

Non-Pharmacological and Non-Surgical Options to Combat Obesity

Abdul Qadeer Memon

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ABSTRACT

Objective: To provide a detailed and simplified information about the role of Non-pharmacological and Non-surgical options i.e. lifestyle, exercise and ketogenic diet to combat obesity.

Place and Duration of Study: This study was conducted as narrative review article at King Faisal University College of Medicine, AlAhsa, Kingdom of Saudi Arabia from January 2026 to June 2026.

Google Scholar and PubMed were searched for last ten years up to June 2026. Medical Subject Headings (Mesh) keywords were used. The filters were applied to include original articles, reviews, systematic reviews and meta-analysis, free/open access full text articles in English language.

Results/Review: By modifying the lifestyle and performing regular exercise, 5% to 10% weight can be lost. It helps to reduce obesity and has a positive psychological effect of feeling well. By diet control, there should be a daily deficit of 500 kcal over a period of one year to lose the weight. Ketogenic diet is different from low-carb diet in terms of proportion of fats, protein and carbohydrates and food species to be taken.

Discussion: It may feel difficult to adopt these strategies because the obese people have craving for food and different types of exercises may not be suitable for every patient due to morbid obesity and associated co-morbidities.

Conclusion: The lifestyle modifications, exercise and/or ketogenic diet may be tried to treat obesity. This modality may spare the patients from the side-effects of pharmacological and the complications of the surgical modalities. It may also be helpful to treat the psychological aspect in obese patients, which contributes a major role in gaining weight.

Key Words: Body mass index (BMI), Ketogenic diet, Obesity

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INTRODUCTION

The management of obesity includes a multidisciplinary approach. It starts with change in eating behavior, diet control i.e. low-carb diet or ketogenic diet, faux food, different types of physical exercises like brisk walk, aerobic/anaerobic, Yoga or Tai Chi etc. Pharmacotherapy may be considered as second line of treatment. These oral or injectable drugs may also help to treat co-morbidities like type-2 diabetes mellitus. None of the drugs is without side effects. Bariatric surgery may be suitable when these options fail to work and/or BMI is more than 35 kg/m^{1,2}

Assistant Professor, Department of Surgery, King Faisal University College of Medicine, Al Ahsa, Kingdom of Saudi Arabia.

Correspondence: Abdul Qadeer Memon, Assistant Professor of Surgery, Department of Surgery, College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia.
Contact No: +966-531441959
Email: drqadeermemon@yahoo.com
amuhammad@kfu.edu.sa
ORCID: <https://orcid.org/0000-0002-7071-9489>

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The bariatric surgery is aimed to reduce the size and capacity of the stomach for food or some intestinal bypass procedures, which may affect the absorption of food ingredients from the intestine. The aim of this narrative review is to discuss the role of non-pharmacological and non-surgical options of management of obesity.

BACKGROUND

Obesity is a heterogeneous disease. Hence, the response to the treatment with different modalities is variable. Obesity results from the primary metabolic as well as endocrine abnormalities. Risk factors of obesity include sedentary lifestyle, over-eating, socioeconomic status, familial/genetic etc. The central nervous system and circulating neuropeptide hormones work together to maintain the body's energy homeostasis. However, genetic inheritance has an impact on it.^{2,3} An important modulator of body weight, food intake and energy homeostasis is the melanocortin 4 receptor (MCR-4). The most prevalent hereditary form of extreme obesity is caused by its mutation or lack.⁴ There is a gut-brain axis. Its response is based on hunger or satiety, which is obtained when peripheral signals from the gastrointestinal tract, adipose tissue, and circulating hormones stimulate or inhibit central neurons.⁵ Dysregulation of this gut-brain axis leads to obesity

either by increased hunger or by decreased satiety. Leptin and ghrelin hormones also play a crucial role in the process by metabolic adaptation, which promotes obesity.⁵ Additionally, larger bites and faster eating are thought to be risk factors for obesity since they reduce feelings of fullness.^{6,7}

METHODS

Google Scholar and PubMed were searched for last ten years up to June 2026. The survey was carried out using combinations of Medical Subject Headings (Mesh) keywords. The filters applied during search of the articles included original articles, reviews, systematic reviews and meta-analysis, free/open access full text articles in English language. Search criteria included keywords such as "Obesity management in adults, Body mass index (BMI), Overweight, Life style, Exercise and Ketogenic diet."

