

2014 Clinical Practice Guidelines for Overweight and Obesity in Korea

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The dramatic increase in the prevalence of obesity and its accompanying comorbidities are major health concerns in Korea. Obesity is defined as a body mass index ≥ 25 kg/m² in Korea. Current estimates are that 32.8% of adults are obese: 36.1% of men and 29.7% of women. The prevalence of being overweight and obese in national surveys is increasing steadily. Early detection and the proper management of obesity are urgently needed. Weight loss of 5% to 10% is the standard goal. In obese patients, control of cardiovascular risk factors deserves the same emphasis as weight-loss therapy. Since obesity is multifactorial, proper care of obesity requires a coordinated multidisciplinary treatment team, as a single intervention is unlikely to modify the incidence or natural history of obesity.

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INTRODUCTION

Obesity is associated with many illnesses that are related to, and might be caused by, excess fat. Obesity is associated with increased risks of type 2 diabetes mellitus (T2DM), hypertension, dyslipidemia, metabolic syndrome, coronary heart disease, other atherosclerotic diseases, non-alcoholic steatohepatitis, and gout [1]. Obesity substantially increases the risk of morbidity from osteoarthritis, low back pain, sleep apnea, asthma, and stress incontinence, as well as cancers of the endometrium, breast, prostate, and colon [2,3]. Greater body weight is also associated with an increase in all-cause mortality [4,5]. Since the impact of obesity on health is enormous, much effort has been made to find optimal managements. This practice guideline is designed to help patients to achieve and sustain weight loss, so as to prevent these chronic diseases.

DIAGNOSIS OF OBESITY

In white populations, obesity is widely defined as a body mass index (BMI) ≥ 30 kg/m² and is a key risk factor for diabetes [6,7]. However, the appropriateness of this definition in Asian populations has been questioned. Asian populations generally have a higher percentage of body fat than do Western populations at the same BMI levels [4]. Consequently, the World Health Organization (WHO) recommends that cutoff values for the definition of overweight and obese should be lower for Asian populations than for Western populations [8]. In a prospective cohort study of more than 1 million Koreans, the average baseline BMI in both sexes was 23.2, and the death rate from any cause had a J-shaped association with the BMI, regardless of cigarette-smoking history [4]. The risk of death from any cause was lowest among patients with a BMI of 23.0 to 24.9. In cohorts of East Asians, including Chinese, Japanese, and Koreans, the lowest risk of death was seen among persons with a BMI of 22.6 to 27.5 [5]. There is a significantly increased risk of T2DM and hypertension among those with a BMI of 23 to 24.9, as compared to those within the normal range. These BMI cutoffs are arbitrary along a continuum of increasing risk with increasing BMI. The cutoffs used for the definition of obesity are based on the excess morbidity and mortality associated with increasing body fat content [8]. Consequently, for the Korean population, we defined overweight based on an increase in morbidity and obesity based on an increase in mortality: overweight is defined as a BMI of 23 to 24.9 kg/m² and obesity as a BMI ≥ 25 kg/m². Current estimates are that 32.8% of adults are

obese: 36.1% of men and 29.7% of women.

Based on the WHO recommendations, the waist circumference (WC) cutoff for Asians was suggested as 90 cm for men and 80 cm for women, respectively, which was different from that of other ethnic groups such as Europeans [8]. However, applied the WHO Asia-Pacific criteria, the prevalence of abdominal obesity in Korea was 20% in men and 40% in women, so the prevalence of abdominal obesity in men was two times higher than in women. Therefore, the study of the WC cutoff points for defining abdominal obesity in Koreans was performed using the data from the Korean National Health and Nutritional Examination Survey 1998. The optimal WC to predict the risk factors of metabolic syndrome in Koreans, was 82 to 84 cm for men, and 79 to 82 cm for women [9]. WC in the 80th percentile in the Korean population is 90 and 86.5 cm for men and women, respectively. Abdominal obesity is defined as a WC ≥ 90 cm for men and ≥ 85 cm for women in Korea.

