



A Stepwise Approach to Prescribe Dietary Advice for Weight Management in Postpartum and Midlife Women

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Abstract

Weight retention and weight gain during the postpartum and midlife period subsequently increase the risk of chronic health conditions, thereby deteriorating the overall health. Dietary intervention is the pivotal component of sustainable weight management. However, in resource restricted settings, where dietitians may not be present, other healthcare professionals such as physicians, obstetricians, and paediatricians should play a vital role in providing timely weight management advice to these women. Therefore, this article provides dietary advice including the setting of realistic weight loss goals, identifying an individual's calorie needs, distribution of macronutrients and consideration of important micronutrients. Healthcare professionals can follow the stepwise approach to prescribe dietary advice to postpartum and midlife women for their weight management. Various dietary principles such as cultural and regional preferences of an individual, portion size, hypocaloric diets, nutrient-dense meals, eating habits, cultural beliefs and myths along with co-morbid conditions should be taken into consideration by healthcare professionals while providing the dietary prescription.

Keywords Women · Postpartum · Midlife · Weight management · Dietary advice · India

Introduction

The prevalence of obesity is rising in women in both developed and developing countries [1]. Among women, various physiological, biological, hormonal, psychological and

nutritional changes especially during postpartum and midlife phases are associated with excessive weight retention and weight gain [2, 3]. Various sociocultural myths such as excessive calorie consumption, increased intake of *ghee*, intake of high fat and sugar-based galactagogues especially in the postpartum period are also associated with increased weight [4]. Excessive weight gain may lead to the development of cardiometabolic complications such as type 2 diabetes, dyslipidaemia, hypertension, stroke, and certain types of cancers such as breast and ovarian cancers [5, 6]. This underscores the need to prioritise weight management among women.

Weight management involves the shedding of excessive body weight and prevention of regaining the lost weight [7]. One of the most effective components of achieving appropriate body weight is dietary management [8]. The dietary advice depends on numerous factors such as body

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mass index (BMI) of the patient, physical activity status, and breastfeeding status (for postpartum women) [9]. These factors should be taken into account by a registered dietitian while prescribing the individualised diet to the patient. However, registered dietitians might not be available in every healthcare setting particularly when resources are limited.

Women during the postpartum period commonly visit gynaecologists and paediatricians while midlife women visit physicians for health-related issues other than their own weight management. Such healthcare providers may lack appropriate knowledge about dietary advice. This highlights the importance of developing stepwise dietary guidance that can easily be followed by healthcare professionals such as gynaecologists, paediatricians, and physicians to facilitate generic dietary advice to postpartum and midlife women for their weight management and encourage them to take professional advice from a qualified nutritionist, whenever feasible.

Weight Loss Goals and Calorie Estimation

Women with BMI in the overweight and obese categories should be advised weight loss. Women lying in the normal BMI range yet having a higher waist circumference (more than 80 cm) or a higher total body fat percentage (more than 30–38%) or retaining ≥ 4.5 kg weight as compared to the pre-pregnancy weight should also be taken into consideration for weight loss [10]. The weight loss goals should be realistic, patient-centric, and should assist in improving lean

body mass and reducing fat mass without compromising the nutritional status of an individual [11, 12]. A weight loss of 5–10% of total body weight is considered to be clinically significant as it fosters the loss of abdominal and intra-hepatic fat [13] and subsequently improves various blood parameters such as blood glucose, blood pressure, and blood lipid levels in all BMI categories [14]. Such a goal can be accomplished by providing an adequate calorie diet to attain the weight loss of 0.5–1 kilogram per week usually over a period of six months [12]. However, it should be taken into consideration that the higher the degree of obesity [Obese I (BMI: 25–29.9 kg/m²) or Obese II (BMI: ≥ 30 kg/m²)], the longer it may take to reach the target body weight. Weight loss goals can be accomplished by adjusting the calorie intake of an individual based on basal metabolic rate (BMR), BMI, and physical activity level (PAL) of an individual. Further adjustments must be made specifically for postpartum and midlife women. A method based on total energy expenditure (TEE) to calculate energy requirements [15–17] is explained in Table 1. Another method based on an individual's activity level, BMI status, and ideal body weight (IBW) for calorie estimation is explained in Table 2.

Principles of a Dietary Prescription

A dietary prescription is based on several principles which determine sustainability in the long run. Personalised, realistic, and patient friendly dietary prescriptions are easy to follow and ensure better adherence with successful outcomes.

Table 1 Calorie estimation for postpartum and midlife women in terms of total energy expenditure. *Source* [15]; [16]; [17]; [18]

Calculate Basal Metabolic Rate (BMR): BMR is the amount of energy required to perform the metabolic functions important for the body, for example, cellular activity, respiration, circulation etc. BMR of an individual can be directly calculated using the age-specific and weight dependent Harris-Benedict equation proposed by FAO/WHO/UNU 2004.

