



## Review Article

# Management of Obesity through Diet and Exercise

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## ABSTRACT

Worldwide, Pakistan is ranked as the 6<sup>th</sup> most highly populated country. Approximately 1.6 million deaths are due to the health problems associated with obesity. Obesity is the root cause of any health problem and can lead to many serious diseases of the heart, lungs, and kidneys, and can cause death. Lack of physical activity, excessive consumption of food, and unawareness is the main cause of obesity in Pakistan. The obesity ratio of people living in urban areas is more than people living in rural. To describe the different types of exercises and diet plans for losing weight in an obese person. This literature review is written by the collection of many search websites like Google Scholar, Pub Med, Sci-Hub, Centre of Disease Control, etc. It is used to enhance the awareness of weight management interventions with the help of evidence-based practice. Weight reduction can be accomplished by following the standard guidelines and different ways of weight management programs.

## INTRODUCTION

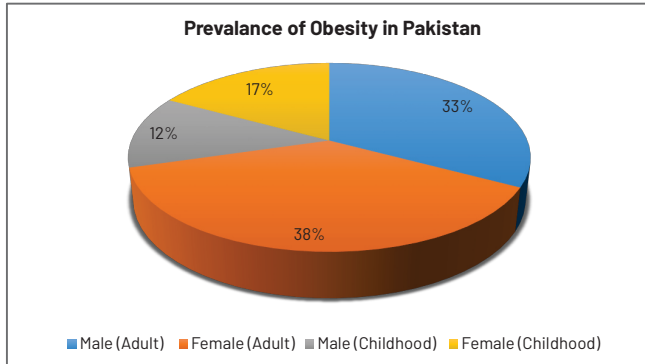
Obesity is the most common condition which affects the world and it is defined as the accumulation of abnormal fat in the body. It is a chronic condition that can cause serious health problems and is also the root cause of many diseases like hypertension, dyslipidemia, chronic heart disease, diabetes, gall bladder disease, stroke, varicose vein, musculoskeletal disorders, mental disorders, respiratory problems, etc [1]. It seriously affects the quality of life of a person and is the major cause of morbidity as well as mortality worldwide. According to the study, the prevalence of obesity is increased to double globally since the 1980s [2]. Basic measurement tools for the evaluation of weight are BMI (Body mass index) which cannot be

affected by the composition of the body, age, sex, etc., according to the study following are the categories of BMI measurement: below 18.5kg/m<sup>2</sup> is considered to be underweight, from 18.5 to 24.5 kg/m<sup>2</sup> is considered to be normal weight individual, greater than or equal to 25 to 29.9 kg/m<sup>2</sup> is considered to be overweight and greater than or equal to 30kg/m<sup>2</sup> is fall in obesity [3]. Waist circumference measurement shows the increase in fat at the center of the body of an individual which is due to the storage of deposition of internal fat and can be dangerous to increase the probability of liver, pancreas, heart, kidney, and other organs of the body [4]. Furthermore, an increase in the circumference of the waist is riskier for the health status of

an individual as compared to an increase in the levels of BMI [5]. For men waist measurement greater than 94cm and for women greater than 80cm is proved to be dangerous when measured by a measuring tape which results in an increased level of adiposity which can cause increased morbidity and mortality [6]. In addition, the waist-to-height ratio can be a good predictor of diabetes and heart disease more than BMI as keeping the waist circumference of an individual less than half of their height can reduce morbidity and mortality worldwide [7]. In the management of weight physical therapists can play a vital role because they have the ability and skills to recommend to people how to modify their unhealthy or sedentary lifestyles into a healthy daily routine [8].

### Prevalence of Obesity

WHO revealed new findings about obesity on World Obesity Day 2022, which stated as The total count of obesity is increasing day by day in the world greater than one billion of the population fall the in the obese category in which adults count was 650 million, adolescents 340 million, and the count of children was 39 million. About the estimation of WHO, 167 million of the population have a chance to become unhealthy and fall into the obese category by 2025 [9]. According to the Global obesity observatory, the prevalence of obesity in Pakistan is shown in the following Figure 1 [10].



