

Evidence and consensus-based clinical practice guideline for the management of obesity and overweight in postpartum women: An AIIMS-DST initiative

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Received: 07-01-2022

Revised: 23-01-2022

Accepted: 31-01-2022

Published: 31-05-2023

Access this article online

Quick Response Code:



Website:

www.jfmpc.com

DOI:

10.4103/jfmpc.jfmpc_45_22

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How to cite this article: Kumari A, Ranjan P, Vikram NK, Kaur D, Balsarkar G, Malhotra A, et al. Evidence and consensus-based clinical practice guideline for the management of obesity and overweight in postpartum women: An AIIMS-DST initiative. J Family Med Prim Care 2023;12:812-55.

Introduction

The prevalence of obesity is rising in both developed and developing countries. Women in reproductive age are at a higher risk of developing obesity, posing a public health challenge.^[1] Worldwide, 15% to 20% women have been reported to be obese during the preconception stage.^[2] Almost half of these women (47%) gain excessive gestational weight^[3] (weight gain more than that recommended by the Institute of Medicine during pregnancy^[4]) with 20% retaining 1 to 5.5 kg of this weight during the first year of their postpartum period.^[5] Excessive gestational weight gain and weight retention during the first year post-delivery are associated with overweight or obesity in later years of life.^[6,7] This predisposes women to an elevated risk of developing cardiometabolic complications such as diabetes, dyslipidaemia, hypertension, ischemic heart disease, stroke as well as certain types of cancers,^[5,6,8,9] thus underpinning the need to prevent or manage obesity among women.

The management of obesity is multidisciplinary. Various lifestyle-related components such as dietary, physical activity and behavioural modifications are required to either lose weight or maintain an ideal body weight.^[10] The management of obesity during the postpartum period is challenging due to various reasons such as personal factors, socio-cultural barriers and environmental factors.^[11] At this stage, women give more priority to their infants than their own health. They usually lack time, energy and motivation to engage in their weight management process.^[11] Moreover, there exist various socio-cultural myths such as ‘doing the month’, wherein the women are advised to consume high calorie foods and restrict physical activity including the household chores for at least the first 40 days post-delivery.^[11] Postpartum women also report that they do not receive any counselling related to diet and physical activity specific to the postpartum period and hence, lack the knowledge and information about the diet and physical activity regime to be followed.^[12]

Postpartum women usually visit only the obstetricians and paediatricians after their delivery. They lack the awareness and information about visiting nutritionists, exercise physiologists and psychologists who might assist them in shedding the weight retained. Obstetricians and paediatricians may lack sufficient information about the diet and physical activity counselling to be imparted to these women. They may further lack skills of motivational interviewing. Moreover, in resource-limited settings, usually nutritionists, exercise experts and behavioural counsellors are either not available or are in such a limited number that they cannot counsel every postpartum woman. This underscores the need for the development of evidence and consensus-based recommendations related to diet, physical activity and behaviour which can be used by obstetricians and paediatricians or any other healthcare provider to holistically counsel postpartum women for their weight management.

Methods

Priorities, needs and gaps identified during the weight management process of postpartum women supported the initiative for development of the evidence and consensus-based guideline for postpartum weight management. The guideline was developed in two phases using standardised methodology as per the National Health and Medical Research Council: (i) development of recommendations and (ii) validation of recommendations. First, a list of key clinical questions was identified through literature search, expert opinion and Delphi method. Second, a literature search was carried out to gather evidence for each question. In Phase I, grading of evidence and expert opinion was sought to formulate clinical practice recommendations for each clinical question. In Phase II, the clinical practice recommendations were peer-reviewed and validated using the Delphi method and graded using the GRADE approach via the experts.

Guideline Development Groups (GDGs)

GDGs comprised the chairpersons and professional members from eminent national organisations such as Department of Science and Technology (Government of India), The Federation of Obstetric and Gynaecological Societies of India, Indian Menopause Society, Association of Physicians of India, Academy of Family Physicians of India, Association of Obstetricians and Gynaecologists of Delhi and Indian Dietetic Association. Experts and senior professors from some leading medical colleges of the country have also been part of the team of GDGs. GDGs were summoned to address the key clinical questions related to the weight management of postpartum women. The role and responsibilities of every member of a GDG comprised prioritising and finalising key clinical questions, reviewing the available evidence, providing the expert opinion, finalising the recommendation for each clinical question, validating and grading the recommendations.

Development and prioritisation of key clinical questions

An exploratory study comprising focus group discussions and in-depth interviews has been conducted among postpartum women to identify the gaps, needs and priorities of weight management among these women.^[12] A questionnaire was designed to survey a larger group of postpartum women to assess the risk factors, facilitators and barriers to postpartum weight management.^[13] The clinical areas of interest were identified and translated into the key clinical questions. The first draft of exhaustive clinical questions was categorised in four domains including the initiation of discussion for weight management, screening and risk assessment of the target population for initiation of weight management advice, management of weight and follow-up for sustainable weight loss. Online meetings were organised with GDGs to familiarise them with the process of peer-review for the development of key clinical questions. The initial draft was subjected to the peer-review process for its relevance, face validity and content validity under two levels. The first level peer-review was done by a smaller group of members consisting of four to

five topic-specific experts. The amendments suggested were agreed and the modified draft was subjected to the second level of peer-review done by a larger group of experts from different disciplines, journal editors and senior professors from leading organizations. The final draft comprised 16 key clinical questions categorised in four domains and prioritised according to the need and impact on the dissemination of postpartum healthcare.

Evidence reviews to answer the clinical questions

Literature search was conducted by the evidence team to answer each clinical question to develop guideline recommendations.

Search for evidence: Broad terms related to the weight management of postpartum women were identified by the evidence team. This search string was tailored for specific search for each key clinical question. The electronic databases such as PubMed, Wiley and Google Scholar were employed to extract relevant evidence.

Selection criteria: Human studies published in English language in peer-reviewed journals were selected. Methodological filters related to the study design were not applied at this stage to ensure an extensive and exhaustive search. The evidence team further performed the title, abstract and full-text screening of articles. Any disagreements on the selection of an article were resolved by consensus among the members of the evidence team.

Eligibility criteria: Studies comprising postpartum women aged 18 years and above; practice guidelines, systematic reviews, randomised control trials, observational studies, narrative reviews; and reporting the information of interest with respect to the specific clinical question were included. The exclusion criteria included studies published in non-English language or in non-peer-reviewed journals, or having only underweight (body mass index < 18.5 kg/m²) postpartum women as participants.

Data extraction and synthesis: The data extracted included author, year of publication, country, study design characteristics and sample characteristics specific to the clinical question. The findings of the studies were reported narratively in tables to form a write-up for summary statement.

Development of clinical practice recommendations

The extracted data for each clinical question presented in narrative tables along with the summary of evidence were circulated among GDGs. Training regarding the evaluation of evidence review and development of recommendations was provided to GDGs through online meetings. The agenda of these online meetings was to describe in detail the process of the guideline development, the process of identifying evidence to formulate evidence-based recommendations, reaching to a consensus wherever there is lack of evidence to formulate consensus-based recommendations and grading the strength of recommendations. The recommendations developed were subjected to a two-level peer-review process. The first level of peer-review was done by a smaller group of four to five topic-

specific members. The second level of peer-review was done by a larger expert group consisting of field experts, journal editors and senior professors of eminent organisations of the country. This led to the development of evidence-based and opinion-based recommendations.

GRADE approach

Based on the GRADE approach,^[14] the evidence has been graded from high quality to low quality for each clinical question. The consensus among the experts has been referred to as 'Expert Opinion'. The criteria for grading the evidence for the recommendations has been depicted in [Table 1].

Table 1: Quality of evidence

Quality of Evidence	Description
I	<p>High-Quality Evidence</p> <p>Based on evidence gathered from the literature search, there is substantial certainty that the true effect lies within the estimated effect.</p> <p>The high-quality evidence will include:</p> <ul style="list-style-type: none"> (i) Well-designed and executed randomised control trials consisting of adequate randomisation, allocation and blinding, sufficient power and intention-to-treat analysis and adequate measures for follow up. (ii) Meta-analysis including high-quality randomised control trials is also included. (iii) Previously published good quality recommendations/ consensus statements and/or position statements given by an organization or working group consisting of experts in that field.
II	<p>Moderate-Quality Evidence</p> <p>Based on evidence gathered from the literature search, it is possible that the true effect lies close to the estimated effect.</p> <p>The moderate-quality evidence includes:</p> <ul style="list-style-type: none"> (i) Well-designed and executed randomised control trials with minor methodological limitations impacting the confidence in the estimated effect. (ii) Quasi-randomised trials with good methodological quality. (iii) Systematic and meta-analysis of low-quality randomised control trials with limited quality.
III	<p>Low-Quality Evidence</p> <p>Based on evidence gathered from the literature search, there is limited certainty that the true effect is close to the estimated effect.</p> <p>The low-quality of evidence includes:</p> <ul style="list-style-type: none"> (i) Well-designed and executed randomised control trials with major methodological limitations affecting the confidence in estimated effect. (ii) Well-designed and executed non-randomised trials including intervention studies, cohort and quasi-experimental studies, case-control studies with minor methodological limitations. (ii) Observational studies with minor methodological limitations.
IV	<p>Expert Opinion</p> <p>Very uncertain that the true effect is close to the estimated effect.</p> <p>Based on clinical experience, reasoning and suggestions. There might be a small net benefit from the suggestion. Based on feasibility, we may incorporate the suggestion for weight management.</p>

Strength of recommendations

The strength of a recommendation has been provided by the GDGs based on three major factors:

- Quality of evidence,
- Benefit to harm ratio and
- Feasibility in daily clinical practice

The current recommendations are based on behavioural lifestyle modification (excluding pharmacological and surgical modalities), which might indicate less potential for harm and/or risk. Thus, the grade of the strength of a recommendation was mainly based on the feasibility, available resources and acceptability within the target population in clinical settings.^[15]

The grading of the strength of recommendations has been depicted in [Table 2].

Results

Chapter One: Initiation of discussion for weight management

1.1 When is the right time to counsel and engage women regarding postpartum weight management?

Background

The postpartum period is an important phase of a woman's life. She undergoes various physiological, psychological, emotional and social changes.^[1] These changes start right from the time of conception and continue till late postpartum.^[16] Owing to these changes, weight gain is quite common and women often end up getting overweight and obese in due course of time. The variables affecting weight gain are different at various stages such as preconception, early gestation, late trimester, early postpartum, late postpartum etc. This calls for a need to engage these women in a structured weight management program at a suitable time to attain significant and sustainable results.^[17] Trying to engage women for their weight management too early might go in vain as they are adapting to the changed and demanding circumstances of early pregnancy. Similarly, sensitising and engaging women for weight management too late might lead to significant postpartum weight retention and weight gain that might get difficult to lose. Thus, it is crucial to identify the right time to counsel and engage women for postpartum weight management and foster the environment to prevent weight gain and associated comorbidities.

Summary of evidence

Several guidelines and randomised controlled trials have mentioned the time of involvement of postpartum women in weight management programmes. Several studies (especially those with physical activity-based intervention) started recruiting the participants from 6 weeks post-delivery with variable outcomes.^[17-21] These studies have not specified the mode of delivery of the participants. Moreover, certain randomised controlled trials have recruited women for weight management interventions during their pregnancy at different gestational ages such as 15 weeks of gestation,^[22] less than 16 weeks of

Table 2: Grades for the strength of recommendations

Strength of recommendation	Description
A	Strong Recommendation: (Quantum of benefit expected >>> Resource requirement/logistic needs) It is certain that the net benefits (i.e., the benefits in comparison to resource requirement/logistic needs) outweigh the resource requirement for achieving optimal weight loss outcome. These recommendations should be universally adopted by the clinicians and allied healthcare providers as a standard practice to prevent and manage overweight and obesity in women at an individual, clinical and public health level.
B	Moderate Recommendation: (Quantum of benefit expected >> Resource requirement/logistic needs) It is moderately certain that the net benefit from the recommendation is moderate to substantial. These recommendations might not be a mandatory part of a standard weight management clinical practice, but their implementation can prove beneficial in attaining significant weight loss outcomes. The implementation of these recommendations should be in accordance with an individual's preferences, values and settings.
C	Weak Recommendation: (Quantum of benefit expected > = < Resource requirement/logistic needs) Although it is expected that there will be benefits from the recommendation, the resource requirement for achieving optimal weight loss outcomes will be substantial. The implementation of these recommendations in daily clinical practice is optional. The clinician and/or healthcare provider should incorporate these recommendations based on the resource availability, feasibility, cost-effectiveness and acceptability in the weight management program.

gestation,^[23] less than 20 weeks of gestation^[24] and 24 to 28 weeks of gestation^[25] to study the effects of interventions on postpartum weight. A recent randomised controlled trial has reported that there is insufficient evidence to conclude that weight management interventions starting in pregnancy are effective for postpartum weight management.^[26]

However, there is a significant association between excessive gestational weight gain and postpartum weight retention. The Institute of Medicine^[4] has published revised guidelines for gestational weight gain that are based on pre-pregnancy body mass index ranges for underweight, normal weight, overweight and obese women.

Clinical practice recommendations

No.	Recommendation	Grade
1.1.1	The sensitisation for weight management should be ideally initiated at the time of preconception counselling or during antenatal visits, whichever is an earlier encounter, and reinforced at the time of discharge post-delivery.	IV A
1.1.2	During the postpartum period, women should be motivated for lifestyle measures for appropriate body weight management.	IV A

Discussion

There is no head-to-head trial to compare the efficacy of an intervention plan based on the time of recruitment of postpartum women. The recommendations made by the expert group are mostly based on the consensus opinion. Early intervention may give an opportunity 'to catch them young' and act prophylactically rather than curative, which is far more difficult. The weight gained during pregnancy can affect the immediate and future health of a woman and her infant. Excessive gestational weight gain leads to greater postpartum weight retention. Thus, there is a need to follow an early strategic approach which sensitises these women about weight management in preconception, appropriate gestational weight gain during their pregnancy, reinforcement of appropriate lifestyle-related behaviour immediately after delivery and finally in the postpartum period if successful weight loss outcomes are not achieved. Hence, there is no specific right time to intervene for postpartum weight management, rather it should be done in a continuous manner starting from preconception to postpartum [Table 3].

1.2 What are the components of knowledge, attitude, and practices that should be evaluated to plan a personalised weight management intervention for postpartum women? Background

Weight management occurs with gradual behaviour change and for that appropriate knowledge, attitude and perceptions are pivotal. They influence education, motivation and extent of adherence to any intervention or treatment.^[27] It is important to have knowledge about the various health aspects which lead to change in attitude and perceptions and subsequently, gradual behaviour change.^[28,29] Many studies have been done on various lifestyle-related diseases such as obesity, diabetes, hypertension and metabolic syndrome in women. These studies have found gaps in knowledge about ideal body weight, dietary practices to be followed and misconceptions about physical activity.^[30-34] Even though women are aware about the negative impact of gaining weight, they face various physical, social and psychological barriers that impede their own ability to put forth the effort required for losing the excess weight. This eventually leads to frustration of weight loss-regain and paves way for distorted body image and unhealthy lifestyle practices.^[35]

Prior to the dissemination of any weight management intervention, it is crucial to identify various important aspects of lifestyle-related management that should be covered in the intervention trial. Thus, there is a need to have a thorough understanding of knowledge, attitude and perceptions about the key components of postpartum weight management such as diet, eating patterns, physical activity, lifestyle habits, motivation to lose weight etc. This will help in better planning, dissemination and evaluation of an intervention. Eventually, it will aid in achieving the targeted weight loss goals and improve quality of life.