Equation (Female, Age 18–30 years): $14.8 \times \text{Body Weight (kg)} + 486.6$

Equation (Female, Age 30–60 years): $8.1 \times \text{Body Weight (kg)} + 845.6$

However, ICMR has proposed that BMR for Indian females is 9% lower than international standards.

Identify Physical Activity Level (PAL): Physical activity is categorised into sedentary, moderate, and heavy intensity activity levels with PAL values of 1.4, 1.8 and 2.3, respectively.

Sedentary activities include sitting, lying down, sleeping, watching television and desk jobs. Moderate activities include brisk walking, dancing, washing windows, mopping, playing outdoor games like badminton, and occupational activities such as farming.

Vigorous/heavy intensity activities include high-intensity sports activities such as basketball and soccer games, hiking, occupational activities such as mining.

Calculate Total Energy Expenditure (TEE): $TEE = BMR \times PAL$

Estimate energy requirement: Energy intake should balance the energy expenditure. Hence, the computation of TEE will help to estimate energy requirements for specific body weight and activity levels summarised in Supplementary Table 1.

Estimate energy requirement for postpartum women: Adjustments must be made specifically for postpartum women. The energy requirements increase for postpartum women breastfeeding their infants by 600 kcal during the first six months and by 520 kcal during the seven to 12 months post-delivery. However, to reduce the weight of overweight and obese postpartum women, 500 kcal per day should be subtracted from the obtained value.

Estimate energy requirement for midlife women: In order to reduce the weight of midlife women, energy intake should be less than energy expenditure. Thus, 500–1000 kcal per day should be subtracted from the obtained value of energy requirement to achieve 0.5 to 1 kilogram weight loss per week.

Table 2 Calorie estimation for postpartum and midlife women in terms of body mass index

Calculate Body Mass Index (BMI): The BMI of an individual can be calculated using the formula,

$$\text{BMI} = \text{Weight}(\text{kg})/\text{Height}^2(\text{m}^2)$$

The Asian cut off values given below should be used to identify the BMI category of an individual.

<18.5 kg/m² = Underweight; 18.5–22.9 kg/m² = Normal; 23–24.9 kg/m² = Overweight; ≥25 kg/m² = Obese.

Identify Physical Activity Level (PAL): Physical activity is categorised into sedentary, moderate, and heavy intensity activity levels with PAL values of 1.4, 1.8 and 2.3, respectively.

Sedentary activities include sitting, lying down, sleeping, watching television and desk jobs. Moderate activities include brisk walking, dancing, washing windows, mopping, playing outdoor games like badminton, and occupational activities such as farming.

Vigorous/heavy intensity activities include high-intensity sports activities such as basketball and soccer games, hiking, occupational activities such as mining.

Calculate Ideal Body Weight (IBW): The IBW can be predicted using the following equation,

For medium build women, IBW = 45.5 kg for the first five feet + 2.3 kg for each additional inch.

The obtained value should be subtracted by 10% for women with small build and added by 10% for women with heavy/large build.

Estimate energy requirement: Energy requirements per kilogram IBW (kcal/kg IBW) for women can be calculated by multiplying IBW and energy requirements (provided below) considering the activity level and nutritional status of the patient.

Energy requirements (kcal/kg IBW)

Activity level	Obese	Normal weight	Underweight
Sedentary	20-25	30	35
Moderate	30	35	40
Heavy	35	40	45-50

Estimate energy requirement for postpartum women: Adjustments must be made specifically for postpartum women. The energy requirements increase for postpartum women breastfeeding their infants by 600 kcal during the first six months and by 520 kcal during the seven to 12 months post-delivery. However, to reduce the weight of overweight and obese postpartum women, 500 kcal per day should be subtracted from the obtained value.

Estimate energy requirement for midlife women: In order to reduce the weight of midlife women, energy intake should be less than energy expenditure. Thus, 500-1000 kcal per day should be subtracted from the obtained value of energy required to achieve 0.5 to 1 kilogram weight loss per week.

Source: [16]; [17]; [18]; [46]; [47]

Some important dimensions that make the diet plan sustainable for the long term are discussed below.

Realistic Goals

Postpartum women should attain either their pre-pregnancy body weight or the IBW. Similarly, overweight and obese midlife women should also reach their IBW for height by setting achievable and realistic weight loss goals for a specified time [13], for example, consumption of four to five servings of vegetables and fruits in a day, consumption of no more than two teaspoons of simple sugar throughout the day, and targeting weight loss of about 0.5–1 kilogram in a week.

