MEAL REPLACEMENT AS A PART OF OBESITY TREATMENT: A NARRATIVE REVIEW

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Abstract

Obesity is thought to be a complicated, multifaceted chronic disease that results from the combination of environmental and genotypic variables. Implementing a wide strategy for obesity prevention and management is required given the variety and complexity of factors impacting obesity. Most healthcare practitioners use dietary therapies such calorie-restricted diets, Mediterranean diets, DASH diets, and intermittent fasting to encourage weight loss. Meal replacement products (MRPs) are used as part of a calorie restricted diet which helps to control our food choices and leads to calorie reduction. This article reviews the usage of MRP as a weight loss therapy and summarizes the literature about their effectiveness to reduce weight in patients with obesity. From the literature search, it can be concluded that MRPs contain a precise amount of macronutrients, micronutrients, and fiber to provide a nutritionally balanced meal. MRPs have been extensively studied as a weight loss therapy, and several scientific studies have confirmed their efficacy. The main ways that MRPs aid in weight loss are by reducing appetite and improving diet adherence, which makes it easier for individuals to stick to their diet plan and achieve their weight loss goals. Overall, MRPs should be considered as a viable treatment option for patients who are motivated to lose weight, as they offer a simple, convenient, and effective way to reduce calorie intake, improve diet adherence, and achieve sustainable weight loss. However, it is important to note that MRPs should be used as part of a comprehensive weight loss plan that includes regular physical activity and behavior modification strategies for long-term success.

Keywords: Obesity, Weight-loss, Meal Replacement

Introduction

The World Health Organization (WHO) defines obesity as having an excessive amount of body fat that is likely to be harmful to health (1). In 2016, the WHO reported that the prevalence of obesity in children and adolescents aged 5 to 19 had surpassed 340 million globally, almost tripling since 1975 (2). Specifically, the prevalence of obesity in Asian children was 5.8%, and in adolescents, it was 8.6% (3). An estimated 50.1% of adults in Malaysia are diagnosed with overweight or obesity, a condition which is seen as a major health crisis in most countries (4).

According to WHO, overweight and obesity categorized as body mass index (BMI) are those having equal to or more than 25 kg/m^2 and 30 kg/m^2 respectively. However, scientific evidence showed that in Asian countries, increasing number of diabetes mellitus and cardiovascular disease were observed at BMI lower than the cutoff point of 25, secondly Asians have more body fat percentage as compared to European nationals at similar BMI level. Therefore, the cutoff levels of BMI for Asian populations are set at 23 kg/m^2 as overweight and 27.5 kg/m^2 as obesity (6).

Obesity is thought to be a complicated, multifaceted chronic disease that results from the combination of environmental and genotypic variables. The main contributors to energy balance are diet and exercise, which are influenced by a variety of social, environmental, behavioural, genetic, and physiological factors either directly or indirectly (7). Obesity increases risk of diabetes, hypertension, cardiovascular diseases, obstructive sleep apnea, cancer, osteoarthritis which increases mortality and morbidity (8). Also, those who have obesity may experience bias and social shame (9).

Implementing a wide strategy for obesity prevention and management is required given the variety and complexity of factors impacting obesity. Individuals' needs and preferences should be considered when designing the intervention plan. Thus, multicomponent interventions that address nutrition, physical activity and psychological approaches towards obesity management should be executed rather than a single component intervention.

Nutrition interventions are one of the key strategies for enhancing general health, promoting a healthy connection

with food, and promoting realistic and enduring healthy eating patterns for each individual. A certified dietitian should be involved in providing the proper Medical Nutrition Treatment (MNT), which includes assessment, intervention plan and monitoring. MNT provided by a dietitian has proven to show improvements in weight changes which is additional -1.03 kg and BMI changes -0.43 kg/m^2 compared to usual care or written documentation (10). Besides, there are significant changes reported on waist circumference, glycemic control, reduction in LDL-C, triglycerides and blood pressure by following MNT (11).

Medical nutrition therapy in obesity treatment

The goal of MNT in obesity treatment is often weight loss which can be achieved by calorie reduction and positive behaviour changes towards diet (12). Many dietary approaches have been studied for their effects on body weight, cardiometabolic risk factors, and problems associated with obesity. Calorie restricted diet, Mediterranean diet, vegetarian diet, Dietary Approaches to Stop Hypertension (DASH) diet, intermittent fasting are the common dietary approaches used in clinical settings (13).