Summary of evidence

Studies of both qualitative and quantitative nature were considered. Cross-sectional surveys had been conducted for assessment of

Table 3: Time appropriate information for women of reproductive age

Time	Information to be given at the time of initiation of the discussion
Preconception	Underweight, overweight and obesity must be duly addressed in consultation with a healthcare provider. It is important to consume a healthy, balanced diet with appropriate physical activity. Special consideration must be given to women with obesity, hypertension and diabetes. Supplementation of 400 to 800 micrograms of folic acid must be prescribed to lower the risk of birth defects especially spina bifida after due consultation.
Pregnancy	Appropriate gestational weight gain must be ensured as per the preconception body mass index. There is no need for extra calories during the first trimester, however, for the second and third trimester additional intake of 350 kcal should be advised. Emphasis should be laid on a healthy and balanced diet comprising low-fat dairy products, pulses, whole grains, fruits and vegetables. Normal physical activity should be encouraged unless there are any complications such as certain types of heart and lung diseases, cerclage, placenta previa after 26 weeks of pregnancy, preterm labour or ruptured membranes, preeclampsia or pregnancy-induced high blood pressure, severe anaemia etc. Micronutrient supplementation should be ensured. Cultural myths should be busted with evidence-based facts.
After delivery	Intake of a healthy and balanced diet comprising low-fat dairy products, pulses, whole grains, fruits and vegetables should be promoted for healing. Emphasis should be laid on avoidance of consumption of excessive ghee and sugar rich foods. Drinking plenty of water to stay hydrated should be emphasized. Deep breathing exercises, pelvic floor exercises and abdominal muscle strengthening exercises should be started as soon as possible. Exclusive breastfeeding should be practiced for the first six months. Healthy galactagogues like milk, fenugreek seeds, garlic, fennel seeds, edible gum (<i>gondh</i>), flax seeds, sesame seeds, nuts and green leafy vegetables should be consumed after consulting the registered dietitian.
Postpartum	Moderate intensity physical activity should be resumed four weeks after normal delivery and 6 weeks after caesarean delivery. Dietary intervention should be initiated for overweight and obese women keeping in mind the lactation status. Women with pregnancy-related complications like gestational diabetes mellitus, hypertensive disorders of pregnancy, thyroid disorders should be counselled accordingly.

knowledge, attitude and practices regarding the diet to be followed during the postpartum period, initiation of physical activity, perceptions about weight, myths driven by the socio-cultural environment, breastfeeding practices and attitude toward postpartum weight retention.^[36,37] Besides, components of knowledge, attitude and practice for energy intake, energy expenditure, self-monitoring and self-regulation were also assessed.^[38]

In the descriptive studies, knowledge of adverse effects of obesity, family-centred lifestyle behaviours that promote unhealthy eating,^[39] specific strategies for weight loss, physical activity after childbirth, diet after childbirth, exercise classes, involvement/contribution of nutritionists and weight management programmes were evaluated.^[40] In conclusion, studies have assessed knowledge about diet and physical activity after delivery along with due focus to misconceptions and myths.^[12,41,42]

Clinical practice recommendations

No.	Recommendation	Grade
1.2.1	Assessment of knowledge, attitude, and practices related to risk factors and consequences of obesity on the holistic health of women is recommended.	III A/B
1.2.2	Different modalities for weight management, barriers and facilitators in their implementation should be evaluated and accounted for in the management plan.	IV B

Discussion

Knowledge, attitude and practice are the most important part of a behavioural model. These help in measuring the extent of any known situation and add new tangents to the known reality. They help in baseline evaluation and measure the effectiveness of interventional activities and their ability to change health-related behaviours. In the absence of robust evidence from literature, these recommendations have been formulated with consensus among eminent experts across the country. Therefore, clinicians and experts providing interventions should follow them to attain comprehensive information about women's knowledge, attitude and practices related to body weight, eating behaviour, physical activity behaviour, sleep pattern and common beliefs/myths associated with the postpartum period. This will aid in bringing about the behavioural change among these women to achieve sustainable weight loss goals. There is a need for developing a centralised module where the assessment of knowledge, attitude and practice is done with the help of randomised controlled trials to generate significant results and gather insights into its efficacy. Some questions that can be discussed to assess knowledge, attitude and practices have been summarised in [Table 4].

1.3 Which healthcare providers should counsel women for their postpartum weight management?

Background

Postpartum women should be counselled about weight management in a strategic, localised and easily adoptable manner. The counselling process should involve dissemination of information about various lifestyle-related aspects such as general weight management advice, dietary habits, physical activity behaviour, sleep and stress management.^[18] In India, women are exposed to a plethora of unauthenticated information from friends, family members and relatives. This subsequently affects the readiness of postpartum women to engage in any weight management program.^[12] Hence, it is important to identify healthcare providers who would counsel these women. Ideally, it could be a team comprising a physician and/or a gynaecologist, a dietitian/nutritionist for medical nutrition

Table 4: Questions to assess knowledge, attitude and practices regarding obesity in postpartum women

Domains	Key questions that can be enquired while initiating clinical management
Knowledge	What are the adverse effects of obesity on general well-being? What are the effects of obesity on pregnancy? What are the different components of a balanced diet? How many additional calories are required during different stages of pregnancy and lactation? What is the appropriate weight gain recommended during pregnancy in women with different categories of body weight/body mass index? Can weight issues adversely affect your mood and stress levels?
Attitude	To what extent are you willing/comfortable to participate in a weight management program at this stage of life?
Practice	What are the different food items that you usually consume in a day? What are the physical activities including different types of exercises and household chores that you do in a day? What is your sleep routine? How do you cope with emotional stress?

These questions should be asked as an opportunity to initiate discussion. Healthcare providers should supplement with the appropriate facts as and when required.

therapy, a physical therapist for exercise and a psychotherapist to address psychological barriers and suggest coping strategies. However, despite the recent advances in the healthcare system, the doctor–patient ratio and the number of trained personnel is still low. Thus, it is crucial to decide as to who should address the participants and provide counselling for different components of weight management. This will ensure successful outcomes either by a multidisciplinary approach or by training and capacity building of auxiliary healthcare providers in resource-limited settings.

Summary of evidence

Various intervention studies for postpartum weight management conducted worldwide have used professionals from different fields of work. In some studies, dietary counselling has been provided by a qualified dietitian^[19,20,43-45] and physical activity counselling provided by a physical therapist/exercise physiologist/professional coach/yoga professor,^[43,46] whereas in other studies, a trained health educator/lifestyle counsellor has provided weight management counselling.^[21,47] Few studies have also delivered the intervention through a behavioural counsellor.^[18,21,47] At the same time, there are some studies where a team of experts including nutritionist/dietitian, exercise physiologist/exercise coach, psychologist and health educator have delivered the intervention.^[48]

Apart from the intervention studies, there are various guidelines available that suggest that counselling should be provided by the field experts such as dietary counselling being provided by a registered dietitian^[49] and physical activity counselling/recommendation should be disseminated by a registered exercise professional.^[50] Behavioural counselling is a crucial aspect for successful weight management interventions that should be delivered by behavioural health specialists.^[49] Health professionals should advise these women to seek information about diet, physical activity and breastfeeding merely from reliable and authentic sources.^[51]

Clinical practice recommendations

No.	Recommendation	Grade
1.3.1	The protocolised weight management module should be implemented by any healthcare professional who encounters a woman in her postpartum period for routine screening or specific health conditions.	IV A
1.3.2	Wherever feasible, a multidisciplinary team consisting of obstetricians, internists, primary care physicians, family physicians, clinicians, dietitians, and exercise experts/physiotherapists should be involved in the weight management of postpartum women. Specialists including psychologists/psychiatrists and endocrinologists should be involved, whenever indicated.	II A
1.3.3	During antenatal check-ups, the obstetrician should initiate the discussion regarding myths related to diet, such as excessive intake of calorie-dense foods or galactagogues.	IV A
1.3.4	Paediatricians can sensitise mothers accompanying infants to the immunisation clinic, check their body mass index and advise healthy lifestyle measures for weight management or refer them to the registered dietitian/nutritionist.	IV C
1.3.5	Weight management clinics can be set up at health facilities providing obstetric services and infant immunisation services.	IV C

Discussion

Effective weight management can be done by employing various counselling techniques in different lifestyle domains. This requires a multicomponent and multidisciplinary approach. Although the consensus among the experts suggests the promotion of multicomponent and multidisciplinary approaches, in developing countries like India, it might not be feasible. The tertiary care centres are overburdened, and the obstetricians and paediatricians may not be able to intervene for postpartum weight management. Hence, efforts should be made to involve other paramedical workers such as dietitian, physical therapist, psychotherapist, physicians etc. In rural or resource-limited scenarios where a multidisciplinary team is not available, auxiliary healthcare workers like Accredited Social Health Activist (ASHA), Auxiliary nurse midwife (ANM) and Anganwadi workers can take up the role. This can be attained by skills and capacity building as well as timely training. As a result, they will not only be empowered but also these interventions will reach every nook and corner of the country. Policymakers should set up weight management clinics even in public health centres and impart knowledge about the importance of weight management interventions in the curriculum. This will eventually help in combating the problem of obesity.

1.4 What could be the effective ways of delivering pertinent information to women regarding postpartum weight management?

Background

Counselling or delivering pertinent information in the correct way is crucial to generate awareness and bring behaviour change related to weight management among the participants.^[27] However, it can be a daunting task where the doctor to patient ratio is low, and the time and resources are limited.^[52] Further, the inadequate knowledge, attitude and practices of the participants coupled with their socio-cultural background may act as a barrier in disseminating information in a manner that is easily understood.^[53] Another

challenge post-delivery could be the difficulty of reaching out to the postpartum women in physical mode, as they may not even visit the hospital/health centre for their own or baby's health check-up. Hence, the method chosen for counselling should consider their socio-familial obligations, convenience and availability of resources. It is also important that the participants feel comfortable, and the desired information reaches them as intended.^[54] Information can be delivered effectively by employing various techniques and materials such as face-to-face counselling, telephonic counselling, text messages, social media groups and posts, audio-visual aids, emails, newsletters, printed material like pamphlets, leaflets, posters etc. The choice of the method would depend on the sensitivity of the information, the amount of information to be shared and its relevance in the socio-cultural context.^[55] Thus, there is a need to decipher various patient-friendly counselling techniques and materials that would aid in conveying the information about postpartum weight management.

Summary of evidence

Many successful postpartum weight management interventions conducted worldwide have used a combination of various counselling techniques and to disseminate information and bring about a behaviour change. These counselling techniques and materials include face-to-face individualised and group counselling,^[17,20,56] telephonic counselling,^[20,47] individualised diet plans and physical activity goals.^[20,21] Various such as lifestyle information leaflets,^[57] physical activity booklets,^[20] diet plan booklets and pamphlets,^[20] motivational videos on healthy recipes and types of exercises and weight loss tips^[17,56] have been used. Materials such as weight logbooks and web diaries^[17,48,56] and equipments such as weighing scale,^[48,58] pedometer^[20,48,58] and measuring cups and spoons^[48] have been provided for self-monitoring. Motivational interviewing of the participants has been assured through follow-up notebooks, emails and text messages.^[17,19,20,56] In-person or telephonic problem-solving sessions have been organised to overcome the barriers.^[47,58] Apart from this, social media platforms such as Facebook have been used to create groups and post recipes, videos and tips for weight management.^[21,47,58]

Clinical practice recommendations

No.	Recommendation	Grade
1.4.1	A combination of face-to-face and technology-supported distance counselling should be planned for the management of overweight and obesity in postpartum women.	II A
1.4.2	Judicious use of social media platforms, educational material like leaflets, booklets, pamphlets etc., should be done to disseminate information.	II A
1.4.3	Internet- and mobile-based applications should be used proactively for improving compliance by enhancing participant education, motivation, self-monitoring, personalised feedback, and managing challenges faced by inappropriate weight management practices.	II A
1.4.4	A toolkit consisting of education material apprising women about postpartum obesity and its impact on future health and key management strategies can be developed, distributed and utilised across healthcare settings.	IV B

Discussion

The acceptability of any information depends on its mode and way of delivery. A combination of counselling techniques should be used to provide information related to diet, physical activity and other components of weight management. The experts believed that the healthcare provider should decide the mode of counselling based on various factors including infrastructure, availability of resources, expertise of the healthcare provider, clinician to patient ratio and characteristics of the patient attending healthcare settings. The advantages and disadvantages of each method should be weighed adequately [Tables 5 and 6]. The weight management information should be based on the socio-behavioural construct and techniques like goal setting, self-efficacy, motivation, problem-solving and stimulus control should be incorporated. Digital technology should be used prudently to engage these women for weight management. Techniques like text reminders, social media posts, accountability groups on social media apps and weekly phone calls will help in adherence to the guideline and achievement of the goal. Besides, the use of digital technology can be extended for self-monitoring of diet and physical activity. Self-monitoring is the cornerstone of behavioural modification. Self-monitoring techniques like food logging as in a diary or an application, weighing oneself at least twice a week and keeping a track of weight change, log of exercise and daily step count with the use of smartphone apps and pedometers can be used for better outcomes.

Chapter Two: Screening and risk assessment of the target population for initiation of weight management advice

2.1 What body mass index cut-off and other anthropometric parameters should be considered to determine the need to initiate postpartum weight management?

Background

Anthropometric measurements are quantitative measurements of the muscle, bone and adipose tissue to determine the composition of the body. Measurements such as weight, height, body mass index, body circumferences (waist, hip) and skinfold thickness not only play a significant role in serving as diagnostic criteria of obesity but also predict the risk of complications such as type II diabetes, cardiovascular diseases, hypertension etc.^[59] Different anthropometric measurements can be used for the assessment and identification of nutritional risk/weight gain in pregnant and postpartum women. However, each assessment method has its own merits and demerits. Furthermore, it is also pertinent to determine respective cut-off values for each method to categorise the population groups as per their nutritional status and body composition. Asian populations have a higher risk of developing comorbidities at even lower cut-off values.^[60] In the absence of any reference standards of body mass index for pregnant and postpartum women, it is crucial to ascertain what body mass index cut-offs and other anthropometric parameters can be used in clinical practice keeping in mind the feasibility and availability of resources to identify postpartum women who

Table 5: Advantages and disadvantages of counselling techniques

Counselling technique	Advantages	Disadvantages
Individualised counselling	Intense and comprehensive therapy Focused attention from the counsellor Individualised and tailored treatment Personalised feedback High flexibility Increased confidentiality	High demand for human resource Time intensive More expensive Lack of social support for the individual
Group counselling	Sharing of new perspectives and insights Cost-effective Social support for the individual Less time consuming Less demand for human resource	Limited individualised and focused attention from the counsellor Limited opportunities for managing specific individual needs Less confidential Low trust and high hesitancy among individuals Requires more space
Web-based counselling	High flexibility to those having time constraints Easy accessibility Convenient Easily affordable Improved adherence Long-term efficacy	Limited digital skills and non-availability of smartphones among participants in resource-constraint settings Need of technology Lack of visual clues Limited opportunities to attend specific individual needs Data security issues or unreliable technology Lack of effectiveness
Mass awareness	Bridge geographical distance Cater to a larger audience Cost-effective Less time consuming Social support Anonymity	Limited opportunities to attend specific individual needs Need of technology Lack of visual clues Lack of effectiveness No long-term effect

Table 6: Advantages and disadvantages of various tools used for counselling

Tools for counselling	Advantages	Disadvantages
Print media: Posters, Brochures, Pamphlets and Leaflets	Informative Easy to distribute Cost-effective Less time consuming Connects with the target audience	No long-term effect
Presentations and Videos	Broad population reach Informative Cost-effective	Limited digital skills and non-availability of smartphones among participants in resource-constraint settings Need of technology Limited interaction Requires time for planning and content
Social media	Broad population reach Cost-effective Less time-consuming Easy accessibility User-friendly	Need of technology Lacks feedback and follow-up
E-counselling tools: Websites, e-mail, group chat	Easy accessibility Convenient Bridge geographical distance Cater to individuals as well as masses Increased follow-up rates	Need of technology Time-delayed format Lack of visual clues Higher potential for misinterpretation
Video conferencing	Easy accessibility Convenient Bridge geographical distance Real-time Greater privacy	Need of technology Unreliable technology

would be needing guidance or counselling about their weight management.