Distribution of Macronutrients and Micronutrients

Sustainable dietary prescription for weight management should be planned with an aim to provide adequate levels of macronutrients and micronutrients for optimum health in addition to weight loss. Different approaches of macronutrient alterations such as high-carbohydrate moderate-fat moderate-protein (balanced nutrient reduction diets), low-carbohydrate high-protein moderate-fat (Zone Diet, South Beach diet), low-carbohydrate high-fat moderate-protein (Dr Atkin's Diet), and low-fat high-carbohydrate moderate-protein (Dr Dean Ornish Diet) have been suggested for weight loss [13, 18]. However, among all, a balanced composition diet constituting 50–60% energy from

carbohydrates, 15–25% energy from proteins, and less than 30% energy from fats has been found to be successful for sustainable weight loss [13, 19, 20]. Certain important considerations of macronutrients for sustainable weight loss are summarised in Table 3, while Table 4 covers important considerations of some micronutrients for health promotion and well-being of postpartum and midlife women.

Patient-Friendly Dietary Advice

Healthcare providers should provide a dietary prescription according to the personal preferences and eating habits of an individual for better adherence [21]. For example, a vegetarian woman should be prescribed high-protein sources such as milk and its products, cereal–pulse combination, and soy, rather than egg white, chicken, and fish. Cultural and regional preferences should also be taken into consideration (Table 5).

Small and Frequent Balanced Meals

Small, frequent meals comprising three major and two–three minor meals/snacks in a day help spread total energy requirements throughout the day. This promotes appetite control, prevents binge eating, reduces cravings and consumption of energy-dense meals at one go [7].

Hypocaloric, Nutrient-Dense Meals

Hypocaloric diet targets weight loss by cutting down around 500–750 kcal of usual intake to obtain a negative energy balance [18]. A hypocaloric diet of 1200–1500 kcal is usually prescribed for midlife women aiming for weight loss [2]. Obese postpartum women should have a calorie deficit diet of 500 kcal ranging between 1200 and 1800 kcal/day; however, if the woman is breastfeeding additional 300 kcal need to be included [3]. The quantity and quality of food products consumed in major and minor meals determine the day's energy intake, with the majority of the daily diet's calories being obtained from major meals. Hence, covering half a plate with fiber-rich vegetables and quarter of a plate with a good quality protein source in every major meal should be encouraged [8]. Such foods have a good satiety value, control the appetite, and prevent binge eating, thus preventing the excessive food intake [22]. Less energy-dense yet high nutrient-dense options under 200 kilocalories [8] such as vegetable salad, fruit *chaat*, and broth-based vegetable soups should be recommended for minor meals.

Monitoring Portion Size

Consumption of larger portion sizes of food often leads to over-eating and subsequent weight gain. Techniques such as using smaller dishes, smaller bowls and plates, avoiding watching television, or using phones while eating help in identifying satiety cues [19]. Using a plate as a scale for estimating the right portion of different food groups such as covering half a plate with vegetables and salad, quarter with protein and rest with complex carbohydrate can be a useful technique for portioning.

Dealing with Cravings and Comfort Foods

Psychological distress and mood swings due to hormonal imbalance are quite common among postpartum and midlife women. This subsequently leads to cravings and emotional eating episodes [3, 23]. Strategies such as ensuring consumption of five to six small, frequent meals may help in managing cravings. Increasing awareness among women about the selection of healthier food options (Table 6) may help them to choose low-calorie foods during their emotional eating episodes.

Eating Habits During Festivities and Social Gatherings

Indian festivals are usually incomplete without sweets and special preparations that are high in fat and sugar. Food habits during festivities and social gatherings greatly hinder weight management journey. Women should be educated about healthy eating practices that can be adopted during outings and festivities. Strategies such as reducing the portion size

by eating in small dishes or sharing the food can be helpful when eating out [24]. Healthier food products such as opting for multigrain bread instead of refined ones, and hung curd/vegetable sauce instead of mayonnaise or cream-based dressings should be emphasised. Increased portions of protein- and vegetable-based dishes can be picked [22].

Improvising Traditionally Prepared Energy-Dense Galactagogues

Postpartum women are given traditionally prepared energy-dense food products loaded with fat and sugar to enhance milk formation and promote post-delivery recovery [3]. Substitution of fat and sugar with fiber-rich vegetables such as GLVs and coarse grains and millets such as *ragi*, *bajra*, etc., can improve the nutritional quality of these foods.

Reading Food Labels

Food packaging is often attractive, and customers tend to buy products without reading the food label. For healthy and conscious eating, comparing products in terms of nutritional values and ingredients is important [25]. Analysing food based on nutritional content especially calories and protein content, amount of added fat, salt, and sugar, ingredients used, portion size and serving must be advised. Therefore, the importance and technique of reading food labels must be emphasised during the counselling.

Choosing Right Cooking Methods

Cooking methods using air, water, or steam as a medium should be preferred over other methods that use fat as a medium. Techniques such as baking, steaming, boiling, grilling, braising, and sauteing should be preferred over deep and shallow frying to prevent excessive calorie consumption [26].

Addressing Cultural Barriers Associated with Diet to Improve Adherence

Weight loss process has always been associated with several cultural beliefs and perceptions. These may act as potential barriers in either initiating the weight loss journey or hindering the successful weight loss outcome [27]. Hence, healthcare providers should address these barriers to improve adherence to appropriate dietary advice. Some common myths among postpartum and midlife women are discussed along with the facts in Table 7.