**Figure 1:** Prevalence of obesity among adult and childhood males and females in Pakistan

### Causes of Weight Gain

These are the reasons that can increase weight: Some people are more prone to gain weight due to gene components. In addition, children of obese parents are more prone to gain weight [11]. People who are not doing enough activity have an increased risk of weight gain as compared to physically active individuals [12]. Food addiction is one of the reasons for gaining weight because people lose their control over the requirements for food. Marketing from the food producers also affects the behavior of people towards the choice of food. Excess intake of sugar can relate to increasing weight. Furthermore, the availability of junk food is now quite easy

and can help to gain weight [13]. According to the study, an inappropriate amount of sleep contributes to gain weight easily [14]. Higher levels of insulin cause an increase in the weight of an individual [15]. Lack of awareness or incorrect information regarding healthy lifestyle and nutrition among people contribute to weight gain [16].

### Prevention of Obesity according to WHO Guidelines

WHO is formulating a health plan to reduce the prevalence of obesity at the world level to overcome the amount of obese population at reduce the overall epidemic burden, especially in countries where it is at peak level [17]. In this regard WHO is working towards the reduction of obesity through the promotion of healthy lifestyle activities and education through which prevention of obesity can be achieved at the country level where it is required the most. Some key factors that can be used to prevent obesity as per guidelines are: 1. Weight gain can be prevented by the female right after the marriage and before the pregnancy period begins as well as the intake of a healthy diet during the antenatal period. Breastfeeding of a baby from birth to 2 years is recommended for better growth of children from birth. 2. At the country level there is a requirement to work with each other to provide healthy nutrition which can help to increase the accessibility of a healthy diet to the community easily. This can be achieved by the reduction of marketing strategies by the companies to limit people's unhealthy food and drink intake. And also make healthy food items at affordable prices that can increase accessibility to them. 3. At the city level there should be an arrangement of parks and grounds that can enhance the aerobic activities the people like walking, jogging, cycling, etc. 4. At the school level there should be an arrangement of training sessions that can increase the healthy dietary behavior of children. 5. Production of dietary products by the production companies by the elimination of Trans fats, sugar, salt, etc. 6. There should be the availability of information regarding the contents of food in every product like food color, and other nutrients of the food. 7. Marketing for the benefit of society through awareness programs by the government regarding the importance of a healthy lifestyle including physical activity and a healthy diet, etc. Implement appropriate social marketing campaigns. 8. At the Health sector level, Screening of weight in primary healthcare centers to reduce diabetes occurrence. Make sure the counseling sessions regarding healthy weight, and exercises during and after the pregnancy. There should be the establishment of targets by the country along with the effective formulation of the strategic plan and working with WHO for the implementation and evaluation of an action [18].

## METHODS

It is a literature review type of study which is completed by

searching 45 original research articles from the previous 25 years and browsing through different websites such as Google Scholar, Sci-Hub, Centre of Disease Control, PubMed, Scopus, Access Physiotherapy, Web of Science Core Collection, and Medline Plus through the searching of the terms related to our review literature topic: physiotherapy, weight management, BMI, weight gain, lifestyle modification, diet plan, work-out, etc. Mainly we used research articles that are experimental and are related to the reduction of weight from different techniques like exercise, diet, gym, etc. In this study, we tried to enhance the efficacy of the research by accurate selection of articles by observation reading and reviewing their abstracts and references systematically.

### **Weight Reduction**

Weight gain is the root cause of many diseases so it is necessary to highlight and overcome obesity with the consultants at the primary level. It is the responsibility of healthcare professionals to control it according to the proposed WHO guidelines [19]. Multiple factors should be applied to manage obesity which are Behavior modification, medications, surgical Interventions, dietary changes and exercise. Behaviour Modification: There is a need to consult with a psychotherapist to control the behavioral changes of an overweight person because many interventions can be offered by them to control the behavior of an affected person like the appropriate setting of goals, problem-solving strategy, stimulus, and stressor control therapy, restructuring of cognitive function, patient-centered care, and motivation, etc. These interventions can be proven to be more effective when they are combined with diet and exercise [20]. Medications: Some pharmacological agents are also available in the market to reduce the weight of an obese patient but it can be recommended for those persons who have a BMI equal to and greater than 30 kg/m [21]. Surgery: Surgical intervention is indicated in patients with equal to and greater than 40 kg/m<sup>2</sup> BMI without comorbid and equal to and greater than 35 kg/m<sup>2</sup> BMI in patients with comorbid conditions [22]. Postoperative patients should need lifestyle medication related to daily physical activity, exercise, and diet that can help to maintain body weight after surgery [23].