General approaches such as educating the patient on portion control, food labels, tips to manage hunger and cravings are often used during the counselling session to encourage the patient to lose weight (14). Healthy plate portions which are endorsed by the Health Ministry of Malaysia can be a great tool to educate patients on portion control. This is because the Healthy Plate concept promotes a balanced and diverse diet that includes moderate portions of different types of foods. It illustrates how to create a balanced meal by visually representing the recommended amounts of food to be consumed on a single plate (15). This healthy plate portions advocate a quarter plate of carbohydrate foods, a quarter plate of protein foods and a half plate of vegetables and fruits.

Calorie restricted diet is often regarded as a more structured dietary patterns used in obesity treatment. Research on calorie restriction generally fall into three categories: moderate (1300-1500 kcal/day), low calorie (900-1200 kcal/day) and very low-calorie (< 900 kcal/day), with intervention periods ranging from three months to three years (16). Usually, a structured meal plan will be given to patients based on the calorie prescribed. Besides the structured meal plan, Meal Replacements Products (MRP) are commonly used in a calorie restricted diet as a partial replacement or total replacement.

Meal replacement as a part of medical nutrition therapy

MRPs are formulated products for weight reduction, with extremely low energy content intended to replace the diet as a partial or sole dietary source of energy and essential nutrients (17, 18). MRPs can be utilized into a comprehensive meal plan for weight loss and weight maintenance (19). They are usually prepared as a soup, drink, or snack bar.

Malaysian Clinical Practice Guidelines and Australian Clinical Practice Guidelines for Obesity recommends MRP usage as a part of Very Low Calorie Diet (VLCD) for patients with BMI > 30 kg/m^2 and BMI of 27 to 30 kg/m^2 who have comorbidities that might respond to rapid weight loss (7, 12). The National Institute for Health and Care Excellence (NICE) guidelines advise that this low-energy diet type may be taken into consideration for weight management, providing care is made to ensure they are nutritionally balanced (20). In 2010, the European Food Safety Authority (EFSA) concluded that MRPs are effective for both weight loss and maintenance (21). The use of MRP as a component in a comprehensive weight loss programme received a good rating from the Academy of Nutrition & Dietetics (AND) recently (22).

The use of MRPs in a calorie-restricted diet aids patients in sticking to a meal plan by reducing problematic food options and easing the burden of choosing what to eat. Moreover, MRPs can improve dietary adherence by controlling portions and reducing dietary variety and convenience. (23-25). The changes that happen in neurological pathways that control appetite, hunger and cravings through the use of MRPs lead to weight loss (23).

Types and content of meal replacement products

MRPs that are usually in beverage form (powder/ready to drink formula), snack bar or soup can be categorized into partial meal replacement and total meal replacement. Partial meal replacements are used to supplement the diet or to replace one or two meals a day as a part of Low Calorie Diet (LCD). Total meal replacements are usually used for VLCD which intend to provide calories ranging 500-800 kcal/day (18) to replace all the meals in a day along with some additional no-calorie or low calorie foods.

MRP are often high in protein and low in carbohydrates because they are made to promote quick weight loss without causing significant lean body mass loss (17, 18). There are a few regulatory bodies that have proposed the recommended content for complete MRPs. In the European Union countries, MRPs are regulated by Directive 96/8/EC of February 26, 1996 and they proposed that for total MRP, it should have a minimum calorie of 600 kcal, 75g-105 g/day of protein, 30 g/day of carbohydrate, 11 g/day of Linolenic acid, 1.4 g/day of Alpha-linolenic acid, 950 mg/day of calcium, 730 mg/day of phosphorus and other essential nutrients (21).

In Canada, MRPs are governed by the Canadian Food Inspection Agency. They set several requirements intended for MRP such as minimum calorie content per serving is 225 kcal, 15-40% of protein and not more than 35% of fat from the calorie available, 200-400 mg of calcium, 250 mg of sodium, 250-500 mg of phosphorus per serving and so on (26).

In Malaysia, Food Safety and Quality (FSQ) Division under Ministry of Health is responsible to monitor and regulate

the marketing and sales of MRPs. FSQ has adopted guidelines from Codex Alimentarius to regulate the MRP usage in Malaysia. They set requirements for the labelling such as to include total weights and percentages of carbohydrates, protein and fat, to include total energy value in the package or the total energy in each 100 ml or 100 g (27). However, there are no requirements set for the content of MRP in Malaysia.

Research outcomes using meal replacement products

Many earlier systematic reviews and meta-analyses have demonstrated that highly energy-restricted diets with the use of MRP are safe and effective for long-term (>1 year) therapy of obesity-related comorbidities in persons with a BMI 25 kg/m^2 (24, 28).