ASSESSING CARDIOVASCULAR RISK FACTORS AND OBESITY-RELATED COMORBIDITIES

When assessing a patient for treatment of overweight and obesity, consider the patient's weight, WC, and presence of risk factors. Management involves not only weight loss and maintenance of body weight but also measures to control other risk factors [7]. Since obesity is associated with increased risks of hypertension, dyslipidemia, diabetes mellitus (DM), and a host of other comorbidities, the clinician should assess patients for associated conditions. Some obesity-associated disease and risk factors place patients at very high-risk for subsequent mortality. Patients with these diseases will require aggressive modification of risk factors in addition to the clinical management of the disease. In obese patients, control of cardiovascular risk factors deserves the same emphasis as weight loss therapy [10].

DETERMINE WEIGHT LOSS AND HEALTH GOALS

Since sustained weight loss of as little as 3% to 5% of body weight can lead to clinically meaningful reductions in cardiovascular risk factors and DM risk, as an initial goal, we recommend the loss of 5% to 10% of baseline weight within 6 months [7,10]. Typically, in patients undergoing a lifestyle intervention, the maximum weight loss is achieved in 6 months, followed by a plateau, and then a gradual regain over time [7]. This is also

true for medication-assisted weight loss, although the regain in weight might be slower with continued medication use. For bariatric surgery patients, it can take much longer for weight to plateau. Patients should be advised that participation in a long-term (>1 year) weight-maintenance program (dietary, physical activity, and behavior therapy) can improve successful weight maintenance.

COMPREHENSIVE LIFESTYLE INTERVENTION

Weight loss requires creating an energy deficit through caloric restriction, physical activity, or both. An energy deficit of >500 kcal/day can typically be achieved with a dietary intake of 1,200 to 1,500 kcal/day for women and 1,500 to 1,800 kcal/day for men [7]. The choice of calorie-restricted diet can be individualized to the patient's preferences and health [11]. Very low-calorie diets (<800 kcal/day) should be used only in limited circumstances in a medical care setting where medical supervision and high-intensity lifestyle intervention can be provided. Alcohol consumption not only increases the number of calories in the diet but has also been associated with obesity in epidemiologic studies [12]. The impact of alcohol calories on a person's overall caloric intake needs to be assessed and controlled appropriately. Although various diets (low-fat, low-carbohydrate, or high protein diet, etc.) can be used, it should be a calorie-reduced, nutritionally balanced diet. There is no "magic" diet for weight loss [10]. Therefore, we recommend prescribing a calorie-reduced diet based on the patient's health profile and food preferences [10]. If a specialized diet for cardiovascular risk reduction, DM, or other medical conditions is prescribed, referral to a dietician is recommended. This includes monitoring the patient's requirements for medication change as weight loss progresses, particularly for antihypertensive medications and diabetes medications that can cause hypoglycemia [7].

Physical activity should be an integral part of weight-loss therapy and weight maintenance. Initially, moderate levels of

physical (aerobic) activity for 30 to 60 minutes or 20 to 30 minutes twice, 5 days per week, should be encouraged. The exercise prescription should include the mode of activity and frequency, intensity, and duration of exercise. Resistance training should be progressive in nature, individualized, and stimulate all of the major muscle groups. One set of 8 to 10 exercises that conditions the major muscle groups twice a week is recommended.

Comprehensive lifestyle interventions usually provide a structured behavior-change program that includes regular self-monitoring of food intake, physical activity, and weight. These same behaviors are recommended to maintain lost weight, with the addition of frequent monitoring of body weight.

DRUG THERAPY FOR OBESITY

Pharmacotherapy is recommended as an adjunct to comprehensive lifestyle intervention to help achieve targeted weight loss and health goals for individuals with a BMI >25 kg/m² or a BMI >23 kg/m² with more than one obesity-associated comorbid condition (DM, hypertension, dyslipidemia, or sleep apnea) in patients who are motivated to lose weight (Table 1) [8]. Drugs should be used only as part of a program that includes diet, physical activity, and behavior therapy. Since sustained weight loss of as little as 3% to 5% of body weight can lead to clinically meaningful reductions in cardiovascular risk factors and DM risk, as an initial goal we recommend the loss of 5% to 10% of baseline weight within 6 months [7,10]. If a patient does not lose 2 kg in the first 4 weeks after initiating therapy, the likelihood of a long-term response is very low. If a patient does not respond to a drug with reasonable weight loss, the clinician should assess whether the patient is adhering to the medication regimen and adjunctive therapies, and the need to adjust the dosage [7]. If the patient continues to be unresponsive (less than 5% to 10% weight loss of baseline weight for 3 months) to the medication, or serious adverse effects occur, the clinician should consider discontinuing the treatment.