### **Dietary Changes**

For modification of diet, it is important to check body weight regularly. The inclusion of dietary food with low fat and carbohydrates is recommended by the healthcare professional to reduce the calories a person [24]. Intake of food with low carbohydrates can cause rapid weight loss in the early month as compared to food consisting of low fat [25]. In low-calorie diets, the content of carbohydrates is 60 percent high while the fat content is less than 30 percent

low which results in a reduction of energy for women. The glycemic index is lower and the fiber diet is high in a low-calorie diet [26]. According to the American Heart Association, low carbohydrates high in fat and protein content are not recommended. The Atkins diet was introduced in the 1970s and most people used this type of diet because it digests quickly which results in increasing the rates of insulin and glycemia [27]. This type of diet should be limited and the use of total energy is not important but the use of protein and fat is permissible. This diet plan should be used in combination with the consumption of vitamins, and minerals to maintain the health requirements [28]. For the preservation of lean body mass, vitamins, fats, and minerals that type of diet is used for the consumption of high protein. During the intake of this diet, the collaboration of a physician is necessary to reduce the side effects of the diet due to the changes in balance between the electrolyte and nitrogen [29]. This type of diet is contraindicated in obese people with a BMI of more than 30 kg/m<sup>2</sup> and should not be recommended for more than 16 weeks because this may lead to serious health issues [30]. This type of diet contains 12 to 15 percent of fat and it is used for the prevention of cardiac diseases [31]. According to the study, this type of diet should be used in combination with aerobic exercises cessation of smoking, and counseling of the concerned person. In this type of diet, the quantity of carbohydrates and fiber is high and the fat content is very low [32]. However, the after-effects of this diet are reduction of (Zn, Ca, and Fe) absorption and abdominal fullness [33]. The major key factors of diet plans are safety and avoid the risk factors that may lead to cardiac disease, cancer, and other medical issues related to weight loss [34]. To increase the validity of diet plans randomized control trials should be needed to increase the understanding of factors that can lead to the reduction of weight [35]. In addition, prior knowledge regarding preventive measures and the collaboration of healthcare professionals are needed to reduce weight safely [36].

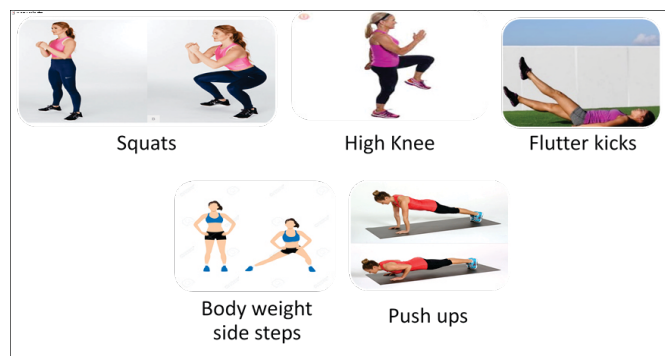
### **Exercise Recommendations**

Some essential key points related to exercises that are useful for weight reduction and prevention of re-weight gain are: Moderate to vigorous exercises are recommended for the person who wants to lose weight 200–300 min/week for maintenance of weight. A moderate level of exercise of 150–300 min/week is recommended for the prevention of reweight gain and fitness [37]. For individuals with a sedentary lifestyle, exercise recommendation is a very low start with a very low intensity that can be increased by the physical therapist according. Make a plan to perform exercises for the whole week as compared to doing all exercises in 1 day [38].

