Obesity Prevention In Adults: Preventive Strategies and Physical Activity

Erişkinlerde Obezitenin Önlenmesi: Koruyucu Stratejiler ve Fiziksel Aktivite

ABSTRACT
Obesity develops because of excessive accumulation of body fat when energy intake exceeds energy expenditure over time. The prevalence of obesity is rapidly increasing worldwide, reaching epidemic proportion. Obesity imposes large burdens on public health systems and economy. Also it has negative effects in social life. Healthy nutrition and physical activity are important factors to deal with obesity. The purpose of this review is to emphasize preventive rehabilitation approaches to prevent and cope with obesity.

Keywords: obesity, preventive therapy, exercise therapy, public health

ÖZET

Anahtar kelimeler: obezite, önleyici tedavi, egzersiz tedavisi, halk sağlığı

Introduction
Obesity develops because of excessive accumulation of body fat when energy intake exceeds energy expenditure over time (1). The prevalence of obesity is rapidly increasing worldwide, reaching epidemic proportion (2). The Body Mass Index (BMI) determines body fat based on height and weight. BMI is calculated as body weight in kilograms (kg) divided by height squared (m²). While BMI ≥25 kg/m² indicates overweight, ≥30 kg/m² indicates obesity in adults (3).

Obesity-related mortality is ranked 5th after high blood pressure, tobacco use, high blood glucose and physical inactivity in the world. About 1.6 billion people worldwide are overweight and 400 million have been suffering from obesity. These numbers are predicted to reach at least double until 2030. While obesity prevalence is higher in women, the particular prevalence of overweight and obese people differs in every region. Middle East, Central and Eastern Europe and North America have higher rates (3,4).

Some factors play important role in the assessment and management of obesity. Those factors can be examined in two groups; endogenous (genetic) and exogenous factors (diet and physical activity) (5). Obesity rate have continued to increase depending on the nutrition and activity habits which have changed in course of modernization and economic downturn. As people have preferred to consume high energy foods which are enriched with carbohydrates and fats in this process, it has led...
to genetic susceptibility in time (6).

Obesity imposes large burdens on public health systems most relatively such as cardiovascular diseases, diabetes and cancers. When economy is accounted alone in 2008, medical costs related to obesity is estimated $147 billion annually in the United States (US). Also it has negative effects on social life causing the disability and decreasing quality-of-life (7,8). Thus, it is very important to build and apply effective key strategies for controlling epidemic process of obesity. While the process of avoiding overweight or obesity is called as primary prevention, interventions for weight loss and maintaining the weight at the same level can be considered as a secondary prevention. Surgery is a tertiary prevention while other options cannot be effective to lose weight (8).

The purpose of this review is to emphasize preventive rehabilitation approaches to prevent and cope with obesity in adults.

I. Primer Preventive Rehabilitation Approaches In Obesity

Obesity which is appeared during early life is inextricably linked to the later stages of development (9,10). Malnutrition diet and lack of physical activity are given in the first place among the cause of obesity (11). 70% of obese adolescents are candidate to become obese adults (11,12). Thus children should be considered as prior focus groups for intervention strategies. Also if obesity is prevented, comorbidities such as glucose intolerance, hypertension and metabolic syndrome can be avoided (13). Multiple sectors such as government, health care providers, schools and workplaces should have collective efforts to prevent obesity (14). Primary prevention of obesity development requires the following factors.

Dietary

Pregnant women should be careful to nutrition for both their children and themselves to reduce the risk about developing of obesity. Greater gestational weight gain plays a critical role in occurring adiposity of the offspring (15,16). The other maternal factor is over feeding the infant who was born with low-weight to be able to catch up the growth and if continued, also contributes to obesity later (17). Because of this reason giving breastfeeding information to pregnant women and connect them to the supporting programs can help them to raise their awareness about breastfeeding. Breastfeeding for first nutrition should maintain for 12 months (18).

Parents should pay attention to choose nonfat or low-fat dietary for their children and provide a wide variety of foods with sufficient portion sizes. Also having regular family mealtimes is important to prevent children from having a snack (18). Also school cafeterias should sell healthy food and healthy eating education should be given to all students.

In adults, diet plans should include low-carbohydrate food items, high dietary fiber food items, and restriction of excessive fat foods.