A low-calorie diet composed of MRP shows a greater weight loss compared to conventional foods, which is 2.54 kg and 2.43 kg for the 3 month and 1 year follow ups respectively (24). Another systematic review and meta-analysis of 23 randomized control trials documented that diet that include partial MRP attained more weight loss in one year period versus diet programs without use of partial MRP (29). A long-term study showed the usage of MRP in a VLCD reported weight loss outcomes of -6.2% in the first year and -2.3% in year three (30).

The Look AHEAD (Action for Health in Diabetes) trial is thought to be the most extensive whole lifestyle intervention for type 2 diabetics. In this trial, participants are instructed to use MRP to replace 2 meals per day with liquid meal replacements and one snack per day with a bar meal replacement. According to the trial's findings, participants who adhered to MRPs more closely had weight reduction that was four times as great as the intended amount (about seven pounds lost in a year) compared to those who did not (19).

Practices towards meal replacement products

Various guidelines suggest prescription of MRP for Very Low-Calorie Diets (VLCD) should be done under supervision by healthcare professionals (7, 12, 31). Healthcare professionals should follow safety measures and guidelines when prescribing MRP and Very Low-Calorie Diets (VLCD) to ensure the safety and well-being of patients. This includes assessing the patient's suitability, educating patients, prescribing appropriately, monitoring regularly, encouraging adequate hydration and nutrient intake, and gradually transitioning patients off the diet. By exercising caution and following guidelines, healthcare professionals can provide safe and effective treatment to patients (32).

In addition, choosing MRP that are recommended by healthcare professionals and of good quality is crucial. Optifast (33), and SlimFast (34) are reputable programs while that are specially designed to educate, while Herbalife high-protein product (35) are formulated to meet nutritional requirements, provide satiety, and facilitate safe and effective weight loss. However, there are many "scam" MRP products that may contain harmful ingredients, have misleading claims, fails to meet safety standards, and may often be accompanied by side effects (36). To avoid these products, it is advisable to carefully review product labels and ingredients, look for products that have been clinically tested and approved, and consult with a healthcare professional before beginning an MRP program.

In fact, primary care doctors and dietitians/nutritionists are the frontline professionals in managing adults with overweight and obesity as they are the most frequently contacted professionals in weight loss treatment. Primary care doctors have a significant role in weight management cases as they are often involved in providing initial counselling (9, 37) and they can identify the patients who need MRP as an obesity treatment. Dietitians/nutritionists are responsible to structure a calorie restricted meal plan involving MRP as they are specialized in weight management (38).

VLCD should be tailored according to individuals' nutritional requirements based on age and sex, taking into consideration that MRPs are available in different nutrition formulation and cost (39). Recommending enough protein intake can help to promote adherence by reducing the desire to eat (40). Integrating daily exercise with a VLCD that includes MRP can provide a more effective way to lose weight. It is recommended to start slowly and choose low-impact exercises, plan workouts ahead of time, and time them between meals to maximize weight loss and prevent fatigue. Additionally, it is always advisable to stay hydrated throughout the day and during exercise and to avoid pushing too hard beyond capacity. In short, combining exercise with a VLCD that includes MRP can provide more promising results in achieving weight loss goals (41).

There are some side effects from following VLED such as lethargy, light headedness or dizziness, constipation, menstrual irregularities, gastrointestinal intolerance, dry skin and gallstone (42). Thus, healthcare providers who are commencing MRPs to an individual's diet should ensure that the diet contains adequate fat and fibre level to reduce the occurrence of gallstones formations, constipation problem and by this it helps to promote the adherence as well (43).

According to a study, the usage of meal replacement diet with low-quality protein and poor medical oversight led to roughly 60 deaths, many of which were linked to a loss of lean body mass and, specifically, cardiac muscle atrophy (44). According to a study conducted in Australia, MRP is widely available and commercialized, indicating that it is widely used by the general population and that it is accepted as a weight-loss option. However, utilisation among doctors and dietitians/nutritionists is still minimal (45). Just 3.2% of Australian dietitians were found to recommend MRP as a weight-loss therapy, according to a study among those professionals (45).

Moreover, according to a different survey, MRP is the least popular weight-loss strategy among physicians in United States (46), likewise among British physicians which is about 2% (47). MRP is readily available in many retail pharmacies and hospitals in Malaysia. However, there is no data to show the usage level of MRP by doctors and dietitians/nutritionists in Malaysia.

Conclusion

MRPs are proven to be effective weight loss therapy through scientific studies because they decrease appetite and hence improve diet adherence. Thus, it should be one of the active treatment options given to patients who are keen to lose weight. More research should be done in Malaysia to know the practices towards MRP in order to create appropriate strategies to encourage usage.

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Competing interests

The authors declare that they have no competing interests.

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