Summary of evidence

The universally recommended body mass index values for overweight (≥ 25 kg/m²) and obesity (≥ 30 kg/m²) were established based on the morbidity and mortality data from the white adult population.^[61] These recommended cut-offs have not accounted for ethnic variation in the components of body weight (body fat, muscle mass and total water), particularly observed amongst the Asian Indian population. In Asian Indians, higher body fat and higher cardiometabolic comorbidities are observed at a lower body mass index status.^[52] This raises concerns in clinical practice as these individuals who are metabolically obese and predisposed to developing hyperlipidaemia, diabetes, high blood pressure and atherosclerosis are misclassified as individuals with normal body mass index. Considering a greater cardiometabolic risk at a lower body mass index, a revision of the body mass index cut-off for Asian Indians was suggested by recommendation bodies.^[62]

Various recent randomised controlled trials conducted have carried out weight-loss interventions among overweight and obese women. Some randomised controlled trials have recruited those women whose present body mass index (body mass index at the time of commencement of intervention programme in the post-delivery period) was in the range of overweight and obese category,^[17-21,56,63-65] whereas other randomised controlled trials have used pre-pregnancy body mass index lying in the range of overweight and obesity^[45,47,57] as a parameter to identify women

needing some kind of weight-related intervention. However, there are two randomised controlled trials that have considered the need for weight intervention programs for types of women with the postpartum body mass index lying in the range of being overweight and obese as well as women whose postpartum body mass index lies in the normal range but have a postpartum weight exceeding pre-pregnancy weight by 4.5 kg or more.^[17,56] The waist circumference has been associated with cardiovascular morbidity, all-cause mortality with or without adjustment for body mass index.^[66,67] Considering the importance of waist circumference in assessing the cardiometabolic risk factors in an individual, a consensus on a cut-off of waist circumference in the adult population was recommended. For women, a waist circumference of more than 88 cm was considered as an indicator of cardiometabolic risk.^[68] In Asian women, the waist circumference of 80 cm was appropriate in identifying cardiovascular risk factors in comparison to 88 cm which was internationally accepted.^[69]

Apart from this, women may lose up to 5.9 kg during childbirth, this includes the weight of the baby, amniotic fluid and placenta. In the first week post-delivery, the additional weight is lost by shedding retained fluids^[70] and by 6 weeks half of the weight gained in pregnancy is lost. This can be taken up as a time to assess the anthropometric parameters. The fat stored during pregnancy does not diminish on its own and hence, women end up retaining more than 6% of body weight even at 6 months postpartum.^[71] There are certain reference guidelines available stating that women who are overweight or obese or have concerns about their weight should be indulged in weight loss interventions.^[51,72]

Clinical practice recommendations

No.	Recommendation	Grade
2.1.1	Preconception body weight must be considered while fixing the target weight gain during pregnancy. Overweight and obese women need less gestational weight gain than underweight or normal-weight women.	I A
2.1.2	All postpartum women should be assessed at 6 weeks for their body mass index.	II A
2.1.3	Postpartum women with body mass index ≥ 23 kg/m ² at 6 weeks should be involved in a weight management program comprising lifestyle management and medical management as per the standard indications.	I A
2.1.4	Women belonging to the normal body mass index category (18.5-22.9 kg/m ²) can be started with lifestyle management measures if they have: Retained more than 4-5 kg weight as compared with their pre-pregnancy body weight. Waist circumference more than 80 cm. Waist to hip ratio greater than 0.81. Body fat composition greater than 38%. Metabolic complications such as lean non-alcoholic fatty liver disease, insulin resistance, gestational diabetes mellitus etc.	III A

Discussion

It is very crucial to determine the cut-off point for weight management in postpartum women. The recommendations for cut-off have been set with a regional perspective in mind. Women should be started with weight management when their body mass index is in the overweight category, as it is better to gauge them early and prevent further risk of metabolic complications. The expert group recommended initiating intervention for even those women who have normal body mass index with other suggestive features of central/abdomen obesity. The body mass index cannot truly indicate the fat mass and fat-free mass in an individual's body and sometimes leads to overestimation or underestimation of disease risk as well. Along with this, pre-pregnancy weight status of women should not be overlooked as it is a significant predictor of postpartum obesity. Efforts should be made to seek information about the pre-pregnancy body weight or body mass index as this will assist in developing a more inclusive and robust intervention. Sensitisation for weight management should begin in preconception and overweight and obese women should be advised for gestational weight gain as per the recommendations. Postpartum women with persistent weight retention should be advised for lifestyle interventions after assessment of their anthropometric parameters at their first postnatal visit (at 6 weeks postpartum), as by this time they have shed most of their retained weight.

2.2 What are the important pregnancy-related and other medical health conditions that should be evaluated during postpartum weight management?

Background

Various pregnancy-related complications such as gestational diabetes, gestational hypertension, preeclampsia etc. have a bidirectional relationship with obesity and can lead to the additional risk of cardiovascular complications.^[73] Apart from this,

the other chronic conditions related to metabolic health such as diabetes, hypertension, thyroid disorders and renal disorders can influence the weight management regime for postpartum women and hence need to be evaluated.^[74] There are various guidelines available that have highlighted the significance of evaluation of pregnancy-related and chronic medical health conditions that can influence the postpartum weight management strategies.^[72,74,75]

Prior to the formulation of weight management regimes and their dissemination to the postpartum women, it is crucial to identify various pregnancy-related and other metabolic health complications that may affect their postpartum health. Thus, there is a need to thoroughly understand the effect of different complications on the weight management regime related to dietary behaviour and physical activity levels during the postpartum period. This will assist in the development of individualised weight management strategies for postpartum women undergoing specific health conditions.

Summary of evidence

Available guidelines emphasize on identifying pregnancy-related complications as well as other medical health complications that might lead to the increased cardiometabolic risk in future and hence require attention. Pregnancy-related complications that should be evaluated include gestational diabetes mellitus^[72-76], hypertensive disorders of pregnancy^[74,75] comprising gestational hypertension^[72,73,76] and pre-eclampsia^[72,73,76]; preterm birth^[72,73,76]; placental abruption^[72] and polycystic ovary syndrome^[76] as they can be potential risk factors of weight gain and cardiometabolic complications. Anaemia^[75] should also be considered as an important complication to be addressed when formulating postpartum weight management strategies. Apart from this, chronic medical conditions such as diabetes, hypertensive disorders, thyroid disorders, renal disorders etc. of women should also be taken into consideration^[74] when engaging them in postpartum weight management, as these specific health conditions may require some alterations in their diet and physical activity regimes.

Clinical practice recommendations

No.	Recommendation	Grade
2.2.1	Assessment of pregnancy-related complications such as gestational diabetes mellitus, hypertensive disorders of pregnancy, anaemia, placental abruption, preterm birth and polycystic ovary syndrome is recommended for formulating weight management strategies.	I A
2.2.2	Assessment of metabolic complications of overweight and obesity such as non-alcoholic fatty liver disease, hypertension, impaired glucose regulation and dyslipidaemia is recommended.	IV A/B

Discussion

Weight management is crucial for postpartum women to protect them from developing obesity and other metabolic complications in future. Additional considerations needed to be evaluated for those women who had higher pre-pregnancy body mass index or any metabolic complications before or during pregnancy. These specific health conditions may require modifications in

the weight management regime for such women including their diet and physical activity needs. The recommendations have been formulated based on the evidence-based literature and consensus among the eminent experts. Therefore, clinicians and other experts disseminating interventions should consider various pregnancy-related and other metabolic health conditions of these women to provide individualised weight management counselling specific to their health condition for postpartum weight management.

2.3 How should dietary practices be evaluated in postpartum women being engaged in weight management?

Background

Diet is a major component of lifestyle-related factors that can lead to obesity.^[77] Pregnant and postpartum women are vulnerable to unhealthy dietary practices due to various socio-cultural myths and practices.^[12] Methods/tools used for the assessment of dietary behaviour should provide a holistic comprehension about one's usual dietary intake, food habits and eating patterns. With this information, the nutritionist can assess the adequacy of food intake, the food groups consumed, food habits and related socioeconomic barriers.^[78] Accurate assessment of the dietary intake and practices will help in devising an individualised diet plan. Dietary practices can be evaluated either by subjective report or by objective observation. The subjective report includes open-ended surveys such as dietary recalls or records or closed-ended surveys such as food frequency questionnaires which can be either self-reported or can be done by a trained dietitian/research staff.^[79] The objective observation includes methods such as duplicate diet approach or food consumption record at household level which mandates the use of a trained research staff.^[80] The strengths and limitations of each method should be adequately weighed with respect to the socioeconomic status and the availability of resources before finalising any method. Moreover, the methods/tools used should be less time consuming with low-moderate participant burden so that authentic information is obtained.^[81] This necessitates the healthcare team to choose an optimum assessment method, that helps in acquiring accurate and reproducible data from which significant conclusions can be drawn for postpartum weight management. Thus, there is a need to identify the appropriate method/tool to assess dietary behaviour.

Summary of evidence

Various randomised controlled trials conducted recently have used different tools and methods for dietary assessment. Some interventions have used pre-developed and validated questionnaires to assess weight control practices and eating behaviour.^[47,56,57,65,82] Many studies have used 24-h recall,^[17,20,23] dietary records^[20,83] and food frequency questionnaires^[84,85] to obtain information about usual dietary intake. Some studies have used validated questionnaires to assess the fruit and vegetable intake^[85] or fat and fiber intake^[45] specifically. Apart from this, a prospective study used a combination of 24-h recall and food frequency questionnaire.^[86]

There are practice guidelines available that suggest the use of various tools and methods to assess dietary information such as 24-h recall, food records and food frequency questionnaires.^[87] They also suggest the use of self-developed questions to assess the participant's dietary behaviour, food choices, food habits, food security, food-related cultural factors and beliefs and food-related psychological issues.^[87]

Clinical practice recommendations

No.	Recommendation	Grade
2.3.1	The detailed dietary evaluation should include an assessment of the usual meal pattern (including the quantity of food items consumed) and dietary habits (including skipping meals, consumption of foods high in fat, salt and sugar [HFSS], consumption of sugar-sweetened beverages [SSBs], usual frequency of eating out and emotional/stress eating).	II A
2.3.2	24-h dietary recall for three days (two weekdays and one weekend) and food frequency questionnaire should be used for dietary evaluation, if feasible. Energy, macronutrient and fiber intake should subsequently be calculated. Alternatively, a short-validated questionnaire can be used (Refer Annexure 1)	II B
2.3.3	Standardized validated infographic material can be prepared and supported with dietary tools to achieve uniformity in capturing data through diet recall and portions consumed besides the standard format of the dietary data capturing methods.	IV B
2.3.4	Dietary intake of micronutrients such as iron, vitamin B12, calcium, and vitamin D should be assessed through frequency of intake of food groups rich in these micronutrients.	IV B
2.3.5	The barriers faced by postpartum women to maintain a healthy diet in their daily lifestyle should be evaluated.	IV B

Discussion

The recommendations are based on existing practice guidelines, randomised controlled trials and consensus by the experts. The assessment of energy, macronutrient and relevant micronutrient intake from all food groups, along with dietary habits are important as it would help prescribing an individualised diet plan for postpartum women. To attain adequacy in assessment of food intake and its conversion to nutrient intake, it is important to have trained personnel preferably dietitian/nutritionist and they should be willing to devote enough time for the purpose. In contrast to other lifestyle-related factors such as smoking or alcohol, dietary practices are relatively difficult to assess. It is mostly based on the perception of people about their food habits and the amount of food consumed. There is a higher risk of measurement error among the individuals in recalling a complex collection of exposure. Therefore, each method should be weighed for its advantages and disadvantages [Table 7]. Moreover, while conducting a 24-h recall, samples of commonly used standardised measuring cups, plates, ladles and spoons or various chapati size cut-outs should be shown to women to gather adequate data on food intake. Since 24-h recall and food frequency questionnaires are widely accepted tools for dietary assessment, they should be used in combination. In addition to these tools, detailed dietary behaviour should be considered in daily clinical practice. Some

Table 7: Advantages and disadvantages of traditional tools used for dietary assessment

Tools/Description	Advantages	Disadvantages
24-h recall Retrospective assessment method of dietary intake over previous 24 h Multiple recalls for usual dietary intake assessment	Precise method if interviewed efficiently Low respondent burden Sensitive to ethnicity differences Literacy and numeracy skills not required Captures detailed data on eating habits like patterns and preparation methods	Requires skilled and trained interviewer such as dietitian/nutritionist Dependent on respondent's ability to recall intake Recall bias Affected by reporting errors, seasonal variation and day of the week Time consuming and labour-intensive analysis Affected by the respondent's literacy and ability to describe the food and portion size estimation
Food Frequency Questionnaire Retrospective assessment methods for frequency of consumption of certain food products over periods of time. Can be interviewer- or self-administered based.	Useful for estimating long-term usual intakes Can capture a range of foods, specific nutrients, or a specific food group, including rarely consumed food items. Low researcher burden Potential low cost	Requires good participant memory, literacy and numerical skills Prone to misreporting Short food frequency questionnaires not reliable for estimating usual intake May lead to underreporting, if food list is not comprehensive (not covering all the foods consumed by the respondent)
Qualitative: Frequency only Semi quantitative: Estimated portion pre-assigned (e.g., small, average and large) Quantitative: Portion size queried	Low participant burden Less reliance on memory More accurate and culture specific Less intensive analysis	
Food Diary/Records Prospective methods where details of all food items consumed are recorded by the participant as they are consumed. Amount of food eaten can be either estimated using household measures (estimated food diary) or weighed by the respondent or research assistant in the home (weighed food diary).	More accurate Provides detailed information (dietary intake and portion size) Good estimates of short term total dietary intake and total nutrient intake. Little reliance on responder's memory Cost effective	High participant burden Participant need to be trained and literate Analysis is labour intensive and time consuming Chances of misreporting Estimated food diaries rely on one's ability to describe portion size
Semi-quantitative weighed food record Regarded as reference instruments and used for validating other dietary assessment methods Portion sizes quantified by weight or by estimation using household measures such as cups and tablespoons	Direct and simple recording of all consumed foods Does not rely on respondent's long-term memory	Substantial burden on subject Accuracy depends on motivation of the respondent Requires literate and trained participants Time consuming Food recording can lead to under-reporting and in undereating

specific points need to be emphasised upon to obtain a detailed dietary behaviour have been mentioned in [Table 8]. Special attention should be paid to assess micronutrients such as iron, calcium and vitamin D. Iron deficiency anaemia should be assessed through haemoglobin levels and serum ferritin levels (refer Annexure 2). Dietary calcium intake can be assessed using the National Osteoporosis Foundation tool (as shown in Annexure 3). The tool assists in comparing the actual daily dietary calcium intake and the recommended daily allowance for calcium to assess the adequacy of calcium intake. Vitamin D enhances calcium absorption. Vitamin D deficiency can be assessed through serum 25-hydroxyvitamin D levels (refer Annexure 4). Apart from the dietary consumption pattern, the other dietary components related to socio-cultural myths and barriers should be assessed using developed and validated questionnaires (Annexure 1). Dietary diversity questionnaires can be used to capture the intake of various food groups along with their quantities. Such questionnaires can also be used in resource-limited settings where a registered dietitian is not available to conduct 24-h recall or use food frequency questionnaires. The dietary behaviours should be duly assessed using the combination of appropriate tools and methods to formulate robust interventions.