RESULTS / REVIEW

Lifestyle/Exercise: The obese patients, before any medical/surgical interventions, should be referred to psychologists to help them change the behavior in their lifestyle. Evidence-based counselling techniques can assist in starting conversations with patients about therapy. The goal may be achieved through 5As (Assess, Advise, Agree, Assist, Arrange), which can guide shared decision-making with multiple sessions ranging from six to 24 months.⁸ Chronic stress and inadequate sleep can also have a detrimental impact on metabolism and hunger.⁹ The patients who are weight-conscious and regularly perform self-weighing, have been seen to improve weight loss and its maintenance. By this way, 5% to 10% weight can be lost.¹⁰

There is a vital role of physical activity to reduce the body weight and maintain it. The daily calories requirement in diet also depends upon the physical activity. Physical activity reduces adipose tissue in the body and preserves the lean mass. Walking for two minutes per hour, using the stairs, or doing 1800 steps a day on average are examples of moderate physical activity and exercise that may aid in weight loss from 0.5 to 1.5 kg.¹¹ American College of Sports Medicine (ACSM) has classified exercise into aerobic or anaerobic. The aerobic exercise consumes the oxygen present in the muscle to a level that still there is sufficient oxygen in the muscle to supply on demand. The activities in this category include running, cycling, rowing etc. The anaerobic exercise consumes the oxygen that is insufficient to meet the demands. Hence, alternative energy sources present in the muscle must be utilized. These sources preferentially are metabolism of carbohydrates, which produce lactic acid. Such activities include heavy exercise like weight lifting. To advise the intensity of the exercise, the comorbid conditions like cardiovascular disease, asthma, arthritis must be considered.¹² It is advised to engage in 150 to

300 minutes of moderate physical activity or 75 to 150 minutes of strenuous physical activity every week in order to lose weight or prevent weight gain. It is advised to engage in 200–300 minutes of intense activity per week if you want to lose a lot of weight. Initially, the exercise should be of lesser intensity and duration with slow and gradual increase.¹³ Yoga not only helps to reduce obesity but also has a positive psychological effect of feeling well and avoid depression.¹⁴

Diet control and ketogenic diet:

Calories and water intake: Adult males and females should consume 2600–2800 kcal per day and 2000–2200 kcal per day, respectively. Men and women between the ages of 19 and 30 who weigh about 75 kg are advised to consume 3.7 and 2.7 liters of water per day, respectively. Age, sex, weight, level of physical activity, humidity, ambient temperature, and other variables all affect how many calories and water are consumed. Obesity is caused by a positive energy balance.¹⁵ Therefore, in order to achieve weight loss through negative energy balance, energy intake must be reduced and energy expenditure must be increased. The European Food Safety Authority has recommended that there should be a daily deficit of 500 kcal over a period of one year to lose the weight. Fats contain twice energy as compared to carbohydrates and proteins. If a person wants to lose more weight by reducing calorie intake, it must be under supervision of a qualified physician/dietician. No doubt, the diet should be balanced with micro- and macro-nutrients to avoid deficiency and its consequences.¹⁶

Carbohydrates intake: Severe carbohydrates restriction is not necessary during weight loss program. If the total daily food contains 1200 to 1500 kcal, the carbohydrate content may be 135 to 245 g/day and for 1500- to 1800-kcal/day diet, it may be between 170 to 290 g/day.¹⁶

Proteins intake: Higher intake of protein is necessary, particularly in older adults. Inadequate protein consumption can result in significant loss of lean body mass, frailty, edema, hair loss, and skin abnormalities.¹⁶

Fats intake: If the total daily food contains 1200 to 1500 kcal, fats proportion may be 25 to 60 g/day, while if the total daily food contains 1500- to 1800-kcal, fats may be 35 to 70 g/day. Dietary fats will also help to prevent the deficiency of fat-soluble vitamins like A, D, E and K. Unsaturated fatty acids (poly- or mono-) should be preferred in the diet. Such fats are present in soybean, canola, olive and vegetable oils, fish, nuts and seeds.¹⁶ Apart from the macronutrients, the micronutrients (all vitamins and trace elements like iron, copper, zinc) must be considered in the diet.

Ketogenic diet: A ketogenic diet (KD) is a low-carb, high-fat, moderate-protein diet that mimics the breakdown of a fasting state without actually fasting in order to produce ketone bodies (3- β -hydroxybutyrate, acetoacetate, and acetone). The KD is different from the low carbohydrate or calorie-restricted diet. It contains

up to 70% fats, up to 25% proteins and only 5% carbohydrates (Figures 2).