Physical activity

Sedentary life promotes increasing screen time like television viewing, internet, and computer games especially in developed countries. Also other leisure time activities in sitting are also associated with weight gain. It is recommended to do exercise for 150–250 minute per week (moderate-intensity activity) to prevent weight gain or aid in weight loss (19).

Unsafe neighborhoods for walking and other outdoor activities are important reasons for increasing indoor leisure activities and entertainment. Also open spaces and playgrounds are not enough in schools. Furthermore because of parents’ pressure academic success play more important role than physical activity in the process of children’s growth (17). Inactivity is an important risk factor for obesity. Low energy expenditure makes both children and adults to be inclined to obesity. As this is a social problem, local governments, states and schools should take precautions as well as parents (20). Also this risk can be changed easily.

• Prevention of obesity in school includes; teaching regular physical activity and its positive effect on health with a school curriculum, providing comprehensive community sport and recreation programs, and adding daily physical education classes in all schools (20).

• Designing parks and community recreational facilities should have priority in state and local government’s planning. Also there should be public
spotlights about proper nutrition and physical activity. Physical activity and exercise is essential regarding individuals’ wellness.
- Frequency, intensity, duration and content of activity should be considered while prescribing physical activity (Table 1) (21).
- School-age youth should participate daily moderate to vigorous physical activity which is developmentally appropriate and enjoyable. It should also involve a variety of activities for 60 minutes or more (supervised 30 to 45 minutes) (22).
- For adults guidelines suggest either 10,000 steps or at least 30 minutes of moderate-intensity activity per day to improve health related outcomes (23).

### II. Secondary Preventive Rehabilitation Approaches In Obesity

The weight reduction programs should include the following components; assessment, diet, exercise, behavioral therapy and maintenance plan.

#### Assessment

Assessment is the first step to manage with the obesity. It is used to set programed goals, determine objectives of therapy and evaluate the effect of interventions with outcome measures. The goal should be realistic and individual program should be applied such as measuring BMI, determining family history, habits of dietary, lifestyle, physical activity and risk factors. Also assessment of the anthropometric characteristics, aerobic capacity, endurance, circulation, gait, locomotion, balance, muscle performance, pain, range of motion, and posture are key factors to prescribe exercise program (24,25).

#### Dietary

Aims of all diet programs are to achieve of reducing intake relative to energy expenditure. There is not one diet program which is superior to the other for weight loss. In recent years diet interventions which are generally accepted are ad-libitum diets, very low calorie diets, low glycemic index diets, high protein diets and meal replacement diets. Low calorie diet (LCD) (800 to 15,000 kcal per day) is moderate in calorie intake to achieve a slow but progressive weight loss (3). It is allowed to loss about 0.5 kg/week by energy deficit (26).

#### Physical activity

In recent years it is determined that physical activity alone is limited for weight loss but it appears to be critical for long-term weight management (27-29). Also it is encouraged for health, bodyweight control and wellness. Improving and maintaining physical fitness include; cardiorespiratory fitness, muscle strength, body composition and flexibility (30). American College of Sports Medicine Position Stand announced that sedentary individuals would
need to perform 80 minutes of moderate-intensity physical activity or 35 minutes of vigorous physical activity to prevent weight regain. Weekly caloric expenditure should reach 2000 to 2800 kcal for all obese people with prescribed exercise program (27, 31).

Exercise program should predominantly include aerobic mode as it provides more caloric expenditure when compared to resistance training. Also regular aerobic activity reduce blood pressure and lipids, glucose intolerance and insulin sensitivity and glycemic control (32). On the other hand it improves depressive symptoms and maximum oxygen consumption (33). Physical fitness, increased with physical activity, may decrease obesity-related mortality (34). Aerobic exercise can be prescribed as either weight bearing (walking, jogging, treadmill training) or non-weight bearing (stationary cycling, upper body ergometer and water activities). Exercise program should be prepared so that the person can endure up to 1 hour of activity each day. People without significant comorbid conditions can perform aerobic training in the range of 50–75% of (heart rate reserve) the highest heart rate for enhanced fat burning (35). Initial intensity may be near 40% heart rate reserve especially for individuals who have no exercise history but progression should be provided up to %60-80 heart rate reserve by adding 5 minutes every 1 or 2 week until the person can perform at least 1 hour of exercise. For deconditioned persons exercise time can be completed with two or three sessions with short durations (5 to 15 minutes).