2.4 How should daily physical activity levels be evaluated in postpartum women being engaged in weight management?

Background

An adequate amount of physical activity is important in postpartum weight management. It increases energy expenditure and provides various health benefits.^[88] It is pertinent to assess physical activity status of postpartum women as it will help in understanding their ability to participate in various types of physical activity. The daily activity of postpartum women can be comprehensively assessed under the following domains: exercise, occupational, household-related, leisure-related and sedentary activities.^[89] There are various techniques to assess physical activity such as self-reported questionnaires (including diaries, recall questionnaires and interviews), direct behavioural observation and physiological markers like heart rate, motion sensors and calorimetry by use of devices (accelerometer, pedometer and heart rate monitor).^[90] The selection of a method should be done by assuring that the obtained results represent normal daily activity. The selected method should be feasible, with minimal participant discomfort and should lead to significant conclusions that can be applied to a larger population. Hence, it is important to determine the objective, valid and

Table 8: Specific points to be considered while assessing a detailed dietary behaviour

Specific points	Detailed dietary behaviour
Type of diet	Healthcare professionals should assess the quantity and quality of usual dietary intake as: High calorie diet High carbohydrate low protein diet High fat low fiber diet
Meal Pattern	Meal pattern includes the frequency and timings of the meal consumption. Healthcare professionals should assess the unhealthy eating habits as: Meal skipping especially breakfast Longer gap between the two meals Too frequent meal consumption, i.e., more than five to six meals in a day Consumption of energy dense meals
Portion size	Eating more than that required results in weight gain. Healthcare professionals should assess the high energy intake through the portion size: Consumption of a large portion size Consumption of energy-dense foods in a meal Second helpings
Macronutrient consumption	Healthcare professionals should assess the usual intake of macronutrients as: <div> <div>Carbohydrates</div> <div>Whether or not, the consumption of: Whole grains Refined cereals High glycaemic index foods Fiber-rich foods Added sugar in tea, coffee, or other beverages</div> </div> <div> <div>Proteins</div> <div>Whether or not, the consumption of: At least two glasses of milk in a day or milk products At least one serving of pulse preparation each in at least two major meals Handful of nuts One-two egg whites/one serving of lean chicken (for non-vegetarians)</div> </div> <div> <div>Fats</div> <div>Whether or not, the consumption of: Processed and convenient foods Bakery products Fried food items The quantity and quality of oil consumed on a daily basis should also be considered.</div> </div>
Important Micronutrient intake	Healthcare professionals should assess the intake of important micronutrients as: <div> <div>Iron</div> <div>Whether or not, the consumption of iron-rich foods such as: Plant sources: Pearl millet (<i>Bajra</i>), Bengal gram, Bengal gram flour, Soyabean, Green leafy vegetables (Fenugreek leaves, Amaranth leaves, <i>Bathua</i>), Mushrooms Animal sources: Chicken</div> </div> <div> <div>Calcium</div> <div>Whether or not, the consumption of calcium-rich foods such as: Plant sources: Finger millet (<i>Ragi</i>), Bengal gram, Soyabean, Green leafy vegetables, Sesame seeds, Flax seeds Animal sources: Milk and milk products, Fish (Bacha, Katla, Mrigal, Pran and Rohu)</div> </div>
Methods of cooking	Healthcare professionals should assess various methods of cooking such as sauteing, frying, steaming, boiling, grilling, baking etc., and opt for preparation of meals throughout the day.
Galactagogue consumption	Healthcare professionals should assess the galactagogue consumption quite common in India for higher milk formation. The quantity of galactagogue consumption and the ingredients used in its preparation should be assessed.
Eating out habits	Healthcare professionals should assess eating out habits as: Frequency, quality and quantity of food consumed outside home Frequency and quantity of processed and convenience foods consumption
Reading food labels	Healthcare professionals should assess the individual's ability to read and understand various components of a food label such as: Getting an idea about the portion size Identifying the energy, protein and fat content of the product Identifying if the product contains trans fat Identifying the amount of added sugar or salt in the product

reliable methods for the comprehensive assessment of physical activity in postpartum women.

Summary of evidence

Various randomised controlled trials conducted worldwide have assessed the physical activity levels of the participants. A variety

of tools and methods have been used in different studies such as International Physical Activity Questionnaire^[23,57,65,82,83] which helps in assessing habitual physical activity in a population across different socio-cultural contexts. It has two versions—a long form and a short one which can be chosen as per the feasibility. Pregnancy Physical Activity Questionnaire^[25] helps in assessing duration, frequency and

intensity of physical activity among pregnant women with dedicated physical activity domains such as work-related activities, leisure-related activities, transport-related activities and sedentary activities (screen and sitting time) for a comprehensive assessment. Apart from this, Pregnancy Infection Nutrition 7-day physical activity recall^[85] and Paffenbarger Physical Activity Questionnaire^[84] have also been used to assess the duration, frequency and intensity of physical activity. In addition, some studies have used physical activity trackers, armbands and pedometers to measure step counts, energy expenditure and sleep time.^[17,20,23,56] Few studies have also evaluated sedentariness by asking pre-developed questions on sitting time, television viewing etc.^[65,84] One of the randomised controlled trials has used the Physical Activity Neighbourhood Environment Scale,^[23] a pre-developed and validated questionnaire to assess the physical activity environment of the participants. A valid and reliable physical activity questionnaire, that is, Madras Physical Activity Questionnaire (MPAQ), is also available to assess an individual's physical activity level from various domains. It assesses various dimensions of physical activity such as frequency, intensity, type and duration and is suitable for the Indian population.^[91]

Clinical practice recommendations

No.	Recommendation	Grade
2.4.1	The detailed physical activity evaluation should include an assessment of dedicated physical exercise, work-related activities, leisure-related activities, transport-related activities and sedentary activities (screen and sitting time).	II B
2.4.2	Madras Diabetes Research Foundation- Physical Activity Questionnaire (MPAQ) can be used for evaluation, if feasible. Alternatively, a short, validated questionnaire can be used.	III B/C
2.4.3	Evaluation of the adequacy of physical exercise should be done by assessing type (stretching/strengthening/aerobics/balance), intensity (light/moderate/vigorous), duration (number of minutes per day) and frequency (number of days per week) of exercise.	II B
2.4.4	Special attention should be given to assess the number of sedentary hours (especially, screen time and sitting time) spent during the day.	IV A
2.4.5	Postpartum women should be encouraged to discuss the barriers faced by them in maintaining an active lifestyle.	IV A
2.4.6	The acceptability and feasibility of performing various types of physical exercises (aerobics, strength training, yoga, Pilates etc.) should be assessed.	IV B

Discussion

The recommendations on physical activity assessment during postpartum are based on existing practice guidelines, randomised controlled trials and consensus by the experts. The selection of assessment methods whether subjective or objective must be done based on the feasibility and availability of resources. Therefore, each method should be weighed for its advantages and disadvantages [Table 9]. A validated physical activity tool MPAQ has been found to be feasible for physical activity assessment of Indian population assisting in a detailed assessment of daily physical activity by comprising various components such as dedicated physical exercise, work-related activities, leisure-related activities, transport-related activities and sedentary activities.

However, in resource-limited settings, where the tool might not be available, certain points should be taken into consideration while assessing the physical activity behaviour depicted in [Table 10]. Further, the focus should be laid on the type of physical activity (stretching/strengthening/aerobics/balance), intensity of physical activity (light/moderate/vigorous), duration of participation (in minutes per day) and frequency of involvement (days per week). Consensus among the experts suggested that postpartum women are saddled with childcare that often leads to stress or mental fatigue. Hence, it increases their indulgence in sedentary activities like sitting, increased screen time etc., and reduced household activities. Therefore, time spent in sedentary activities should be duly assessed. Along with this, focus should be given to assess various social, physiological and cultural barriers to physical activity faced by women. These parameters can be assessed by using a comprehensive tool designed for Indian postpartum women (Annexure 1). The healthcare provider should consider the feasibility of the assessment approach before including it into daily clinical practice.

2.5 How should psychosocial variables/health/parameters be evaluated in postpartum women being engaged in weight management?

Background

The methods/tools used to assess psychosocial variables should cover various aspects of unhealthy behaviours that may lead to limited compliance and subsequent weight gain.^[92] The methods/tools used should be such that they evaluate participants' self-efficacy, self-esteem, body image concerns, perceived stress due to added responsibilities and challenges and social support.^[56] Apart from this, methods/tools used should be less time consuming and have a low participant burden to obtain appropriate information. Thus, it is essential to identify which methods/tools should be used for the evaluation of psychosocial parameters.

Summary of evidence

Many randomised controlled trials have been conducted worldwide assessing different psychosocial parameters. Various developed and validated questionnaires have been used to assess different aspects of psychosocial health such as self-efficacy, self-regulation, social support, body image concerns, perceived stress, depressive symptoms, emotional coping and sleep patterns. Most commonly used validated questionnaires have been Edinburgh Postnatal Depression scale for assessing depressive symptoms,^[23,25,47,56,57,82,84] body shape questionnaire^[56] and EQ-5D-5L^[19,57] to evaluate body image concerns and Perceived Stress Scale to assess perceived stress.^[23,56,85,86] A wide variety of tools such as Self-efficacy subscale,^[56] Self-efficacy for Physical Activity Questionnaire,^[25] Exercise Self Efficacy,^[65,82] Marcus and colleague's validated questionnaire,^[23] Self-efficacy for Diet Questionnaire^[23] and Weight Self Efficacy^[65,82] have been used in various studies to assess the participants' self-confidence to indulge in healthy behaviours. Self-regulation questionnaires such as Exercise Goal-Setting Scale^[23] and HealthStyles survey^[23] have been used to assess self-regulation for exercise and diet, respectively. Stress and emotional coping strategies have also been evaluated by various scales such

Table 9: Advantages and disadvantages of physical activity assessment methods

Tools/Description	Advantages	Disadvantages
Self-report Questionnaires Most commonly used retrospective method for physical activity assessment It depends upon the recall ability of the participant Various standardised questionnaires available which may vary by the measurable components (type of activities, intensity and duration), reporting (calories, activity score and time) and scoring (met/hour/day or met/hour/week etc.)	Cost effective Easy to administer even in resource-limited settings Can determine the time present in various physical activity categories (light, moderate, vigorous) Accurate in measuring vigorous activities Can help in generating comparative data set	Less robust in determining light to moderate intensity activities Recall bias Influenced by extrinsic factors such as age, social desirability, literacy and complexity of the questionnaire
Self-report Activity Diaries/Logs It is a prospective method which requires keeping a record of physical activity in real time It helps in assessment of total daily energy expenditure (IDEE)	Less prone to recall bias due to real-time assessment Low measurement and social desirability bias	Can be cumbersome for participants to report minute-minute record Can only be used with literate population Inappropriate for people with cognitive dysfunction
Direct Observation Independent observation by an individual that requires controlled environment It can help in gathering contextual data of physical activities Mostly used in children	Helps in understanding type and context of activity	Time consuming and expensive Unable to measure physical activity objectively
Devices Various devices available to measure energy expenditure Accelerometer: Helps in measurement of acceleration (rate of change in activity in real time) Pedometer: Helps in measuring the step count of an individual Heart rate monitor: Indicates energy expenditure by measuring heart rate in real time	Measure physical activity rate, volume and time spent in it Monitors minute-minute physical activity Can measure various intensities of activity	Induction of reactivity bias Unable to provide contextual data Inability to give adequate data in different positions

Table 10: Points to consider for physical activity assessment

Components of physical activity	Points to be considered
Dedicated physical activity	Early postpartum phase: Dedicated physical activity includes light to moderate intensity activities such as walking, pelvic floor exercises and yoga relaxation techniques for 150 min per week. Late postpartum phase: Dedicated physical activity includes moderate to vigorous intensity activities such as yoga, aerobics, resistance, endurance and flexibility for 150 min per week. Healthcare professionals should assess dedicated physical activity level by evaluating: The frequency of participation in dedicated physical activities in a week The time spent doing dedicated physical activities in a day The types of exercises included in dedicated physical activity
Household activities	Household activities include cooking, cleaning, mopping, gardening, childcare etc. Healthcare professionals should assess household activities by evaluating: The frequency of participation in household chores in a week The time spent doing household chores in a regular day The types of exercises included in household activities
Occupation-related activities	Occupation-related activities include manual tasks, sitting tasks, walking, working on laptop, carrying, or lifting objects. Healthcare professionals should assess occupation-related activities by evaluating: The number of hours in a day spent doing sedentary work-related activities (sitting and screen time)
Transport-related activities	Transport-related activities include self-driving, cycling, walking, etc., from one place to another. Healthcare professionals should assess transport-related activities by evaluating: The kind of transport usually opted for while travelling from one place to another The time usually spent in travelling
Leisure-time activities	Leisure-time activities include discretionary or recreational activities including hobbies, walking and gardening. Healthcare professionals should assess leisure time activities by evaluating: The type of activities usually done in free time The time usually spent in leisure activities
Sedentary habits	Sedentary habits include sitting, reclining, or lying posture, watching television, playing video games, or using the phone or computer. Healthcare professionals should assess sedentary habits by evaluating: The daily screen and sitting time

as Rhode Island Stress and Coping Inventory^[65,82] and validated questions related to emotional eating, physical activity and stress

management.^[85] Social support in the form of emotional support, instrumental support and informational support from friends and

family has also been assessed through validated questions.^[56,65,85] Sleep being another crucial component of psychosocial health has been evaluated using developed and validated questionnaires such as Sleep Pattern Questionnaire, General Sleep Disturbance Questionnaire^[84] and Pittsburgh Sleep Quality Index^[25,82] to measure sleep quality and habits.