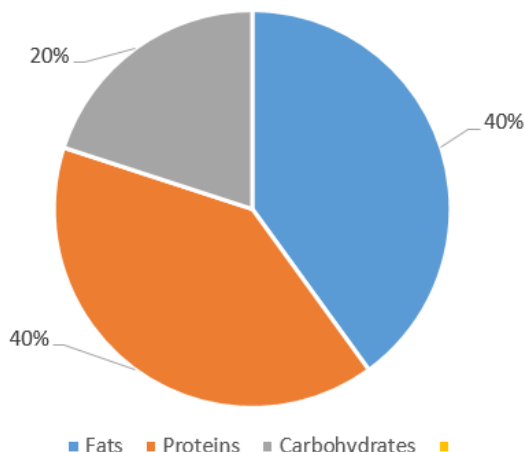


Figure No.1: Low Carbohydrates diet

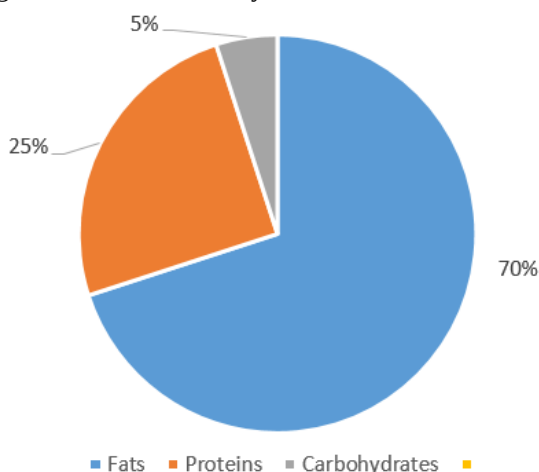


Figure No. 2: Ketogenic Diet

Encouraging fatty acid oxidation without altering protein intake is the aim of implementing a KD. This goal is achieved by reduced intake of carbohydrates, resulting in less insulin release. The metabolic process will have less effect on lean body mass; the fat will be mobilized preferentially for the calories supply (lipolysis) with a net result of caloric deficit.³¹ It provides greater feeling of satiety and controls the appetite better than the diets rich in carbohydrates. There are different varieties of KDs based on low carbohydrates. These include the Medium-Chain Triglyceride Ketogenic Diet, Atkins Diet, Modified Atkins Diet, Classical Ketogenic Diet, and Low Glycaemic Index Therapy.¹⁷ The KD must be started under supervision of a physician/dietician due to potential risks especially if it is for prolonged period. It must be given in phases of few weeks and then evaluated the outcome. Hunger, exhaustion, thirst, poor mood, irritability, constipation, diarrhea, headaches, cramping in the muscles, nausea, dizziness, gastrointestinal discomforts, loss of energy, changes in

heart function, kidney stones, and halitosis are all possible risks of KD. Some of these side effects appear at the beginning of the KD and are so-called 'keto-flu', which may disappear after few weeks (Figures 1&2).¹⁸

Chewing gum: One kind of faux/sham feeding is chewing gum. The faux food promotes gastrointestinal peristalsis and increases the salivary rate by just viewing, smelling, tasting, and chewing food without ingesting it. Like actual feeding, the sham feeding also reduces the hunger.¹⁹ Hence, chewing gum may reduce the appetite and gum mastication without ingestion of food will lead to increased energy expenditure leading to net loss of energy and suppress the craving for high-energy food.²⁰

Deep transcranial magnetic stimulation (dTMS): It is observed that certain areas of the brain are involved in dietary habits and food craving. These include prefrontal cortex, mesolimbic regions, precuneus and other areas. Application of a novel modality, the dTMS has been tried, which reduces weight/BMI by decreasing the leptin levels.^{21,22}

DISCUSSION

It is observed in this narrative review that different types of exercise, behavioral change towards food intake and ketogenic diet play vital role in reducing weight. Initially, it may feel difficult to adopt because the obese people have craving for food and different types of exercises may not be suitable for every patient due to morbid obesity and associated co-morbidities like osteoarthritis, cardiovascular and other problems. Hence, this line of management should be under supervision of a physician.^{23,24} Allice Bellicha et al in their systemic review observed that exercise-training programs and resistance exercise lead to a significant weight loss and fat loss from body and viscera. However, aerobic exercise does not reduce the weight or fat significantly.²⁵ Combined aerobic and resistance training (CART) plays a significant role in reducing weight. It also improves glycemic control in type-2 DM, blood pressure and many inflammatory markers like interleukin-6, TNF-alpha and CRP.²⁶ Moreover, the improvements in the inflammatory markers may help to alleviate the inflammatory conditions in obese patients like osteoarthritis. Different specific chemokines play a vital role in the development of obesity. Exercise has been observed to affect these chemokines and other inflammatory markers.²⁷

In a systemic review and meta-analysis, the role of very low-calorie ketogenic diet (VLCKD) was studied. The VLCKD showed its major role in reducing weight, waist circumference, blood cholesterol and other parameters. However, it has certain contraindications which include type-1 DM, kidney and/or liver failure, recent stroke, unstable angina, myocardial infarction, elderly patients, severe mental illness etc.²⁸⁻³²

Intermittent fasting has been observed to affect the dietary habits by affecting the circadian rhythm of the brain. It is not as effective as other dieting plans, but achieves the weight loss by restricting the energy intake.³³

Behavioral change with or without exercise may reduce weight from 5%-10%. Variety of pharmacological intervention may reduce the weight from 8%-21%, while bariatric surgeries may reduce the weight from 25%-30%.³⁴

It is recommended that every obese patient may be considered individually and the modality of treatment may be tailored accordingly. Among many factors to be considered, the fitness of patients for exercise, comorbidities like DM, heart, kidney, liver problems, pregnancy, breast feeding are few. Exercise programs or ketogenic diet should not be without supervision of a qualified health professional.

CONCLUSION

Obesity has different modalities of treatment. Before going for pharmacological or surgical modalities, the lifestyle modifications, exercise and/or ketogenic diet may be tried to avoid the complications of the above two modalities, which may be cumbersome. Non-pharmacological and non-surgical option may also be helpful to treat the psychological aspect in obese patients, which contributes a major role in gaining weight.

Limitations of the study: The search was limited to Pubmed/Medline and Google Scholar. The wider search may include more information.

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