## Aerobic Exercises

Aerobic exercise is performed at a low to moderate intensity. Initiate exercise with walking because it is beneficial for burning calories. Walking is one of the best exercises to put minor pressure on your joints during day-to-day activities [39]. Many researchers studied that a person with 70 kg weight performs walking for at least 30 minutes at a pace of 6.4 kph burns 167 calories. It also includes running, swimming, high knee, flutter kicks, bodyweight side steps, cycling, squats, pushups, and jogging are also the best exercises for reducing weight [40]. Running: Many exercises are used in the reduction of weight but according to the study, running was proved to be an effective activity for reducing weight because the burning of calories is faster during running as compared to other activities like riding, etc [41]. Some recommendations that males and females should consider during running that are: 1. Running should be started gradually with the walk because it exerts less pressure on to lower limbs. It behaves like a preparation tool for a person who's doing an early workout. 2. As running is an aggressive activity it should be done on alternate days at the beginning of workouts for a few weeks. 3. To make this activity more beneficial gradually increase the track distance of running. To continue getting results from your running program, you need to run more. But if you increase your running volume too quickly, you are likely to become injured or overtired. The 10 percent rule is a good guideline for sensible running increases. To practice it, simply avoid increasing your total running distance or time by more than 10% from one week to the next [42]. Swimming: It is a very beneficial type of aerobic exercise that can provide us with many health benefits. According to the comparative study conducted between running and swimming in Australia, They work on the mechanism of buoyancy there were two groups one followed swimming and one group started walking throughout the research tenure with equal frequency according to the observation of vitals [43]. The result of the study showed better results of swimming as compared to running for weight reduction. As all major muscles of the human body are involved in swimming it is scientifically proven to be the exercise of the whole body and it can also provide the strengthening of muscles. The average period required to burn calories through swimming is two to five hours per week and maintenance of weight required one hour a week [44]. High knee: It is the simplest type of aerobic exercise which can reduce abdominal fat, be used to develop endurance, and power in measuring muscles used for locomotion [45]. For good results, it should be used in knee drives with high intensity. The procedure of exercise is as follows: Standing with arms at the side of the body, feet should be aligned in a width of hip-

to-shoulder placement. The head should be in a neutral body position. Now the contralateral movement of both knees with the hands above the level of the waist and towards the chest is required rhythmically. The intensity of exercise can be increased according to the convenience and ability of a person [46]. Flutter kicks: This exercise can be used to strengthen the muscles of the back, hip, and knee and helps to reduce belly fat. It is the most effective workout for core muscles [47]. The exercise recommendation according to the study is divided into three levels: ten to thirty seconds with three sets is required for beginners, thirty to sixty seconds of workout with four sets is required for the intermediate level and more than sixty seconds of workout is required with four sets for advance level [48]. Bodyweight side steps: It is also called lateral lunge, it is used to target the major muscles of locomotion: hamstrings, glutes, and flexors of the hip joint. Exercise of 5 to 10 repetitions with 3 sets is recommended for strengthening of muscles but for weight reduction and development of endurance 12 to 15 repetitions with 3 to 4 sets is recommended by the experts [49]. Cycling: Cycling is an effective method of aerobic training for weight management. According to the literature, cycling is a more supportable weight loss activity as compared to walking and running. It is recommended to cycle for an hour a day to burn five hundred calories even without dietary control, a person can reduce 1 pound weight in a week [50]. Squat: According to the research, squats can burn calories more than the use of a treadmill for an hour. It can cause the burning of calories up to thirty-five in a single minute [51]. Push-ups: This exercise is used to target the strength, and endurance of the major muscles of our body and also proved to be an effective way of reducing weight. It is reported in the study that one minute of push-ups can burn at least seven calories, and five minutes can burn twenty-eight calories depending on the speed of a person it can burn up to 48 calories at the same time [52]. Jogging: This is a type of low-intensity running and a very effective way of losing weight, reducing depression, and improving physical health. Burning of calories depends upon the time duration of this activity which is directly proportional to the capacity and cardiopulmonary status of an individual. The basic protocol of jogging is to initiate this at low intensity then the addition of track should be at 10% per week is recommended by the experts. This pattern of activity will help to prevent injury and stay healthy [53] (Figure 2).



**Figure 2:** Aerobic Exercises

**Anaerobic Exercises**

Anaerobic exercises are more intense but the duration of exercise is short as compared to aerobic. It includes jumping rope, cycling, weight lifting, Pilates, and sprinting. These exercises should be performed in 10 sets per week and 1 set contains 8 to 10 reps. Choose those exercises that are safe for the person decrease the risk of injury and can easily be performed [54].