Clinical practice recommendations

No.	Recommendation	Grade
2.5.1	Assessment should include inquiry into the presence of a diagnosed psychiatric disorder, especially depressive, anxiety or eating disorder.	II A
2.5.2	In case a diagnosed psychiatric disorder is present, then the current condition of the psychiatric disorder and use of psychotropic medications should be asked for by the weight management team.	II A
2.5.3	A two-item Patient Health Questionnaire-2 (PHQ-2) could be used on a routine basis for screening of depressive symptoms.	IV B
2.5.4	The referral to a mental health professional should be considered if: Dietary history reveals abnormal eating to cope with stress. There is a sudden lack of motivation for weight reduction. There are persistent interpersonal difficulties with the weight management team. PHQ-2 indicates the possibility of depression. There is a history of diagnosed psychiatric disorders. There is clinical suspicion of a known psychiatric disorder.	IV A

Discussion

The recommendations are based on the evidence obtained from randomised controlled trials and consensus by the experts. It is crucial to assess the psychosocial health of postpartum women routinely to ensure their optimal engagement in the weight management interventions. Appropriate questionnaires that are not only short and less time consuming but also help in the screening of depressive symptoms should be used (such as PHQ-2). Apart from this, various psychosocial cues such as emotional eating, sudden lack of motivation for continuing healthy behaviour and sudden loss of drive for active participation in the weight management programme should be identified to provide required psychiatric/psychologist help to such women. The mental health professional or a psychologist can then use various validated tools available such as Edinburgh Postnatal Depression scale, Perceived Stress Scale, Self-efficacy subscale, body shape questionnaire etc., for detailed evaluation of psychosocial health.

Chapter Three: Management of weight

3.1 How should stepwise weight loss goals be set for postpartum women being engaged in weight management?

Background

Weight management is a systematic process comprising various techniques and processes to attain healthy body weight. This primarily requires goal setting to pave the way for behavioural changes which focus on gradual lifestyle changes.^[93] Weight loss goals comprise self-monitoring, increasing motivation, mental stability and accountability. These goals should be specific, measurable,

attainable, relevant and time-limited (SMART). They should allow room for setbacks, reassessment and adjustment as needed.^[94] Goals can be short-term and long-term based on the weight status of the postpartum women. Clinicians should set personalised, achievable evidence-based goals after a thorough evaluation of lifestyle-related factors.^[95] Clinically significant weight loss goals, that is, a modest weight loss goal of 5% to 10% facilitate intra-hepatic and intra-abdominal fat loss. This also improves glycaemic and triglyceride levels, thereby preventing the development of cardiometabolic diseases.^[96] Thus, it is important to identify weight loss goals specific to postpartum women which not only help in their weight loss but also improve their overall health and well-being.

Summary of evidence

Various intervention studies have been conducted to bring about clinically significant postpartum weight loss among women post-delivery. However, clinically significant weight loss goals have been defined differently across these studies such as 5% or 10% weight loss from baseline after 12-week intervention,^[21,97] 5% or 10% weight loss by 12 months postpartum/post-intervention,^[17,57] 10% \pm 3% weight loss from baseline after 16-week intervention,^[63] 5% weight loss over a 6-month period^[98] and 3% weight loss from baseline after 14-week intervention.^[47] There are studies that have reported a clinically significant weight loss goal as weekly weight loss of 0.5 kg for final weight loss of 6 kg after 12-week intervention.^[19,20,82] Further, some studies that have defined clinically significant weight loss goals separately for postpartum women who have had normal pre-pregnancy body mass index and those who were in the overweight/obese body mass index category pre-pregnancy. These studies suggest that the clinically significant weight loss goal should be set for women with normal pre-pregnancy body mass index as achievement of pre-pregnancy weight by 6 months^[99] and 12 months^[100] postpartum, whereas women who were overweight or obese before pregnancy should lose an additional 5% of pre-pregnancy weight by 6 months^[99] and 12 months^[100] postpartum.

Clinical practice recommendations

No.	Recommendation	Grade
3.1.1	The healthcare provider should assess the readiness to uptake weight loss attempts by changing current diet and activity using behavioural modification.	IV A
3.1.2	Realistic and sustainable individual-centric weight loss goals should be established after a detailed discussion with postpartum women.	IV A
3.1.3	Overweight and obese postpartum women should be advised to reduce body weight to the normal body mass index (18.5-22.9 kg/m ²).	IV A
3.1.4	A stepwise weight loss goal should be set with a target weight loss of 0.5 kg per week attaining a weight loss of 5-10% of baseline body weight over a period of 6 months (clinically significant weight loss).	II A
3.1.5	Postpartum women with normal body weight but substantial postpartum weight retention (>4.5 kg as compared to pre-pregnancy body weight) should be motivated to attain pre-pregnancy ideal body weight ^{##} over a period of 12 months after delivery.	II C

^{##}Achieving pre-pregnancy ideal body weight means losing additional fat retained in the postpartum period yet not dropping below the normal body mass index category, that is, below 18.5 kg/m².

Discussion

As per evidence and consensus by the experts, the goal setting process for postpartum weight loss should be **SMART**. The goal should be **specific** (i.e., losing 0.5 kg in a week or 5 cm from waist circumference in a month), it should be prompt and motivate the participants. It should be **measurable** and produce quantifiable results (i.e., consuming 1400 calories in a day, eating five servings of vegetables or walking 8000 steps every day). It should be **attainable**, where the participant has enough time and resources to achieve it (i.e., easy to cook weight loss recipes and home-based workouts for postpartum women). It should be **relevant**, individualised and evidence-based to achieve sustenance (i.e., planning a diet based on estimated average requirements (EAR) as per current body weight in consideration of dietary habits). It should be **time-limited** (i.e., weight loss target of 10% of body weight over 6 months or attaining pre-pregnancy body mass index by 6 months postpartum). The goals can be short-term and long-term, since long-term goals seem more difficult to attain, they can be fragmented into smaller goals (i.e., a woman needing to lose 20 kg of body weight may split it into smaller weight loss goals of 2 kg/month). The clinician should always formulate these goals after a thorough evaluation with a provision for setbacks. If the need arises, the goals can be adjusted by reassessment. While setting the weight loss goals, clinicians should ensure a healthy weight loss, that is, women lose their additional/retained fat mass rather than lean mass or fat-free mass. They should be advised to achieve and maintain their body mass index in the normal category (18.5–22.9 kg/m²).

3.2 In postpartum women, what type of dietary recommendations should be advised for improving weight management, anthropometric and metabolic health outcomes?

Background

Dietary interventions are one of the most crucial components of postpartum weight management. Usually, weight reduction in other stages of life is done by consuming a calorie deficit diet^[10]; however, the postpartum period is a demanding phase as the requirement of both macronutrients and micronutrients increases for lactating women.^[101] This makes it challenging to manage postpartum weight without compromising maternal health and nutrition. The challenges further escalate as there are various diet-related myths associated with this period particularly in Indian context.^[12] It is generally believed that postpartum women should increase the quantity of food intake as they have to eat for two, that is, for the mother and infant.^[12] It is believed that mothers should be allowed to eat more than their satiety levels and should not follow any diet plan, as it will lead to reduced milk formation.^[12] Moreover, to meet the increased energy demands, mothers during this phase are usually fed *ghee* and other high calorie foods in the form of galactagogues such as *laddoos* that are rich in fat and sugar.^[12,102,103] The focus is usually on intake of calorie-dense foods rather than nutrient-dense foods, which generally result in weight gain and micronutrient deficiencies in postpartum

women.^[104,105] Apart from this, experts have seen that mothers who experience failure of lactation or have early cessation of breastfeeding also have high calorie foods in the view of their post-delivery recovery usually on the advice of their elders. Various myths related to dietary intake in this phase may consequently lead to weight gain. Thus, there is a need for setting individualised dietary goals for postpartum weight management depending on the mother's body mass index, breastfeeding status and physical activity levels.

Summary of evidence

Various recent randomised controlled trials have targeted the dietary habits and behaviour of postpartum women to manage their weight. Of these trials, the majority have reported significant outcomes in terms of postpartum weight loss without compromising the health of the mothers. The interventions included either all or some of the components for disseminating dietary interventions such as individualised diet plan,^[19,21] macronutrient and micronutrient information, dietary composition of <30% energy from total fats, 10% to 20% energy from proteins, 50% to 60% energy from carbohydrates, ≥12.5 g fiber per 1000 kcal,^[20] individualised calorie goals^[21] ranging from 1200 to 1800 kcal/day with additional 300 kcal for those breastfeeding^[17] and a reduction in 500 kcal/day for women with body mass index in the obese category.^[19,20] Other components for disseminating dietary interventions comprised covering half of the plate with vegetables at lunch and dinner,^[20] limiting sugar-sweetened beverages,^[20,47] limiting high fat, salt and sugar foods,^[20,47] controlling portion sizes,^[20] information on restaurant eating^[56] and label reading.^[56] However, some interventions with non-significant outcomes either reported high attrition rates^[65] or a lack of relapse prevention.^[18] These interventions with non-significant results have suggested that participants with high intervention adherence may have positive outcomes, thus benefiting these women.^[63]

Apart from intervention studies, there are various national, international and practice guidelines available for dietary management of postpartum women. These guidelines recommend macronutrient composition of diet^[49], and requirement of micronutrients such as calcium,^[49,105,106] iron, vitamin C,^[49,104,106] vitamin D,^[49] vitamin B₆,^[49] vitamin B₁₂,^[49] and iodine.^[107] The guidelines give food group specific advice such as number of servings of various food groups,^[107,108,109] consumption of nutrient dense foods,^[106] covering half of the plate with fruits and vegetables and the other half with whole grains,^[110] intake of one serving of oilseeds and nuts per day^[110] and limiting foods high in fat, salt and sugar.^[107,110] The guidelines also recommend healthy dietary practices such as consuming small frequent meals as three major and three minor meals,^[106,107] consuming nutrient-dense snacks,^[106,107] avoiding skipping meals,^[49,107] using healthy cooking methods such as boiling, grilling and steaming,^[107] limiting the intake of caffeine drinks such as tea and coffee to two to four drinks per day,^[104,107,110] avoiding/limiting alcohol intake,^[107,108] avoiding smoking^[108] and avoiding fad diets.^[108]

Clinical practice recommendations

No.	Recommendation	Grade
3.2.1	Eating preferences, food habits, and health status of the woman should be considered while individualising the diet plan.	IV A
3.2.2	The meal pattern should be spread throughout the day in preferably five-six servings involving three major meals and two to three minor meals or snacks.	II A
3.2.3	Meal skipping, crash diets and fad diets should always be discouraged.	II A
3.2.4	Individualised calorie goals should be set depending on the mother's body mass index, breastfeeding status and physical activity levels with a target calorie deficit of 500 kcal/day.	II A
3.2.5	Postpartum mothers must be given an additional 300 to 500 kcal based on their status of lactation ^{###} .	I A
3.2.6	The dietary composition must be 50% to 60% energy from carbohydrates, 15% to 20% energy from proteins and <30% energy from total fats.	I A
3.2.7	The daily fiber intake should be more than 12.5 g/1000 calories obtained from whole grains, legumes, nuts, oilseeds, fruits and vegetables.	I A
3.2.8	Encourage the consumption of local and seasonal fresh fruits and vegetables, and adoption of techniques like fermentation and germination to meet the additional requirement of micronutrients.	II A
3.2.9	Supplementation of calcium, iron and vitamin D should be ensured as per the doctor's advice.	IV A
3.2.10	Limit consumption of high caffeine drinks such as tea and coffee to two to three cups each day.	IV A
3.2.11	Consumption of HFSS food products should be discouraged.	II A
3.2.12	Consumption of calorie-dense galactagogues with added fat and refined sugar should be discouraged.	IV A

^{###}Status of lactation means whether or not a postpartum woman breastfeeds her infant.

Discussion

Postpartum weight management can be carried out by maintaining appropriate calorie intake. Individualised calorie goals should be set for postpartum women depending on their body mass index, breastfeeding status and activity levels. Eating preferences and food habits should be taken into consideration while prescribing a diet to an individual. Breastfeeding mothers have higher calorie requirements and thus, should be provided additional 300 to 500 kcal/day. However, those not breastfeeding do not require any additional calorie intake. The calorie intake for postpartum women having body mass index in the overweight and obese category should be reduced with a maximum deficit of 500 kcal/day. The composition of calorie intake should be 50% to 60% energy from carbohydrates, 15% to 20% energy from proteins and <30% energy from total fats. Focus should be laid on consumption of complex carbohydrates and fiber rich foods rather than simple carbohydrates. High protein diet and consumption of good quality fat (monounsaturated fatty acid and omega-3 fat sources) should be encouraged. Apart from the macronutrient intake, postpartum period is usually accompanied with micronutrient deficiencies as the requirement of some micronutrients increase but their intake is generally low. It is crucial to lay emphasis on adequate intake of micronutrients such as calcium, vitamin D and iron in accordance with the EAR provided by Indian Council of Medical Research (Annexure 5). Dietary sources of

calcium and iron are presented in (Annexure 6 and Annexure 7), respectively. Postpartum mothers should be encouraged to meet additional requirements of micronutrients by consuming local and seasonal fresh fruits and vegetables and using techniques such as fermentation and germination to improve micronutrient content of food. Galactagogues usually consumed during this period should be nutrient-dense rather than calorie-dense. Emphasis should be laid on consumption of galactagogues such as milk, fenugreek seeds, garlic, fennel seeds, flax seeds, sesame seeds, nuts, edible gum (*gondh*) and green leafy vegetables. Added fat and refined sugar in galactagogues such as *ladoos* and *panjirees* should be discouraged. Further, the intake of alcohol and caffeine should be limited or avoided as they hamper micronutrient absorption. Besides, small, frequent meals should be promoted as three major and three minor meals. Meal skipping should not be considered synonymous to intermittent fasting. Intermittent fasting is developing as a new approach to weight loss; however, it is done under medical supervision taking care of the nutritional needs of an individual. On the contrary, meal skipping refers to the lack of intake of either one or more main meals (breakfast, lunch and dinner) under no medical supervision. Meal skipping should be discouraged as this can affect the nutritional status of the mother. Crash diets and fad diets usually followed to reduce weight at a faster pace should be highly discouraged as these diets cannot be sustained upon for long run. Healthy cooking methods such as grilling, boiling and steaming should be preferred over frying as this will assist in prevention of empty calorie intake.

3.3 In postpartum women, what type of physical activity recommendations should be advised for improving weight management, anthropometric and metabolic health outcomes?

Background

Physical activity interventions hold significance as sedentary behaviour is quite prevalent among postpartum women.^[11] Various myths related to physical activity are commonly followed around the time of pregnancy and postpartum period. It is believed that physical activity during pregnancy could be dangerous for both mother and the foetus.^[12] The inactive lifestyle during pregnancy usually persists in the postpartum period wherein postpartum women are bound to follow certain traditional customs such as 'doing the month' particularly in Indian settings.^[11] These women are advised to restrict physical activity including their participation in some common household chores. Consequently, women tend to decrease their activity levels post-delivery, whereas their sitting time including the screen time increases.^[37] Physical activity is crucial to lose excessive weight, especially the fat mass gained at the time of pregnancy.^[113,114] Despite potential benefits of physical activity, postpartum women not only lack information about the right time to begin an exercise regime but also the type and intensity of activity to be adopted.^[12] There is a need for individualised physical activity regimes for weight management to be advised to postpartum women depending on their mode of delivery, complications, if any, and neighbourhood built-environment characteristics.