Taking into consideration the various principles of dietary prescription, the template and the sample of seven days menu plan for postpartum and midlife women to be referred by healthcare professionals are presented in the Supplementary Table 2.

Table 3 Important considerations of macronutrients. *Source* [13]; [16]; [29]; [41]; [42]**Carbohydrates**

A balanced diet should derive 50–60% of total energy from carbohydrates.

A diet containing complex carbohydrates should be preferred over simple carbohydrates.

Complex carbohydrates are the sugars bonded in complex chemical structures.

They are low in the glycaemic index and have higher fiber content, usually taking longer to digest providing early satiety and a steady increase in blood glucose levels.

Simple carbohydrates have a high glycaemic index.

They get digested quickly and produce a spike in blood glucose levels.

Emphasis should be laid on the high fiber diet. Soluble fiber lowers LDL (bad cholesterol) levels.

Soluble fiber also improves blood glucose levels by decelerating the absorption of glucose.

Dietary fiber intake of around 15g/1000kcal is advisable.

Sources of complex carbohydrates (to be consumed in moderation): Whole cereals (whole wheat, oats), Millets (finger millet (*ragi*), pearl millet (*bajra*), sorghum (*jowar*)), fruits (guava, apple, pear), and vegetables (beans, brinjal, GLVs)

Specific sources of soluble fiber (to be consumed in moderation): Whole cereals (barley, oats), fruits (apple, citrus fruits), vegetables (peas, beans, carrots)

Sources of simple carbohydrates (to be restricted/avoided): Refined cereals (refined flour (*maida*), semolina (*sooji*), white rice, and white bread), added sugar (in tea, coffee, and other beverages including sugar-sweetened beverages such as colas), refined and processed food products (pasta, pizza, waffle, breakfast cereals, biscuits, rusks, cakes, etc.)

Proteins

A balanced diet should derive 15–25% of total energy from proteins.

Increased protein requirement during the lactation period is attributed to the protein content of breast milk.

+16.9 grams in the first 6 months.

+13.2 grams in 7–12 months post-delivery.

A protein-rich diet is required to prevent musculoskeletal issues among midlife women.

Dietary prescription for weight loss should have an emphasis on the quality of protein.

High-quality proteins providing essential amino acids should be preferred over low-quality proteins.

Protein sources with high-fat content should be replaced with protein sources with lower fat content.

Sources of high-quality protein with lower fat content (to be consumed in moderation): Low-fat milk and milk products, egg-white, fish, lean meat such as chicken breast, nuts, soybean, cereal–pulse combinations

Sources of high-quality protein with higher fat content (to be restricted/avoided): Full-fat milk and milk products, cheese, whole eggs, and red meat

Fats

Balanced diet should derive 20–30% of total energy from fats.

Fat being the most energy-dense macronutrient should be consumed in a restricted manner.

Consumption of saturated fats should be restricted to less than 10% of total energy.

10–15% of total energy should be obtained from MUFA and 5–8% from PUFA.

Consumption of trans fat should be totally restricted to less than 1% of total energy.

Cholesterol intake should be within 200–300 mg/day.

Visible fat of 20–30 grams/day for adult women and 30 grams/day for postpartum women is advisable.

Invisible fat should be minimum of 10% fat from foods other than visible fat sources.

Sources

Visible fat (to be used in moderation): Cooking oils (rich in MUFA and PUFA) used in rotation or as a blend.

MUFA-rich cooking oils: Mustard oil, canola oil, rice bran oil, sesame oil, groundnut oil, olive oil

PUFA-rich cooking oils: Flaxseed oil, sunflower oil, soybean oil, corn oil

Visible fat (to be restricted/avoided): Saturated fats: Ghee, butter, vanaspati, PHVO, fatty cuts of meat

Invisible fat (to be consumed in moderation): MUFA and omega-3 PUFA rich foods: Avocados, nuts and oilseeds (almonds, cashews, walnuts, flax seeds), milk and milk products, lean chicken, and fish (salmon, tuna)

Invisible fat (to be restricted/avoided): Foods rich in saturated and trans fats like processed and bakery products

LDL: Low-density lipoprotein; GLVs: Green leafy vegetables; MUFA: Monounsaturated fatty acids; PUFA: Polyunsaturated fatty acids; PHVO: Partially hydrogenated vegetable oil

Dietary Tips for Common Comorbid Conditions

Obesity is often associated with several chronic diseases such as dyslipidaemia, diabetes mellitus, and hypertension [5, 6]. Healthcare professionals should consider these comorbidities while prescribing dietary modifications. Special attention is needed for postpartum women who had gestational diabetes and hypertension during pregnancy to avoid

further complications. Important considerations for some of the common comorbid conditions have been presented in the following section.

Diabetes Mellitus

Achieving a weight loss goal of $\geq 2\%$ initiates the improvement in glycaemic and HbA1c levels. Higher the weight loss, greater is the benefit in glycaemic outcomes [14].