Table 1. Treatment Options for Different Levels of Body Mass Index and Other Risk Factors in Korean Populations

Treatment	Body mass index category			
	23–24.9	25–29.9	30–34.9	≥35
Diet, physical activity, and behavior	With comorbidities	+	+	+
Pharmacotherapy	With comorbidities	+	+	+
Surgery			With comorbidities	+

Currently, orlistat is approved by the Korea Food and Drug Administration (KDA) for long-term use (1 year) in weight loss. Orlistat inhibits fat absorption from the intestine. Orlistat can also reduce the absorption of fat-soluble vitamins and nutrients [13]. Phentermine, diethylpropion, phendimetrazine, and mazindol are approved by the KDA for short-term use (up to 12 weeks) in weight loss. Lorcaserin (Belviq) will be approved by KDA and will be available in Korea in early 2015 [14]. It is uncertain when extended release phentermine and topiramate combination (Qysmia) and sustained release bupropion and naltrexone (Contrave) become available to patients in Korea [15].

BARIATRIC SURGERY

For adults with a BMI >40 kg/m² or a BMI >35 kg/m² with obesity-related conditions who fail to respond to behavioral treatment (with or without pharmacotherapy) with sufficient weight loss to achieve targeted health outcome goals, bariatric surgery might be an appropriate option to improve health [7,10]. Asian populations have an elevated risk of T2DM, hypertension, and dyslipidemia at a relatively low BMI. At International Federation for the Surgery of Obesity and metabolic disorders Asia Pacific Chapter consensus statements [16], it was recommended that bariatric surgery may be considered as a treatment option for obesity in people of Asian ethnicity with a BMI >35 kg/m² with or without comorbidities.

In adults with morbid obesity, bariatric surgery produces greater weight loss and weight loss maintenance than that produced by standard care or conventional medical treatment [17]. The surgical treatment of obesity and metabolic disorders requires a multidisciplinary approach with a team that includes surgeons, physicians, psychiatrists, dietitians, counselors, and others, as needed.

CONCLUSIONS

The dramatic increase in the prevalence of obesity and its accompanying comorbidities are major health concerns in Korea [18]. The early detection and proper management of obesity are urgently needed. Since obesity is multifactorial, proper care of obesity requires a coordinated multidisciplinary treatment team. It is unlikely that a single intervention can modify the incidence or natural history of obesity. Although more evidence and clinical trials should be undertaken, appropriate clinical practice guidelines for Koreans with obesity have been developed and

updated to provide better clinical outcomes.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Park JH, Yoon SJ, Lee H, Jo HS, Lee SI, Kim Y, Kim YI, Shin Y. Burden of disease attributable to obesity and overweight in Korea. *Int J Obes (Lond)* 2006;30:1661-9.
2. Jee SH, Yun JE, Park EJ, Cho ER, Park IS, Sull JW, Ohrr H, Samet JM. Body mass index and cancer risk in Korean men and women. *Int J Cancer* 2008;123:1892-6.
3. Oh SW, Yoon YS, Shin SA. Effects of excess weight on cancer incidences depending on cancer sites and histologic findings among men: Korea National Health Insurance Corporation Study. *J Clin Oncol* 2005;23:4742-54.
4. Jee SH, Sull JW, Park J, Lee SY, Ohrr H, Guallar E, Samet JM. Body-mass index and mortality in Korean men and women. *N Engl J Med* 2006;355:779-87.
5. Zheng W, McLerran DF, Rolland B, Zhang X, Inoue M, Matsuo K, He J, Gupta PC, Ramadas K, Tsugane S, Irie F, Tamakoshi A, Gao YT, Wang R, Shu XO, Tsuji I, Kuriyama S, Tanaka H, Satoh H, Chen CJ, Yuan JM, Yoo KY, Ahsan H, Pan WH, Gu D, Pednekar MS, Sauvaget C, Sasazuki S, Sairenchi T, Yang G, Xiang YB, Nagai M, Suzuki T, Nishino Y, You SL, Koh WP, Park SK, Chen Y, Shen CY, Thornquist M, Feng Z, Kang D, Boffetta P, Potter JD. Association between body-mass index and risk of death in more than 1 million Asians. *N Engl J Med* 2011;364:719-29.
6. North American Association for the Study of Obesity; National Heart, Lung, and Blood Institute; National Institutes of Health (US); NHLBI Obesity Education Initiative. The practical guide: identification, evaluation, and treatment of overweight and obesity in adults. Bethesda: National Institutes of Health, National Heart, Lung, and Blood Institute, NHLBI Obesity Education Initiative, North American Association for the Study of Obesity; 2000.
7. Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, Hu FB, Hubbard VS, Jakicic JM, Kushner RF, Loria CM, Millen BE, Nonas CA, Pi-Sunyer FX, Stevens J, Stevens VJ, Wadden TA, Wolfe BM, Yanovski SZ; American College of Cardiology/American Heart Association Task Force on Practice Guidelines; Obesity Soci-