Prior to the formulation and dissemination of weight management interventions to the postpartum women, it is crucial to identify the physical activity component and evaluate its role in postpartum weight management.

Summary of evidence

Recently, various randomised controlled trials have been conducted targeting physical activity levels of postpartum women along with dietary intervention. These interventions consisted of either one or more components for disseminating physical activity advice such as basic information about physical activity,^[56] culturally sensitive videos for both indoor and outdoor activities,^[18] individualised step count goals of 5000 steps^[47] per day, recommendation to gradually increase physical activity^[20,63] up to 150 min per week,^[21] encouraging women to set specific goals such as taking brisk walks or walking with the stroller.^[20] The intervention studies further include physical activity components such as reducing the sitting time^[44] and television watching to less than 2 h per day.^[65] Mixed findings have been reported, wherein few interventions have shown significant weight loss outcomes^[17,20,21,47,56] while others did not report any significant findings owing to high attrition rates^[65] or lack of relapse prevention.^[18] Yet, the combination of these dietary and physical activity interventions suggests positive weight loss outcomes with improved metabolic health for participants with high intervention adherence.^[63] A systematic review has also reported that a combination of diet and physical activity interventions are successful in bringing about significant weight loss goals as compared with the physical activity intervention alone.^[115]

Apart from the intervention studies, various international and national guidelines are available providing physical activity recommendations for postpartum women. The guidelines recommend those women with uncomplicated pregnancy and delivery to indulge in mild exercises such as walking, pelvic floor exercises and stretching as soon as post-delivery,^[51] whereas for those with complicated pregnancy or caesarean delivery, it is recommended to resume to pre-pregnancy physical activity levels after the first postpartum check-up usually done at 6 to 8 weeks post-delivery.^[51] Further, guidelines recommend these women to indulge in moderate-intensity aerobic^[50,109,116] and muscle strengthening exercises^[50,109,116] and gradually increase the intensity and duration of their activity.^[50,109,117] Talk-tests should be used to measure the intensity of aerobic exercises.^[109,118] If the speech is comfortably possible, then it is a light-intensity activity; if speech is possible with certain difficulty level, then it is a moderate-intensity activity; and if a person cannot speak much without taking a pause for breath, that is, speech is limited only to short phrases, then it is a vigorous-intensity activity. Apart from this, guidelines related to breastfeeding and physical activities are also available. It is recommended that lactating mothers should be informed that they can breastfeed their infants and indulge in a routine physical activity regime. However, they should be advised to either express/pump their breast milk or breastfeed their baby before the initiation of physical activity.^[88,108]

Clinical practice recommendations

No.	Recommendation	Grade
3.3.1	Postpartum women with uncomplicated delivery must be encouraged to gradually resume physical exercise within 4 to 6 weeks post-delivery or as soon as they feel comfortable.	I A
3.3.2	Women with caesarean or complicated deliveries should gradually resume physical exercise within 6 to 8 weeks post-delivery after their first postpartum check-up.	I A
3.3.3	Postpartum women must be encouraged to engage in low impact exercises such as walking and gradually include core muscle group strengthening exercises (i.e., abdominal, paraspinal, pelvic floor and gluteal muscles).	I A
3.3.4	Exercise intensity and duration should be gradually increased up to 150 min/week of moderate-intensity aerobic activity (up to 30 min per day for 5 days per week) and one to three sets of muscle-strengthening exercises (twice per week).	I A
3.3.5	The talk-test should be used for self-monitoring the intensity of aerobic exercises***.	I A
3.3.6	Sedentary time (sitting, watching television, using mobile phone etc.) should be limited and replaced with low intensity activities.	II A
3.3.7	Lactating mothers should be advised to either breastfeed or pump the breast milk prior to the initiation of physical exercise.	I A
3.3.8	Postpartum women should restrict upper-body exercises such as weightlifting if they tend to develop mastitis.	IV A

***The talk-test is used to measure the intensity of aerobic exercises. Comfortable speech denotes light-intensity, speech with certain difficulty denotes moderate-intensity and speech limited to phrases denotes vigorous-intensity.

Discussion

Various myths are related to physical activity during the postpartum period. Especially in Asian countries like India, the period of confinement for the first 40 days post-delivery is usually practiced. Consequently, postpartum women land up being sedentary. It is crucial to burst myths related to physical activity specifically during the postpartum period and raise awareness among these women about the type, intensity and importance of various exercises that should be performed during this period. Depending upon the complications and mode of delivery, postpartum women should be motivated and guided to indulge in physical exercise. Women with no complications and normal delivery should be encouraged to resume physical exercise within 4 to 6 weeks post-delivery or as soon as they feel comfortable, whereas women with complications or caesarean delivery should be screened for their ability to exercise during the first postpartum visit usually held between 6 and 8 weeks postpartum. Lactating mothers should be encouraged to indulge in physical exercise. They should be informed that lactic acid content increases in breast milk when indulging in vigorous-intensity activities, whereas participating in light-moderate intensity activities does not affect their breastfeeding status and composition. However, women who tend to develop mastitis should be restricted from performing upper-body exercises. Postpartum women should be encouraged to set individualised, realistic physical activity goals such as an aim of gradually achieving 10,000 steps per day. They should be encouraged to indulge in moderate-intensity aerobic physical activity like

brisk walking for at least 150 min per week (30 min per day for 5 days per week), excluding the warm-up and cool-down time and minimum of 10-min bouts per session. Women should be encouraged to start walking gradually from slow to brisk walking. They can be motivated to practise breathing exercises and gentle yoga. Kegel exercises such as contraction of pelvic floor muscles should be advised. Once they get used to the intensity or duration of a type of exercise, they should be further encouraged to increase the intensity (low to moderate to vigorous) and/or duration (progressively increase 5 min per session per week till the goal is reached). Postpartum women should also be educated about the talk-test to measure the intensity of their activity. If their speech is comfortably possible while exercising, then it is a light-intensity activity; if their speech is possible with a certain difficulty level, then they are performing a moderate-intensity activity; and if they cannot speak much without taking a pause for breath, that is, speech is limited only to short phrases, then they are getting indulged in a vigorous-intensity activity. Different physical activities that can be planned for postpartum women have been presented in [Table 11]. Sedentary behaviour of these women should also be targeted. Women should be encouraged to reduce their sitting time along with the screen time. Apart from this, various barriers are usually faced by postpartum women such as lack of time, energy, space etc. to indulge in physical exercise. In such cases, where mothers are unable to spare time separately or they do not have provision of walking tracks and fitness centres, they should be motivated to perform activities inside the house involving their infants such as walking while strolling the baby in a pram or performing abdominal exercises while lying next to the baby.

3.4 How can breastfeeding practices be useful for postpartum weight management?

Background

Breastfeeding is known for its various health benefits not only for infants but for mothers as well.^[119,120] It is recommended that

the baby be breastfed exclusively for 6 months postpartum and 2 years beyond along with complementary feeding for better growth and development.^[119] Moreover, breastfeeding reduces the risk of breast cancer and ovarian cancer among mothers.^[121] Theoretically, it is believed that breastfeeding involves increased energy cost of lactation and should assist in postpartum weight loss.^[122] However, the available evidence is limited and inconsistent.^[109,123] Postpartum women with failure of lactation or early cessation of breastfeeding do not require any additional calories because it might lead to positive energy balance and subsequent weight gain.

Prior to the formulation and dissemination of weight management interventions, it is crucial to identify the breastfeeding component and evaluate comprehensively its role in postpartum weight management.

Summary of evidence

Available evidence suggests that breastfeeding has various health benefits both for the offspring and the mother. However, inconsistent findings have been reported about its effect on postpartum weight loss. Some studies, systematic reviews and meta-analysis did not find any significant association between breastfeeding and postpartum weight loss,^[124,125] whereas other studies reported some significant association between the duration and intensity of breastfeeding with postpartum weight loss.^[123,126-133] A recent meta-analysis reported that women getting benefit from breastfeeding in postpartum weight loss are mostly those whose age is less than 30 years, who are primiparous and had normal pre-pregnancy body mass index.^[128] Hence, breastfeeding cannot be solely relied for postpartum weight loss among women aged above 30 years and who are overweight or obese. Further, evidence suggesting significant association between breastfeeding and postpartum weight loss have stressed on the need for more robust studies to rely on such findings.^[123] Certain guidelines^[109] also state that breastfeeding should not be solely relied upon for postpartum weight loss.

There are postpartum women who experience failure of lactation or early cessation of breastfeeding. Available evidence suggests that postpartum women who are not breastfeeding do not need any additional calories.^[17] Their nutrient requirements are the same as the non-pregnant non-lactating women; however, adjustments can be made according to their nutritional status.^[49]

Clinical practice recommendations

No.	Recommendation	Grade
3.4.1	Postpartum women should exclusively breastfeed their infants for the first 6 months and continue breastfeeding along with complementary feeding for up to 2 years.	I A
3.4.2	Exclusive breastfeeding should be coupled with other weight management interventions for postpartum weight loss.	I A
3.4.3	In cases of failure of lactation, postpartum women do not need any additional calories, hence should have dietary and physical activity recommendations similar to non-pregnant non-lactating women.	I A

Table 11: Different types of activities that can be planned in exercise categories

Aerobics/Endurance Exercises: These exercises lead to increased heart rate and oxygen consumption.

Examples for immediate postpartum period: Walking

Examples for late postpartum period: Brisk walking, Jogging and Running

Strength Exercise/Resistance Training: These exercises help in increasing muscle strength, carried out against an opposing force.

Examples for immediate postpartum period: Pelvic floor exercise/ Kegel exercise

Examples for late postpartum period: Weightlifting, using resistance bands

Balance Exercises: These indoor and outdoor exercises help in improving and maintaining balance.

Examples for immediate postpartum period: Yoga asana

Examples for late postpartum period: Yoga asana and Tai-chi

Flexibility Exercises: These exercises help in keeping muscles elastic and flexible and joints moving.

Examples for immediate postpartum period: Yoga and Gentle stretching

Examples for late postpartum period: Yoga, Tai-chi, Pilates and Stretching

Discussion

Breastfeeding is highly recommended for both the offspring and the mother. Exclusive breastfeeding for the first 6 months postpartum and continued breastfeeding along with complementary feeding for 2 years and beyond can have health benefits for the mother and her infant. Breastfeeding is theoretically considered to involve increased energy cost; however, considering breastfeeding as the sole intervention for postpartum weight management is conflicting and hence, dietary and physical interventions should also be taken into consideration for postpartum weight loss. Moreover, the additional calorie intake of lactating women should not be supported under special conditions, wherein a mother experiences failure of lactation or early cessation of breastfeeding as this might lead to positive energy balance and ultimately weight gain. Hence, the requirement of such mothers is same as for non-pregnant, non-lactating women.

3.5 What are the behaviour modification techniques that should be incorporated in weight management advice? Background

Weight management interventions are usually associated with slip-ups, challenges and barriers and lack of motivation and support which may act as a hurdle for participants to achieve significant weight loss goals.^[27] The comprehensive weight management interventions not only involve the dietary and physical activity components but also take the behavioural modification into consideration.^[11,27] The behavioural component of the weight management interventions should include the nutrition and exercise counselling along with identification of the barriers to healthy behaviour, problem-solving strategies, facilitation of support from family and team of healthcare providers. Behavioural modification should be such that it focuses on weight loss during interventions as well as maintenance of healthy behaviour even after the interventions are completed.^[11,27]

Prior to the formulation and dissemination of weight management interventions to the postpartum women, it is crucial to identify various components related to behavioural modification that might be incorporated in weight management interventions to improve its success rates. Thus, there is a need to have a comprehensive evaluation of various aspects of behaviour modification.

Summary of evidence

Many randomised controlled trials have been conducted that have taken the behavioural strategies into consideration to enhance the adherence to diet and physical activity advice as well as to maintain this healthy eating and activity behaviour in the long run. Various components of behavioural modification have been adopted in different weight management interventions such as individualised goal setting, stimulus control, self-monitoring, problem-solving, reinforcement, social support, self-efficacy, coping strategies, knowledge and self-regulation. At the time of initiation of weight management interventions, many trials have used goal setting as a behavioural strategy to set realistic and individualised dietary and physical activity

goals.^[17,21,23,25,44,45,56,63,84,85] During the interventions, self-monitoring of diet, exercise and weight was adopted to ensure better compliance with the weight management regime.^[21,23,25,44,45,84] Various other behavioural techniques such as motivational interviewing,^[17,56,84,85] problem-solving,^[21,23,56] relapse prevention,^[21,25,56] coping strategies,^[23] social support^[17,21,23,25,85] and reinforcement^[23,86] have also been adopted during follow-ups to improve the adherence to weight management interventions. Apart from this, text messages and monthly group meetings have been planned to educate participants about calorie goals, grocery shopping, label reading and restaurant eating.^[56]

Clinical practice recommendations

No.	Recommendation	Grade
3.5.1	Adopt goal setting techniques during the initiation of intervention.	II B
3.5.2	Adopt techniques such as self-monitoring and motivational interviewing during the intervention and follow-ups.	II B
3.5.3	Inculcate stimulus control and problem-solving skills such as identifying problems, creating solutions and opting for the best possible choice.	II B/C
3.5.4	Teach cognitive restructuring skills such as avoiding negative thinking and cognitive errors, overcoming stress and other barriers usually faced during weight loss process.	II B/C
3.5.5	Feedback on the accomplishments, achievements and scope for better progress should be given regularly.	II B

Discussion

Weight management interventions must be individualised and realistic to obtain significant outcomes. Participant-specific, practical weight loss targets should be set at the time of initiation of the intervention. Further, participants should be motivated to adhere to the intervention to obtain significant weight loss outcomes. Various behavioural skills such as self-monitoring, stimulus control, problem-solving, emotional eating and relapse prevention should be imparted to the participants for better compliance to the intervention as well as to ensure the healthy lifestyle modification even after the intervention is over.

Chapter Four: Follow-up for sustainable weight management

4.1 What should be the duration, frequency, and mode of contact during the intervention and follow-up phases of the weight management program in a postpartum woman?

Background

The intervention phase of the weight management program is the period when a participant is subjected to appropriate intervention for attaining the target body weight, whereas the period of follow-up is focused on the sustenance and perseverance of the achieved goal.^[134] The duration, frequency and mode of contact during the intervention phase and follow-up phases are pivotal for better engagement of participants, reinforcement of lifestyle-related changes and addressing barriers.^[135] The duration can be long or short, depending upon the quantum of the weight that needs to be shed to attain the target body weight.^[25] Similarly, the

frequency of follow-up can be intense or subdued, depending upon the need for reinforcement and monitoring. The mode of follow-up can be face-to-face or technology-based depending on the feasibility and availability of resources. The correct selection of these components of follow-up helps in adequate and better compliance of the interventions.^[136] It also increases the overall effectiveness of the program. However, each intervention has unique objectives and methodology and is set up in different socio-cultural backgrounds. Therefore, it is crucial to determine the appropriate duration, frequency and mode of contact for follow-ups so that they are effective and do not pose an additional burden on the participants.