Table 4 Important considerations of certain micronutrients. *Source* [9]; [16];[40]; [43]; [44]; [45]

Micronutrient	Recommended dietary allowance		Considerations	Rich sources
	Postpartum women	Midlife women		
Iron (mg/day)	23	29	Adequate iron intake is important to prevent anaemia among postpartum women. Optimum iron intake is required for midlife women as they face a range of menstrual irregularities. Vitamin C-rich food consumed with iron-rich foods enhances iron absorption. Foods with high tannin content (tea, coffee, tamarind) should be restricted as they interfere with iron absorption.	<i>Animal products:</i> Poultry, fish, egg <i>Cereals and pulses:</i> Amaranth seed, pearl millet (<i>bajra</i>), bengal gram flour (<i>besan</i>), bengal gram (<i>chana</i>), <i>rajma</i> , soybean <i>GLVs:</i> Fenugreek leaves (<i>methi</i>), <i>bathua</i> leaves, amaranth leaves (<i>ramdana</i>), mushrooms <i>Nuts and seeds:</i> Peanuts, almonds, sesame seeds
Calcium (mg/day)	1200	NPNL: 1000 PMW: 1200	Additional calcium among lactating women is accounted for women's requirements and breast milk secretion. Extra calcium is required in midlife to prevent bone-related issues with aging and menopause. Optimum vitamin D levels should be achieved for enhanced calcium absorption. Foods rich in phytates (whole grains, pulses, soy products) and oxalic acid (beetroot, spinach, sweet potato) should be limited for better calcium utilisation.	<i>Cereals and pulses:</i> Amaranth seeds, finger millet (<i>ragi</i>), bengal gram (<i>chana</i>), soybean <i>GLVs:</i> Amaranth leaves, colocasia leaves, fenugreek leaves, <i>bathua</i> leaves <i>Milk and milk products:</i> Milk, curd, <i>paneer</i> <i>Nuts and oilseeds:</i> Sesame seeds, flaxseeds <i>Fish:</i> Bacha, katla, mrigal, pran, and rohu
Vitamin A (µg/day)	950	840	Increased vitamin A requirement during lactation is attributed to high vitamin A content in breast milk. Vitamin A-rich fruits and vegetables should be included.	<i>Animal products:</i> Milk, egg <i>Plant sources:</i> Yellow, red, and orange fruits and vegetables (carrot, pumpkin, papaya, tomatoes, red bell peppers) and GLVs (spinach, amaranth)
Vitamin C (mg/day)	115 (65+50)	65	Vitamin C is an important antioxidant secreted in human milk. Vitamin C in breast milk is proportional to the mother's vitamin C levels	<i>Fruits:</i> Orange, sweet lime (<i>mosambi</i>), lemon, guava, <i>amla</i> , kiwi, strawberry, cherries <i>Vegetables:</i> GLVs, cabbage, coriander leaves, drumstick leaves, cauliflower, tomato, broccoli, bell peppers, parsley
Vitamin D (IU/day)	600	600	Adequate sunlight exposure along with vitamin D supplementation depending on serum vitamin D levels should be recommended.	<i>Some oily fish:</i> Salmon, sardines, herring, mackerel <i>Adequate exposure to sunlight</i> <i>Vitamin D fortified</i> food products (milk, yogurt, ghee, soy milk)

NPNL: Non-pregnant non-lactating; PMW: Post-menopausal women; GLVs: Green leafy vegetables

This weight loss can be achieved by prescribing a hypocaloric balanced diet (a diet with restriction of 500 kcal/day of the actual calorie intake). Such a diet should consist of complex carbohydrates proportionally distributed throughout the meals and according to the set doses of insulin for those on insulin. Complex carbohydrates have low glycaemic index and provide a high satiety value, thus facilitating weight loss [28, 29]. Intake of refined cereals and added sugars should be restricted/avoided (Refer Table 3). Further emphasis should be laid on consuming good quality lean protein sources that are low in cholesterol and saturated fats to avoid empty calorie intake [28]. Substituting full-fat milk and milk products with low-fat milk is advisable. Similarly, replacing flesh foods such as mutton, beef and

pork with egg white, fish, lean meat, and chicken should be advised (Refer Table 3). Certain spices have also been found to be effective in managing blood glucose levels. Fenugreek seeds having high soluble fiber and trigonelline content may prove to be beneficial in reducing blood glucose, cholesterol, and triglyceride levels. However, it may have potential drug interactions with certain medications and anticoagulants, hence, should be prescribed under a professionally qualified nutritionist [30]. Similarly, cinnamon also has an active ingredient known as procyanidin Type-A polymer that may help in reducing blood glucose levels. However, its prolonged use or intake in large amounts may lead to hepatotoxicity in individuals with pre-existing liver disease [31]. Fasting and feasting should be discouraged, instead,