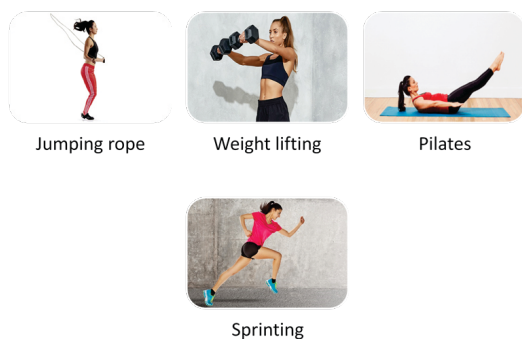
**Jumping Rope:** Jumping with rope is referred to as a smart workout that can save time and burn more calories. It is reported that 25 minutes of jumping rope can burn up to 250-300 calories for a 90 kg person [55].

**Cycling:** It is a type of recreational activity that can be used to lose weight. Half to one hour of cycling per day is recommended to burn calories [56].

**Weight lifting:** Weight lifting for weight loss should be used gradually from 20 to 35 minutes, in the beginning, it can help to reduce weight and also cause many risks of diseases like heart, lungs, kidneys, etc. It can also be used to maintain the strength of muscles [57].

**Pilates:** Pilates is a type of exercise that is used to make a connection between mental and physical activity at the same time which can be helpful for our bodies. Some benefits of this exercise are: strengthening of core muscles, reduction of depression, prevention of injury, and weight loss. The combination therapy of Pilates and cardiovascular exercise for 30 minutes five times a week can be an effective way of losing weight [58].

**Sprinting:** It is a fast calorie-burn exercise that can be used to reduce weight but it is less effective than one hour of jogging, swimming, and cycling [59] (Figure 3).



**Figure 3:** Anaerobic Exercises

**DISCUSSION**

The result extracted from our descriptive study is that exercises are very effective in reducing weight but the use of a single intervention was not as effective as the use of multiple weight loss strategies and nutritional management. Additionally, exercise seems to be effective in the antenatal and postnatal period of women which is a crucial time of maternal and child health [60]. A study reported that women who exercise daily have more energy consumption therefore they don't need to lose weight and they have a balanced weight on the other hand the non-exercising female is required to lose weight by increasing physical activity, exercise, and decreasing caloric intake in daily diet [61]. In another study in which an evaluation of exercise with and without dietary control was done, their result showed the female who exercised daily without dietary control lost weight in the slow pattern but the female who did exercise and diet significantly lost weight in the fast pattern [62]. In a study conducted on postpartum females in which the application of exercise with and without diet was evaluated, they reported a significant reduction of weight in exercise with diet group and they returned to pre-pregnancy weight as compared to the group of females who only do exercise [63]. There are many advantages of aerobic exercises as reported in many studies. According to the study aerobic exercises help improve the level of insulin sensitivity, and cardiac activity, beneficial for voluntary muscles, reducing stress, improving the quality of muscles, and improving the metabolic activity of an individual which results in reducing the weight of a person [64]. Another study reported that anaerobic exercises are a type of highly intensive training program so they can be useful for time-saving, burning more caloric, improving metabolism, and reducing weight in a short duration as compared to aerobic exercises [65]. In our literature, we highlighted the different interventions used for the management of weight in a healthy individual specifically the use of physical therapy exercises is proven to be an effective way of reducing weight in a life-saving manner but these exercises should be performed under the observation of a certified physical therapist.

**CONCLUSIONS**

Weight management is a broad field of programs that can be used in different ways like exercise, diet, etc. In Pakistan, obesity is a very common problem and should be controlled at the country level to reduce the risk of non-communicable diseases. This review will enhance the knowledge of the population regarding the different ways of weight reduction medical and conservative.

**Authors Contribution**

Conceptualization: KJ, SRB

Writing-review and editing: KJ, SRB, MFF, PL, BK, MA

All authors have read and agreed to the published version of the manuscript.

### Conflicts of Interest

The authors declare no conflict of interest.

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