Summary of evidence

Many intervention studies have been conducted worldwide considering the follow-ups to ensure the success of the intervention. However, in the postpartum group, there are mixed results for the duration and frequency of follow-ups. Various successful intervention trials for weight management of postpartum women have been conducted with either two^[17,20,56,57] or three^[19] follow-ups. Some of the successful interventions conducting two or three follow-ups have conducted it with a gap of 3 months to 6 months between follow-ups,^[56,57] whereas others have done it 1 year after the baseline.^[19,20] Available evidence indicates that the mode of follow-up in the intervention trials conducted is of two major types: personalized sessions^[19,20,47,57] and e-consultations.^[17,21] Both methods have also been used both in combination.^[56]

Clinical practice recommendations

No.	Recommendation	Grade
4.1.1	The duration of follow-up for weight maintenance should be 12 months, ranging from 6 months to 18 months based on the target body weight to be achieved.	III B
4.1.2	In the initial stages of weight loss, a follow-up frequency of once or twice a month should be maintained. Later, the follow-up can be scheduled every 3 months.	III B
4.1.3	A combination of physical (face-to-face and/or group counselling) and online meeting modalities/telephonic contacts should be used during follow-ups.	II A
4.1.4	The schedule for initiation and/or continuation of the weight loss program should be based on the weight status of the participant.	IV A
4.1.5	After attainment of weight loss targets, women should be followed lifelong for maintenance and sustenance of lost weight.	IV A

Discussion

All the participants engaged in the weight management program should be closely followed during the intervention period. The expert panel believed that the clinically significant weight loss targets should remain the same for everyone. However, for women with substantial weight retention, the target should be redefined with increased duration and frequency of follow-up to help them reach the ideal body weight. Consensus and evidence suggested that the period of intervention should have gradual and realistic time periods; they may range from a

minimum of 6 weeks to a maximum of 12 months or even 18 months. The effectiveness at the initial stages of intervention can be increased by having more frequent contacts (one to two times/month). Face-to-face contacts supplemented by technology in terms of bi-weekly texts, social media posts or online support groups can be used for follow-up. They help in building mutual trust between the participant and the healthcare team. As the period of follow-up is focused on the sustenance and perseverance of the achieved goal, experts suggested that the period of follow-up ideally should be lifelong as women of reproductive age are prone to obesity in all life stages ranging from conception to menopause. Apart from this, the modalities for follow-up should be feasible for both patient and the healthcare provider. During the intervention, provision of patient education should be done where knowledge and awareness about the importance of regular follow-ups should be imparted. Participants may be contacted every 3 to 6 months to enquire about their health status and should be advised to visit the healthcare centre at least once a year for routine check-ups and investigations related to obesity. This will serve not only as a preventive practice but also curative.

4.2 What advice should be given during the follow-up phase for maintenance of weight in postpartum women? Background

An effective follow-up is timely planned, executed through proper channels and comprises appropriate and adequate advice.^[137] The advice given during the follow-up session is crucial to ensure adherence to an interventional goal and sustain the attained goal. The advice should be evidence-based to formulate effective monitoring strategies. It should reinforce the imparted knowledge and motivation to move towards the goal and sustain the progress made.^[138] Emphasis should be given on components like identification of relapse, prevention of relapse and problem-solving strategies. The given advice should bring about a long-term behaviour change in participants so that they are able to manage appropriate weight even after the cessation of the intervention. The advice should be clear, simple and easy to follow. It should be devised by considering the participants' characteristics, feasibility, availability of resources and all lifestyle-related factors should be given due importance.

Summary of evidence

After the commencement of intervention, it is crucial to ensure the compliance of participants with the treatment. Various successful randomised controlled trials conducted have delivered behavioural therapy during the follow-up periods. The studies have reported the setting of individualised goals and motivating the participants to do self-monitoring. Follow-up periods have been utilised by the interventions to increase the likelihood of favourable lifestyle change^[19,20] by imparting skill training,^[47] problem-solving abilities,^[47] dealing with various barriers^[20] and relapse prevention training.^[56]

Apart from these randomised controlled trials, there are certain practice guidelines^[49] suggesting that a follow-up period should

be utilized to burst participants' myths associated with various aspects of lifestyle such as diet and physical activity. During this period, it is crucial to reinforce the advice delivered during the intervention and conduct motivational interviewing.

Clinical practice recommendations

No.	Recommendation	Grade
4.2.1	Follow-up weight maintenance sessions should include/reinforce advice related to healthy eating behaviours, physical activity, and sleep practice.	III A
4.2.2	During weight maintenance, special attention should be given to behavioural strategies such as motivation, social support, self-efficacy, relapse prevention and addressing individualised barriers.	II B
4.2.3	During the follow-up period, the woman can be counselled regarding the adverse effects of obesity on health, quality of life and spacing (contraception) in subsequent pregnancies.	IV B
4.2.4	A bi-monthly contact should be maintained using digital technology such as text messages, telephonic calls and mobile applications with the interventionist to mitigate the barriers and challenges faced by women during weight maintenance.	IV A
4.2.5	Self-monitoring through technological devices should be incorporated for weight, dietary practices, physical activity, and sleep behaviour for management and sustenance of lost weight.	IV A
4.2.6	Clinical and biochemical parameters such as blood glucose, lipid profile and blood pressure should be measured as per the standard guidelines and/or advice by physicians.	IV A

Discussion

In the absence of robust evidence on this topic, majority of the advice recommendations were formulated on consensus by the experts. It is pertinent to give advice about various lifestyle factors such as diet, physical activity, stress and sleep. Behaviour change is the cornerstone of achieving success in any lifestyle-related intervention hence, during a follow-up, efforts should be made for imparting behavioural skill training such as self-monitoring, stimulus control, problem-solving and relapse prevention. Self-monitoring can be done by weighing oneself at home, measuring waist circumference, tracking calories and step counting. Stimulus control can be practised by teaching healthy food habits, portion control and mindful eating. Relapse prevention may be achieved by the provision of support groups, training for identification of triggers and development of healthy and appropriate coping mechanisms. Apart from this, the provision of health monitoring cards (comprising anthropometric measurements, biochemical parameters, clinical signs or symptoms and diagnosis) should be done for women at the time of post-delivery discharge. This will ensure a sense of accountability in both patient and healthcare provider and will increase the turnout for follow-ups as well. The action points at different anthropometric and biochemical parameters are presented in [Table 12].

Discussion

Women during reproductive age are at increased risk of postpartum weight retention and weight gain.^[8,139] These evidence and consensus-based weight management recommendations for

postpartum women holistically cover the core components of weight management, that is, diet, physical activity and behavioural modifications. The dietary recommendations consider the appropriate combination of methods to comprehensively assess dietary behaviour of postpartum women without any added participant burden. The recommendations also take into consideration the dietary composition (macronutrient and micronutrient intake), calorie intake of lactating and non-lactating women, galactagogue consumption, meal pattern, methods of cooking and restriction of intake of HFSS foods. This will raise the knowledge of postpartum women about the quality and quantity of foods to be consumed and will assist them to correct their faulty eating habits, if any. The adoption of these guidelines will also help in bursting the diet-related socio-cultural myths that otherwise lead to weight gain.

The physical activity component encapsulated in the recommendations suggests the use of validated and reliable questionnaires to obtain the explicit information about the physical activity levels of postpartum women. The recommendations also highlight the duration, frequency, intensity and type of physical activity to be indulged in depending upon the woman's readiness, prior physical activity status, mode of delivery, and complications, if any. Generally, postpartum women either do not wish to indulge in any kind of physical activity or if they desire to, they fail to do so due to the lack of knowledge about the time of initiation of physical activity and type of exercises they can do.^[12] These physical activity recommendations will enhance the knowledge of postpartum women about the importance of physical activity. This will also increase their awareness about the duration, intensity, frequency and type of exercises they can perform post-delivery and burst socio-cultural myths associated with being physically active during this phase.

Along with the diet and physical activity, the guideline includes behavioural recommendations related to goal setting, self-monitoring and problem-solving to empower these women to sustain their weight management efforts. Individuals may set unrealistic goals or experience slip-ups, ultimately losing interest in managing their weight.^[27] These behavioural recommendations will assist in counselling these women to set realistic weight loss goals, self-monitor their diet and physical activity and develop problem-solving abilities to ensure long-term sustenance.

Benefits for healthcare fraternity

The adoption of these evidence and consensus-based recommendations will prove to be beneficial in resource-limited settings. India, being a low-to-middle-income country does not have adequate healthcare infrastructure and facilities available in every corner of the country.^[140] Further, India has a high proportion of population belonging to the low-to-middle income strata. Such a portion of the population many a times is unable to access multi-speciality hospitals or healthcare centres and they resort to the primary healthcare centres, anganwadi centres etc., where there is a lack of comprehensive medical

Table 12: Assessment and advice during follow-up visits

Parameters	Cut-off value	Follow-up actions
Body mass index	$\geq 23 \text{ kg/m}^2$ $\geq 25 \text{ kg/m}^2$	To be counselled for weight gain prevention strategies To be enrolled in lifestyle intervention program for weight loss
Waist circumference	$\geq 72 \text{ cm}$ $\geq 80 \text{ cm}$	To be counselled for weight gain prevention strategies To be enrolled in lifestyle intervention program for weight loss
Elevated cardiometabolic parameters (Blood glucose, blood cholesterol and blood pressure)	Present	To be counselled for behavioural lifestyle modification To be referred to appropriate specialist (if required)

care team.^[140,141] These recommendations may be helpful in such settings where a comprehensive team of healthcare professionals comprising obstetricians and gynaecologists, dietitians, exercise experts/physiotherapists, clinical psychologists, physicians and endocrinologists is not available.

During pregnancy, women visit the obstetricians and gynaecologists, while in the postpartum period, they visit the paediatricians and/or obstetricians. Women belonging to low socioeconomic strata may find it feasible to visit local public health centres and anganwadi centres. Due to lack of time or information and financial constraints, many postpartum women fail to visit specific field experts such as nutritionists to gain knowledge about appropriate diet, exercise physiologists for appropriate exercise regime and psychologists to help them deal with psychosocial problems, if any.^[11,12,41,42] The adoption of these recommendations will empower the obstetricians, paediatricians, anganwadi workers etc. by enhancing their knowledge about various aspects of weight management such as diet, physical activity and motivational interviewing. They will further ensure effective counselling of postpartum women even if these women skip visiting specific experts related to diet, physical activity and psychology.

The adoption of these recommendations will further extend the support to healthcare professionals by assisting them in identifying the right time to counsel and engage women for their postpartum weight management. Most of the time, postpartum women are not provided with adequate dietary and physical activity advice leading to development and continuation of faulty dietary and physical activity practices. This results in gestational weight retention and weight gain.^[12,41,42] The adoption of these recommendations will assist in catching hold of these women at an early stage of conception, during the entire period of pregnancy as well as post-delivery and disseminating lifestyle-related information specific to each stage.

The adoption of these recommendations will provide a coherent idea to the healthcare professionals about the duration, frequency and mode of follow-ups considering the target body weight specific to each postpartum woman as well as avoiding any added patient or doctor burden. The recommendations will further be beneficial for healthcare professionals in designing weight management modules and/or interventions encapsulating various lifestyle-related factors, right time to engage these women and follow-up periods to address the specific needs and barriers related to postpartum weight management.

Suggestions for policymakers

The evidence and consensus-based recommendations have been formulated after thorough evaluation by the experts from leading medical organisations and medical colleges of the country along with nutrition experts. The dissemination and implementation of these recommendations is crucial at the medical level, curriculum level and mass level [Box 1]. Policymakers must ensure an improved medical infrastructure and facilities to provide high-quality, evidence-based healthcare. Along with this, capacity building of healthcare providers is crucial. Healthcare providers should be provided training sessions to elevate their knowledge and information about various aspects of postpartum weight management including diet, physical activity and psychosocial problems. They should be made competent to deliver evidence-based weight management counselling to these women even in resource-limited settings. Further, there is a need to set up and generate awareness about credible weight management clinics or postpartum clinics addressing the weight-related issues of postpartum women.

It is of great significance to augment health literacy levels of postpartum women. The literacy about complications associated with obesity and significance of appropriate weight management should be disseminated at the school and college levels. National Education Policy^[142] has also emphasized on integrating the curriculum with skills and capacities including health and nutrition, as well as physical education, fitness and wellness. Importance of weight management, obesity and its impact on future health should be made part of the curriculum so that young girls become aware and have sufficient information about healthy lifestyle-related practices and having appropriate weight status by the time they reach their pregnancy and postpartum phase. Dissemination of evidence-based scientific knowledge will also assist these young women to burst socio-cultural myths associated with diet and physical activity in different stages of their life, especially the pregnancy and postpartum period.

Policymakers should create mass-awareness about postpartum weight management. Various modes of media such as print media, television etc. should be used. Print media including newspapers, leaflets and posters and television should be used to convey credible information about weight management during pregnancy and postpartum periods. Campaigns should be organised at community levels to raise awareness among women about importance of weight management and associated health benefits.

Box 1: Suggestions for policymakers

Action level	Suggested actions
Medical level	<p>To ensure improved medical infrastructure</p> <p>To provide facilities to deliver high-quality, evidence-based health care</p> <p>To build capacity of healthcare providers by providing them training sessions</p> <p>To increase competency of healthcare workers so as to disseminate evidence-based weight management counselling even in resource-limited settings</p> <p>To set-up postpartum weight management clinics</p>
Curriculum level	<p>To create awareness among young women about the obesity-related implications</p> <p>To disseminate evidence-based information about the prevention and management of obesity</p> <p>To burst socio-cultural myths related to diet and physical activity for weight management especially during pregnancy and postpartum periods</p>
Mass level	<p>To utilize various modes of media such as print media, television etc., for generating mass awareness</p> <p>To organise campaigns at the community level to raise awareness about appropriate weight management and associated benefits</p>

Statement

Considering its potential for widespread public health impact and general interest, the guideline (full form/short form/Executive summary) is co-published/simultaneously published fully/partly in Diabetes and Metabolic Syndrome: Clinical Research and Reviews and Journal of Midlife Health. The guideline can be submitted in some more journals for publication in future. Besides, the guideline can be published on the Government's website and AIIMS New Delhi's website.

Acknowledgements

The guideline has been developed in association with the following **National Bodies and Societies**: (i) Federation of Obstetric and Gynaecological Societies of India, (ii) Indian Menopause Society, (iii) Association of Physicians of India, (iv) Academy of Family Physicians of India, (v) Association of Obstetricians and Gynaecologists of Delhi and (vi) Indian Dietetic Association.

Financial support and sponsorship

The study was financially supported by the SEED division, Department of Science and Technology, Government of India.

Conflicts of interest

There is no conflicts of interest.

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Weight Management Module

Women-Centric Weight Management Module for Women in Childbearing Age:

- Group I: Weight Management Module for Women in Preconception Stage
- Group II: Weight Management Module for Women during Pregnancy
- Group III: Weight Management Module for Women during Postpartum Period

Group I: Weight Management Module for Women in Preconception Stage

Step 1: Weight management counselling at preconception stage

WHO should get?

- Young females aged 16-23 years studying in schools and colleges.
- Girls attending adolescent health clinics for reasons not necessarily related to obesity.

From WHERE should get?

- Schools and Colleges
- Health Clinics

By WHOM should get?

- Primary Care Physicians/Family Physicians
- Clinicians and Specialists: Obstetricians, Gynaecologists and Endocrinologists
- Community Health Nurses
- Registered Dietitians/Nutritionists
- Behavioural Health Specialists/Psychologists/Psychiatrists

WHAT should get?