Table 5 Cultural and regional-specific healthier food options

Specific culture and region	Unhealthy or less healthy foods	Healthier alternatives
Northern India	Fried samosa Aloo paratha Chole with puri/kulcha Fried fritters (pakora)	Baked samosa with stuffing of peas, sprouts Stuffed vegetable/paneer/dal roti Chole with multi-grain chapati Baked/air-fried fritters
Southern India	Vada/bonda	Uttapam/stuffed idli/dosa/appam/adai/poha
Eastern India	Refined flour momos Fried momos	Whole wheat/multigrain-based momos Steamed/baked momos
Western India	Vada pav, batata vada Muthia (fried), Fafda	Pav bhaji (refined flour pav can be replaced with whole wheat flour), dhokla, thepla, steamed/baked Muthia

Table 6 Healthier food alternatives and their calorie content

Energy-dense foods (that need to be restricted or replaced)	Healthier food options (that can be used as substitutes)
Snacks: <i>Samosa, tikki, aloo bonda, vada</i> , pizza, burger <i>1 Aloo-stuffed Samosa</i> [E:123kcal, P:2.2g, F:6g] vs <i>1 Mixed-vegetable Dosa</i> [E:92kcal, P:2.4g, F:2.2g] <i>1 Vada</i> [E:90kcal, P:3.3g, F:4.3g] vs <i>1 Idli</i> [E:52kcal, P:3g, F:0.8g] <i>1 regular size Pizza</i> [E:184kcal, P:7.9g, F:4g] vs <i>1 Paneer Tikka Roll</i> [E:139kcal, P:7g, F:3.6g]	Snacks: Sprouts, corn <i>chaat, dosa, idli</i> , whole wheat <i>paneer tikka roll</i>
Milk: Full fat/full cream milk	Milk: Low fat milk: Skimmed milk, double toned milk, toned milk and cow milk
<i>A glass of Full-cream milk</i> (250 ml) [E:218kcal, P:8g, F:15g] vs <i>A glass of Toned-milk</i> (250 ml) [E:152kcal, P:8g, F:7.5g]	
Dressings: Cream, cheese, mayonnaise	Dressings: Chickpea hummus, mint-coriander dip/ <i>chutney</i> , hung curd dip
<i>1 Tablespoon of Vegetable-Mayonnaise Dip</i> (15 g) [E:142kcal, P:0.6g, F:19.8g] vs <i>1 Tablespoon of Mint-curd Dip</i> (15g) [E:14kcal, P:0.8g, F:1g]	
Meat products with high fat content: Beef, pork, mutton, processed meat products high in fat and salt such as sausages, bacon (Fried chicken/fish)	Meat products with low fat content: Chicken breast, fish (Roasted/grilled chicken/fish)
<i>1 serving of Fried Chicken Nuggets</i> (4pcs) [E:170kcal, P:9g, F:10g] vs <i>1 serving of Grilled Chicken Breast</i> (50g) [E:130kcal, P:29g, F:2g]	
Beverages with high sugar content: Carbonated beverages, processed juices	Beverages from natural sources: Coconut water, freshly prepared fruit juice with pulp, buttermilk
<i>A glass of Cold drink</i> (250 ml) [E:106kcal, P:0g, F:0g] vs <i>A glass of Coconut water</i> (250 ml) [E:38kcal, P:0.65g, F:0.1g]	
<i>Processed and packaged snacks</i> : Chips, Biscuits, Rusk, Cookies, Fried and salty packaged <i>namkeen</i>	<i>Non-processed and non-packaged snacks</i> : Roasted <i>chana, makhana</i> , dry fruits, homemade <i>makhana namkeen</i> (<i>Makhana</i> + Almonds + Peanuts + Puffed rice)
<i>1 serving of Potato Chips</i> (20g) [E:111kcal, P:1.38 g, F:7g] vs <i>1 serving of Roasted Makhana</i> (20g) [E:70kcal, P:1.94g, F:0.02g] <i>1 serving of Aloo Bhujia</i> (25g) [E:164kcal; P:1.42g, F:12.8g] vs <i>1 serving of Homemade Nuts Namkeen</i> (25g) [E:75kcal, P:3.1g, F:6g]	
Desserts: Ice creams, custards, sweets, chocolate-based dessert	Desserts: Fruit and yogurt-based desserts, a piece of dark chocolate
<i>1 cup of Vanilla Ice Cream</i> [E:289kcal, P:2.3g, F:22.9g] vs <i>1 cup of Homemade Fruit Yogurt</i> [E:107 Kcal, P:4.7g, F:3g] <i>1 piece of Chocolate Cake</i> [E:156kcal, P:5.5g, F:4.5g] vs <i>10 g of Dark chocolate</i> [E:55kcal, P:0.6g, F:3.3g]	

E: Energy, P: Protein, F: Fat

small, frequent meals should be prescribed throughout the day to avoid the peaks and lows of blood glucose levels [28]. Moreover, cooking methods requiring minimal oil such as boiling, steaming, sauteing, roasting, grilling, and baking should be used to prevent excessive calorie intake.

