in seven out of eight domains, which carried over again at 2 years. Similar outcomes were seen in a third study, which used the Child Health Questionnaire. The LAGB group had a higher rating in quality of life compared with the lifestyle intervention group in direct correlation to improved health and resolution of comorbid conditions.

A balanced approach

It's recommended that in clinical practice we annually assess BMI percentiles, following the guidelines set forth by the AAP and Bright Futures. When addressing the findings of overweight or obesity in pediatric patients, first-line approaches should be family-based lifestyle interventions with a focus on healthy diet and exercise (see *Diet and exercise plan*).

Families and patients should be offered guidance on lifestyle and behavior modifications, diet, and exercise. After which, they should also be offered medications for weight reduction if applicable. With continued surveillance for weight loss, a referral for bariatric surgery should be offered if other interventions are inadequate in achieving a healthy weight.

There's a perception that bariatric surgery is harmful, but when considering the long-term negative effects of obesity-related comorbidities and the relatively low risk of postsurgical complications, it

can be viewed as a viable treatment option in the management of pediatric obesity.

The decision-making process should also consider the patient's age or other criteria to help determine the ideal age for bariatric surgery. In addition to the NIH criteria for bariatric surgery, it's recommended that patients be at their full adult height, which can be evidenced by radiographic studies and physical examination. There isn't substantial evidence for or against the recommendation of the NIH, but given the delicate time of growth and development that occurs during childhood and adolescence, it would be prudent to wait until further data can be evaluated to change this recommendation. Furthermore, consideration of the patient's maturity level and ability to adhere to postsurgical dietary regimens, vitamin and mineral supplements, exercise recommendations, and follow-up with healthcare providers on a regular basis should be part of the discussion.

Always consider the patient's quality of life, including the psychological and physical aspects of being overweight or obese and the impact on development, from childhood to adolescence and into adulthood. The implications of having a positive self-esteem have far-reaching effects in the lives of these young individuals.

Make sure to communicate treatment options and evaluations in a communication style appropriate for the patient's age while also including his or her parents in the discussions. To truly reverse the clinical incidence of pediatric obesity, we must take a family-centered approach when providing patient education.

A new start

Pediatric obesity remains a worldwide epidemic, with prevalence rates on the rise. It's imperative that we're able to screen pediatric patients who are overweight or obese and offer effective treatment options. The addition of orlistat or metformin needs to be considered, having shown weight loss reductions upwards of 6.8% of BMI. In addition, a dramatic decrease in BMI has been shown across all surgical methods, with sustainable weight loss results of 30% to 50% of excess weight. Quality of life can't be overemphasized as a positive variable in the reduction of obesity in the pediatric population and can be generalized to reduction of BMI. ■

on the web

CDC:
https://www.cdc.gov/obesity/childhood/

Mayo Clinic:
www.mayoclinic.org/diseases-conditions/childhood-obesity/home/ovc-20268886

MedlinePlus:
https://medlineplus.gov/obesityinchildren.html

World Health Organization:
www.who.int/end-childhood-obesity/facts/en/

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