By implementing a moderate intensity activity, respiration rate, heart pulse and body temperature are increased. Walking, cycling, swimming (with moderate effort), stair climbing (with moderate effort) and gardening are good examples of moderate intensity activities. Also health-related outcomes are improved by moderate intensity physical activity which is performed at least 150 min/week (36).

It is defined that glucose tolerance and glycosylated hemoglobin are improved by resistance exercises (RE), as well as muscle strength, endurance and lean body mass (37). Also resistance exercises provides higher resting metabolic rate and protects lean mass loss in obese people. Resistance exercises are planned to perform in the range of 60% to 80% of a one-repetition maximum (1RM). Program should include 6 to 10 exercises which are performed in a 20-30 minute-session and 8 to 15 repetitions is completed for each exercise. Exercises are performed 2 or 3 days in a week and should target to train major muscle groups (31). However there are controversial reports in the literature about RE positive effect on weight of loss. Modern Pilates mat and ball exercises were positive effect on body composition (38).

Dennis et al. (39) suggested combined therapy consisted of aerobic exercises, resistance training, and exercises to improve flexibility and balance and lasted 90 minute.

Group treatment is more effective than individual care to lose weight because of that provide empathy, competition social support (35). Also weight loss (about 2 kg) is larger than individual care, as shown by a randomized trial (40).

**Lifestyle behavioral changes**

The lifestyle modification interventions and behavioral treatment programs help to maintain for reduce fat mass in obese people. Keeping a diary in which is noted daily calorie intake, weekly minutes of physical activity, and number of days is a way of behavioral treatment. So behavior therapy is essential to continue weight control and provide self-monitoring about food intake, physical activity, and body weight. Also internal and external stimulus like eating, activity behavior and environment must be change and become a new lifestyle (41). World Health Organisation’s (WHO) recommendations on physical activity are as the following (42):

- Physical activity should become a habit, not an option (21 day rule).
- You can start with small goals. For example, to reach 150 minutes physical activity target exercise program may be planned as short and frequent trainings in initial sessions (10 minutes/ 3 times a day).
- Change intensity of exercises and do exercises with a friend not alone.
**Maintenance plan**

Weight loss maintenance should be supported by social programs, high motivation, home-based exercises and making low-calorie meal plan. While some researches recommend that PA with moderate intensity should be practiced for 150 minute in a week to maintain weight loss, some of the researchers recommend it 200–300 min in a week (29). Working with moderate to high intensity with large muscles groups maintains weight loss during long term. If exercise is maintained for 12 months, it has a significant impact on body weight. In long-term bodyweight manage it seems that exercise has important role as well as dietary restriction and lifestyle modification. Endurance exercises in the long-term provide higher resting metabolic rate (RMR) and prevent the retrieval of lost weight for obese individuals (43).

**III. Tertiary Treatment**

**Surgery**

The amount of losing weight is dependent to presence any other systematic problems like type 2 diabetes or related to obesity grade. Extreme obesity or having any chronic disease make difficult to lose weight. Surgical intervention should be considered for extremely obese patients such as a BMI of ≥40 kg/m² and had unsuccessful efforts about all conservative treatment methods (43).

**Conclusion**

Especially malnutrition and lack of physical activity in childhood is related to the majority of adult obesity and also this may lead up to many chronic diseases. Based on the evidences, preventive approaches seem to become prominent for treatment of obesity which is being an epidemic problem in the world. Thus healthy lifestyle routines to avoid obesity and its comorbidities should begin from early childhood. Taking precautions by families is not enough to prevent obesity. It is needed to implement multidisciplinary approaches. The following recommendations should be considered to cope with obesity for the future; [1] parents should be a good examples to their children by making proper nutrition and regular physical activity as a lifestyle [2] seminars about gestational weight and breastfeeding should be supported and organized by municipalities [3] school curriculum should include education class to provide awareness for students about physical activity and nutrition [4] overweight children should be identified by scanning and referred to experts. [5] Governments should develop policies about topics such as safe playgrounds parks for physical activity to decrease sedentary life [6] healthy nutrition and physical activity should be indispensable part of individuals’ life to prevent and cope with obesity.

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