Dyslipidaemia

A 5–10% of weight loss leads to improved triglyceride and cholesterol levels [14]. Various diets such as dietary approach to stop hypertension (DASH) diet (intake of low-fat alternatives of dairy products, fruits and vegetables, nuts and seeds, with limited intake of red meat, fats and sugar products), the Mediterranean diet (higher consumption

of fruits, vegetables, olive oil and moderate consumption of proteins and fats), or vegetarian diets (high in fiber-rich foods such as whole grains, fruits, and vegetables and low in saturated fats) are found to be effective for weight loss in the management of dyslipidaemia [32]. Complex carbohydrates, and lean protein sources low in cholesterol and saturated fats (Refer Table 3) should be prescribed to facilitate weight loss and improve the lipid profile. Intake of omega-3 rich sources (Refer Table 3) should be advised to reduce the elevated triglyceride levels [33]. Further emphasis must be laid on the limited consumption of high fat, salt, and sugar (HFSS) products. Besides, a physically active lifestyle, abstinence from smoking, and restricted alcohol consumption should also be emphasised.

Hypertension

A 5–10% of clinically significant weight loss is associated with the prevention and management of elevated blood pressure [14]. DASH diet emphasising fruits, vegetables, low-fat dairy products, whole grains, lean meats, and nuts significantly decreases systolic blood pressure in hypertensive and normotensive adults [34]. It is advisable to restrict the sodium intake to 1500mg to 2000mg per day [16]. Fruits and vegetables with low sodium content such as banana, apple, peach, GLVs, beans, and bottle gourd should be encouraged, whereas those higher in sodium content such as cabbage, cauliflower, spinach, and beetroot should be restricted.

Hidden sources of sodium such as canned fruits and vegetables, processed and packed foods with high salt content like gravies, dressings, chips, etc., should also be avoided or limited. Consumption of non-food items rich in sodium like antacids and certain medicines should be ascertained. Adequate dietary intake of calcium, potassium and magnesium through dietary sources like a handful of nuts, two handfuls of local seasonal vegetables, and restricted quantities of regional millets should be encouraged for controlling blood pressure [34].

Polycystic Ovary Syndrome (PCOS)

Women with PCOS should be counselled for lifestyle changes to begin with a minimum weight loss of 2–5% and subsequently 5–10% to witness improved ovulatory function [14]. Women should be encouraged to increase the intake of high fiber foods over simple carbohydrates (Refer Table 3). Inclusion of lean protein sources should be promoted over red meat (Refer Table 3). Anti-inflammatory foods such as tomatoes, spinach, nuts, omega-3 sources (such as walnuts, flax seeds), and spices such as turmeric should be encouraged over inflammatory foods such as fried foods, red meat, and processed foods [35]. Consumption of processed and HFSS foods should be restricted/avoided.

Table 7 Myths and facts associated with weight management among postpartum and midlife women. *Source* [3]; [48]; [49]

Myth: Consuming energy dense diet rich in ghee improves milk formation and promotes early recovery of the mother!
Fact: The energy requirements of lactating mothers are high which should be met by the intake of a nutrient-dense diet rather than the consumption of empty calories from fat and sugar sources. A balanced diet rich in proteins, complex carbohydrates, fiber-rich foods, and micronutrients should be advised to these women to improve their milk formation and promote their recovery. Consumption of energy-dense food with high sugar and fat content may lead to postpartum weight retention and hence, should be restricted or avoided
Myth: Weight gain during postpartum and midlife is natural!
Fact: Postpartum women usually have the perception that weight gain is natural post-delivery. They tend to eat for two (mother and the baby) and mostly consume empty calories. Similarly, midlife women have a common perception that weight gain is natural with aging. It is crucial to burst this myth by increasing awareness among these women about potential weight loss opportunities. These women should be counselled regarding the adoption of appropriate lifestyle-related practices such as healthy eating, a physically active lifestyle, and adequate sleep that may help in weight management as well as alleviate the menopausal symptoms
Myth: Fasting and skipping meals help in weight loss!
Fact: Practices such as fasting and skipping meals have been associated with weight loss. However, several studies report that skipping meals not only results in overeating during subsequent meals but also lowers the body's metabolism. When practiced for a long period of time, skipping meals may lead to acidosis, hypertension, and nutritional deficiencies
Myth: Carbohydrates should be restricted for weight loss!
Fact: There is a common belief that one should cut down the carbohydrate sources for weight loss. However, it is important to focus on the quality of carbohydrates that should be included in the diet. Refined carbohydrate sources such as refined flour, bread, biscuits, refined sugar, candies should be replaced with complex carbohydrate sources such as coarse grains, pulses and legumes and fibrous fruits and vegetables. Complex carbohydrates in rationed amounts that are rich in fiber help in providing bulk to the food and promoting satiety by increasing the stomach emptying time
Myth: Limited consumption of dairy products assists weight loss!
Fact: It is believed that dairy products are fattening and lead to weight gain. Women should be counselled about the importance of dairy products. Milk and milk products are crucial for lactating mothers. Moreover, dairy products are rich sources of proteins, calcium, riboflavin, vitamin A, etc. When women are encouraged to consume dairy products, they should be counselled to substitute high-fat milk with low-fat milk and milk products such as toned, double toned, and skimmed milk that will be helpful in weight reduction