- ety. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *J Am Coll Cardiol* 2014;63(25 Pt B):2985-3023.
8. Bassett J; International Diabetes Institute; World Health Organization Regional Office for the Western Pacific; International Association for the Study of Obesity; International Obesity Task Force. The Asia-Pacific perspective: redefining obesity and its treatment. Melbourne: Health Communications Australia; 2000.
 9. Lee S, Park HS, Kim SM, Kwon HS, Kim DY, Kim DJ, Cho GJ, Han JH, Kim SR, Park CY, Oh SJ, Lee CB, Kim KS, Oh SW, Kim YS, Choi WH, Yoo HJ. Cut-off points of waist circumference for defining abdominal obesity in the Korean population. *Korean J Obes* 2006;15:1-9.
 10. Kushner RF, Ryan DH. Assessment and lifestyle management of patients with obesity: clinical recommendations from systematic reviews. *JAMA* 2014;312:943-52.
 11. Song Y, Joung H. A traditional Korean dietary pattern and metabolic syndrome abnormalities. *Nutr Metab Cardiovasc Dis* 2012;22:456-62.
 12. Lee MY, Kim MY, Kim SY, Kim JH, Kim BH, Shin JY, Shin YG, Yun JH, Ryu SY, Lee TY, Koh SB, Chung CH. Association between alcohol intake amount and prevalence of metabolic syndrome in Korean rural male population. *Diabetes Res Clin Pract* 2010;88:196-202.
 13. Davidson MH, Hauptman J, DiGirolamo M, Foreyt JP, Halsted CH, Heber D, Heimbürger DC, Lucas CP, Robbins DC, Chung J, Heymsfield SB. Weight control and risk factor reduction in obese subjects treated for 2 years with orlistat: a randomized controlled trial. *JAMA* 1999;281:235-42.
 14. Fidler MC, Sanchez M, Raether B, Weissman NJ, Smith SR, Shanahan WR, Anderson CM; BLOSSOM Clinical Trial Group. A one-year randomized trial of lorcaserin for weight loss in obese and overweight adults: the BLOSSOM trial. *J Clin Endocrinol Metab* 2011;96:3067-77.
 15. Bays H. Phentermine, topiramate and their combination for the treatment of adiposopathy ('sick fat') and metabolic disease. *Expert Rev Cardiovasc Ther* 2010;8:1777-801.
 16. Kasama K, Mui W, Lee WJ, Lakdawala M, Naitoh T, Seki Y, Sasaki A, Wakabayashi G, Sasaki I, Kawamura I, Kow L, Frydenberg H, Chen A, Narwaria M, Chowbey P. IFSO-APC consensus statements 2011. *Obes Surg* 2012;22:677-84.
 17. Padwal R, Klarenbach S, Wiebe N, Birch D, Karmali S, Manns B, Hazel M, Sharma AM, Tonelli M. Bariatric surgery: a systematic review and network meta-analysis of randomized trials. *Obes Rev* 2011;12:602-21.
 18. Yoon KH, Lee JH, Kim JW, Cho JH, Choi YH, Ko SH, Zimmet P, Son HY. Epidemic obesity and type 2 diabetes in Asia. *Lancet* 2006;368:1681-8.