Hypothyroidism

Daily intake of a balanced diet divided into five to six small, frequent meals should be encouraged. A balanced diet comprising complex carbohydrates should be emphasised for sustainable weight loss. Additionally, a daily intake of at least five to six servings of fibrous fruits and vegetables in a day should be encouraged. Lean protein sources (Refer Table 3) and fish cooked in less fat should be preferred. Sources of invisible fat such as full-cream milk and milk products, red meat such as mutton should be replaced with low-fat milk and milk products and lean meat like chicken (Refer Table 3). Unsaturated fatty acid sources should be chosen over saturated and trans-fat sources (street foods, local bakery products—Khari, buns, HFSS foods).

Micronutrients also play an important role in the functioning of the thyroid gland [36]. For instance, calcium-rich foods and supplementation may hinder levothyroxine absorption; hence, a gap of at least four hours should be advised between the two. Similarly, some iron supplements may interfere with thyroxine absorption [36]. Hence, a gap of at least two hours should be ensured between the two. Soya hinders the thyroxine absorption so, either its consumption should be restricted, or the gap should be maintained between soya consumption and thyroxine intake. Brassicas such as cauliflower, cabbage, and kale are also associated with goitre formation when consumed in very high amounts. Hence, their intake should be limited. Along with dietary changes, women should also be counselled to stay hydrated by including non-caloric fluids throughout the day. Moreover, adequate sunlight exposure along with vitamin D supplementation should be prescribed according to the patient's serum vitamin D levels.

Conditions Specific to Postpartum Women

Postpartum Women who had Gestational Diabetes Mellitus (GDM) During Pregnancy

Women diagnosed with gestational diabetes during pregnancy are at risk of developing obesity-associated comorbidities such as diabetes, hypertension, and other cardiovascular diseases [37]. Clinically significant weight loss is associated with improvement in obesity-associated parameters. Therefore, these women should be encouraged to incorporate weight management strategies in their lifestyles. In addition to general dietary advice for weight management, special attention should be given to complex carbohydrates. During the postpartum period, women must be counselled to limit the fried food intake as its consumption during the early

postpartum period may lead to three-fold postpartum weight retention among women who had GDM. Sugar-sweetened beverages and sodas should also be restricted to avoid excess weight retention among women with GDM. Furthermore, blood glucose levels should be evaluated using a 75-gram Oral Glucose Tolerance Test (OGTT) at six weeks after delivery [38].

Postpartum Women who had Hypertensive Disorders During Pregnancy

Women who had hypertensive disorders during pregnancy should be counselled for gradual weight loss during the postpartum period. Medical nutrition therapy for postpartum women who had hypertensive disorders during pregnancy is similar to that for the general population. Dietary advice such as a balanced and nutrient-dense diet distributed into small and frequent meals with the incorporation of complex and fibrous sources of carbohydrates should be prescribed for weight management. Breastfeeding is strongly promoted, but beta-blockers may excrete into the breast milk, hence should be avoided, instead medications not excreting into the breast milk such as methyl dopa, labetalol, and propranolol should be preferred [39].

Conditions Specific to Midlife Women

Osteoporosis

Women during midlife years undergo various physical and hormonal changes leading to conditions such as reduced musculoskeletal health, poor bone mineral density, and osteoporosis [2]. Therefore, while counselling weight management strategies to these women, approaches targeting bone health should also be considered. A balanced diet, along with regular physical activity and adequate exposure to sunlight (10 to 30 minutes ideally between 10 am to 3 pm) should be emphasised. Calcium-rich food products such as low-fat milk and milk products, nuts and oilseeds, whole cereals and pulses, and GLVs should be included. However, food with high oxalic content (GLVs, beans, nuts), phytates (food rich in fiber such as whole grains and legumes), and tannins (tea and coffee) should not be consumed with calcium-rich foods as they hinder calcium absorption [40]. Furthermore, consumption of tobacco, alcohol, caffeine, carbonated drinks, and foods with high salt is associated with poor bone health, hence should be restricted. In addition to inclusion of calcium and Vitamin D fortified foods, supplements can also be prescribed to the patients depending on their serum calcium and vitamin D levels.

Conclusion

Stepwise dietary approach includes setting realistic goals, identifying an individual's caloric requirements, macronutrient and micronutrient composition. Following stepwise dietary approach will potentially assist the healthcare practitioners to provide a realistic, individualised, and easy-to-follow dietary prescription to achieve successful and long-term weight management in postpartum and midlife women.

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