- Weight management advice related to diet, physical activity, and behavioural modification.
- Awareness regarding appropriate weight maintenance.

HOW should get?

- Message/advice disseminated through short videos, PowerPoint presentations, posters, booklets, diet charts, recipes etc.

Step 2: Assess the readiness and motivation to initiate weight management counselling

If the participant is eager to initiate:

- Counsel the woman for next stages of lifestyle modification (screening, management and follow-up).
- Evaluate the participant's degree of obesity, associated risk factors and lifestyle-related behaviour.

If the participant is indecisive and reluctant to initiate lifestyle modification:

- Be supportive and invite discussion.
- Reinforce the benefits of weight loss.
- Assess the reason associated with unwillingness.
- Try to solve the individual's issues and motivate her to initiate lifestyle modification.

Step 3: Take the anthropometric measurements to identify the target group

Measure height, weight, body fat, waist circumference and hip circumference.

Calculate BMI using the height and weight measurements,

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

Identify following indications for initiating weight management:

- BMI in the overweight category ($23\text{--}24.9 \text{ kg/m}^2$) or obese category ($\geq 25 \text{ kg/m}^2$) and/or;
- Body fat greater than 38% and/or;
- Waist circumference $>80 \text{ cm}$ and/or;
- Waist to hip ratio >0.81 .

Step 4: Take the detailed history and make biochemical assessment

Detailed medical history may include the assessment of:

- Metabolic complications of overweight and obesity such as non-alcoholic fatty liver disease, hypertension, impaired glucose regulation and dyslipidaemia;
- Family history related to obesity-associated complications.

Biochemical assessment may include evaluation of:

- Biochemical parameters such as Haemoglobin, Serum ferritin, Lipid profile, Blood glucose level, Thyroid profile, Calcium, Vitamin D and Vitamin B12.

Step 5: Carry out the dietary, physical activity and psychosocial assessment of the target group

Carry out the dietary assessment by using:

- 24-h recall for dietary evaluation;
- Dietary diversity questionnaire to evaluate the consumption of various macronutrients and micronutrients through the analysis of intake of foods from various food groups;
- Validated set of questions to assess dietary behaviour including meal patterns, skipping meals, consumption of HFSS foods
- frequency of eating out, emotional/stress eating, methods of cooking, reading food labels and barriers in maintaining a healthy diet.

Carry out the physical activity assessment by:

Contd...

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- Assessing categories of activity: dedicated physical activity, work-related activity, leisure-related activity, transport-related activity and sedentary activity;
 - Assessing the type, frequency, duration and intensity of physical activity one is indulged in;
 - Assessing the number of sedentary hours (screen and sitting time) spent in the entire day;
 - Using MPAQ for physical activity evaluation;
 - Using a validated set of questions to assess barriers faced in being physically active.
- Carry out the psychosocial assessment by:
- Assessing the presence of a diagnosed psychiatric disorder (Depressive, Anxiety or Eating disorder);
 - Using PHQ-2 for screening depressive symptoms;
 - Referring to a mental health professional, if needed.
- Step 6: Disseminate advice for weight management
- Establish realistic and sustainable patient-centric weight loss goals.
 - Advise to reduce body weight to the BMI equal to or $<23 \text{ kg/m}^2$.
 - Advise stepwise body weight loss goal of 0.5 kg per week acquiring 5% to 10% of clinically significant weight loss.
 - Advise lifestyle modification including dietary, physical activity and behavioural modification.
- Step 7: Deliver dietary advice for weight management
- Prescribe an energy deficit diet of 500 kcal/day for 0.5 kg weight loss per week.
 - Counsel women to spread meals throughout the day (three major meals and two-three snacks).
 - Provide an individualised diet chart based on the energy requirement, principles of a balanced diet, economic, regional and cultural preferences.
 - Use a healthy plate concept to raise awareness about the portion of foods to be included from various food groups.
 - Increase awareness about food products rich in complex carbohydrates, proteins, good quality fats, iron, calcium, vitamin D, vitamin A, vitamin C, vitamin B12 and folic acid.
 - Discourage the consumption of HFSS foods processed and packaged foods rich in saturated fats and trans fats, alcohol and caffeine.
 - Show them a sample of a food diary and teach them to write a food diary.
 - Encourage them to buy a weighing scale.
- Step 8: Deliver physical activity advice for weight management
- Encourage women to participate in dedicated exercise, household related, work-related and leisure-related physical activities.
 - Encourage women to indulge in physical activity for at least 150 min/week.
 - Prescribe stepwise progressive and personalized physical exercise regime.
 - Recommend combination of aerobic exercise (30 min moderate intensity), muscle strengthening (15 min engaging major muscle groups), work-related and/or household related activities (15 min).
 - Generate awareness about various types of aerobic and muscle-strengthening exercises.
 - Emphasize on sitting less and walking more.
 - Advise to reduce the screen time to less than 2 h per day.
 - Consider barriers and facilitators while prescribing physical activity advice.
- Step 9: Impart behavioural skills for weight management
- Use realistic goal setting, motivational interviewing and self-monitoring strategies.
 - Train women regarding problem-solving skills (Defining problems, creating solutions and opting for the best possible choices).
 - Train women regarding cognitive restructuring skills (Identifying and correcting the negative thoughts faced during the weight loss process).
 - Give feedback on the accomplishments, achievements and scope for better progress.
- Step 10: Follow-up
- Plan duration, frequency and mode of follow-up
- Duration: 12 months, ranging from 6 to 18 months based on the targeted weight loss.
 - Frequency: Once or twice a month at initial stages followed by every 2 to 3 months at a later stage.
 - Mode: Face-to-face individualised/group counselling coupled with telephonic contacts.
- Plan advice to be provided during follow-ups
- Reinforce advice related to healthy diet and physically active behaviour.
 - Motivate and provide support to increase adherence to maintaining healthy lifestyle behaviour.
 - Encourage self-monitoring through technological devices such as mobile applications, pedometers etc.
- Checklist to be used during follow-ups
- Following points should be considered during the follow-up visits/contacts with the participants:
- Have you lost 0.5-1 kg weight per week?
 - Have you followed a balanced diet comprising foods from various food groups? .
 - Have you followed the concept of small and frequent meals (three major and three minor meals)? .
 - Have you consumed more complex carbohydrates rather than refined cereals and added sugars? .
 - Have you included protein-rich foods in your diet?
-

Contd...

Have you included good quality fat in your diet? .
 Have you focused on the intake of fiber-rich and micronutrient-rich seasonal and local fruits and vegetables? .
 Have you restricted/avoided HFSS foods? .
 Have you maintained a food diary? .
 Have you started to walk more and sit less? .
 Have you increased the frequency, duration and time of physical activity? .
 Have you initiated other aerobic and/or strengthening exercises that can be done apart from walking? .

Based on the above observation, counsel participants as:
 Address their barriers related to diet and physical activity, if any.
 Give a new customized diet plan based on the current need of the participant (weight loss or maintenance).
 Give a recipe booklet on low calorie snacks.
 Give an exercise booklet on easy-to-do activities.
 Explain possible reasons to the patient, in cases where no progress is made.
 Explain the plateau effect and measures to overcome it.
 Set new weight loss and exercise targets for the patients, if required.

Group II: Weight Management Module for Women during Pregnancy

Step 1: Weight management counselling during pregnancy

WHO should get?
 In-patient and out-patient pregnant women

From WHERE should get?
 Antenatal clinics
 Other health centres

By WHOM should get?
 Primary Care Physicians/Family Physicians
 Clinicians and Specialists: Obstetricians, Gynaecologists and Endocrinologists
 Community Health Nurses
 Registered Dietitians/Nutritionists
 Behavioural Health Specialists/Psychologists/Psychiatrists

WHAT should get?
 Weight management advice related to diet, physical activity and behavioural modification.
 Awareness regarding appropriate weight maintenance.

HOW should get?
 Message/advice disseminated through short videos, PowerPoint presentations, posters, booklets, diet charts, recipes etc.

Step 2: Assess the readiness and motivation to initiate weight management counselling

If the participant is eager to initiate lifestyle modification:
 Counsel the women for next stages of lifestyle modification (Screening, Management and Follow-up).
 Evaluate the participant's degree of obesity, associated risk factors and lifestyle-related behaviour.

If the participant is indecisive and reluctant to initiate lifestyle modification:
 Be supportive and invite discussion.
 Reinforce the benefits of appropriate weight.
 Assess the reason associated with unwillingness.
 Try to solve the individual's issues and motivate her to initiate lifestyle modification.

Step 3: Take the detailed history and make biochemical assessment

Pregnancy-related complications may include:
 Gestational diabetes mellitus
 Hypertensive disorders of pregnancy
 Anaemia

Contd...

Polycystic ovary syndrome

Detailed medical history may include assessment of:

Metabolic complications of overweight and obesity such as non-alcoholic fatty liver disease, hypertension, impaired glucose regulation and dyslipidaemia;

Any family history related to obesity-associated complications.

Biochemical assessment may include:

Haemoglobin

Serum ferritin

Lipid profile

Blood glucose level

Thyroid profile

Calcium

Vitamin D

Step 4: Carry out the dietary, physical activity and psychosocial assessment of the target group

Carry out the dietary assessment by using:

24-h recall for dietary evaluation;

Dietary diversity questionnaire to evaluate the consumption of various macronutrients and micronutrients through the analysis of intake of foods from various food groups;

Validated set of questions to assess dietary behaviour including meal patterns, skipping meals, consumption of HFSS foods; frequency of eating out, emotional/stress eating, methods of cooking, reading food labels and barriers in maintaining a healthy diet.

Carry out the physical activity assessment by:

Assessing categories of activity: dedicated physical activity, work-related activity, leisure-related activity, transport-related activity and sedentary activity;

Assessing the type, frequency, duration and intensity of physical activity one is indulged in;

Assessing the number of sedentary hours (screen and sitting time) spent in the entire day;

Using MPAQ for physical activity evaluation;

Using a validated set of questions to assess barriers faced in being physically active.

Carry out the psychosocial assessment by:

Assessing the presence of a diagnosed psychiatric disorder (Depressive, Anxiety or Eating disorder);

Using PHQ-2 for screening depressive symptoms;

Referring to a mental health professional, if needed.

Step 5: Weight gain counselling during pregnancy

Counsel participants about their gestational weight gain (GWG):

If pre-pregnancy ≤ 18.5 kg/m², GWG should be between 12.5 and 18 kg.

If pre-pregnancy BMI ranges between 18.5 and 24.9 kg/m², GWG should be between 11.5 and 16 kg.

If pre-pregnancy BMI ranges between 25 and 29.9 kg/m², GWG should be between 7 and 11.5 kg.

If pre-pregnancy BMI ≥ 30 kg/m², GWG should be between 5 and 9 kg.

Counsel women to gain the recommended amount of weight:

Gaining weight less than that recommended, may lead to increased risk of:

Miscarriage

Preterm delivery

Low birth weight infant

Illness for infant

Difficulty in initiating breastfeeding

Gaining weight more than that recommended, may lead to increased risk of:

Large for gestational age infant

Complicated delivery or caesarean delivery

Childhood obesity

Postpartum weight retention

Future obesity-related complications

Step 6: Deliver dietary advice for weight management

No need for extra calories during the 1st trimester. Additional intake of 350 kcal in 2nd and 3rd trimesters.

Counsel women to spread meals throughout the day (three major meals and two-three snacks).

Provide an individualised diet chart based on the energy requirement, principles of a balanced diet, economic, regional and cultural preferences.

Use a healthy plate concept to raise awareness about the portion of foods to be included from various food groups.

Increase awareness about food products rich in complex carbohydrates, proteins, good quality fats, iron, calcium, vitamin D, vitamin A, vitamin C, vitamin B12 and folic acid.

Discourage the consumption of HFSS foods, processed and packaged foods rich in saturated fats and trans fats, alcohol and caffeine.

Contd...

-
- Ensure appropriate micronutrient supplementation.
 - Burst cultural myths associated with pregnancy.
 - Show them a sample of a food diary and teach them to write a food diary.
 - Encourage them to buy a weighing scale.
- Step 7: Deliver physical activity advice for weight management
- Frequency of Physical Activity: Advise pregnant women to indulge in at least 150 min of low-moderate intensity activity for at least 5 days a week.
 - Type of exercises:
 - To do: Pregnant women can/should indulge in activities such as walking, stomach strengthening exercises, pelvic-tilt exercises, pelvic floor exercises and prenatal yoga.
 - To avoid: Advise pregnant women to avoid contact sports (judo, basketball, kickboxing and squash), skydiving, scuba diving and hot yoga.
 - Advise pregnant women to use the talk-test to self-monitor their intensity of aerobic exercise.
 - Advise pregnant women to avoid exercising if there are complications such as cerclage, placenta previa, pre-eclampsia and anaemia.
 - Advise pregnant women to sit less and walk more.
 - Advise pregnant women to reduce their screen time to <2 h per day.
- Step 8: Impart behavioural skills for weight management
- Use realistic goal setting, motivational interviewing and self-monitoring strategies.
 - Train women regarding problem-solving skills (Defining problems, creating solutions and opting for the best possible choices).
 - Train women regarding cognitive restructuring skills (Identifying and correcting the negative thoughts faced during the weight loss process).
 - Give feedback on the accomplishments, achievements and scope for better progress.
- Step 9: Advice for some specific conditions
- Gestational Diabetes Mellitus (GDM)
- Inform pregnant women with GDM about various complications associated such as:
- An extra-large infant
 - Caesarean delivery
 - Preterm delivery
 - Risk of high blood pressure and preeclampsia
 - Risk of future diabetes
 - Risk of future obesity and diabetes for infant as well
- Encourage women with GDM to:
- Consume complex carbohydrates, fiber-rich fruits and vegetables.
 - Control portion size.
 - Exercise regularly and stay active.
 - Gain weight during pregnancy in the recommended range.
 - Monitor blood glucose levels.
 - Take insulin, if prescribed
 - Breastfeed your infant post-delivery.
 - Get tested for diabetes at 6-12 weeks post-delivery and then after every 1-3 years.
- Hypertensive Disorders during Pregnancy
- Inform pregnant women with hypertensive disorders about various complications associated such as:
- Placental abruption
 - Intrauterine growth restriction
 - Preterm delivery
 - Risk of injury to other organs of the woman
 - Risk of future cardiovascular disease for the woman
- Encourage women with hypertensive disorders to:
- Regularly visit the healthcare provider.
 - Take the medicine as prescribed.
 - Eat a balanced diet including good quality protein sources, foods rich in calcium, potassium, iron, folic acid and vitamin A.
 - Avoid the intake of papads, pickles and preserved foods.
 - Exercise regularly and stay active.
 - Avoid smoking and alcohol.
 - Breastfeed your infant post-delivery.
- Step 10: Follow-up
- Plan duration, frequency and mode of follow-up
- Duration: Throughout the pregnancy
 - Frequency: At every antenatal visit
 - Mode: Face-to-face individualised/group counselling coupled with telephonic contacts.
 - Plan advice to be provided during follow-ups
-

Contd...

Reinforce advice related to healthy diet and physically active behaviour.
 Motivate and provide support to increase adherence to maintaining healthy lifestyle behaviour.
 Encourage self-monitoring through technological devices such as mobile applications, pedometers etc.

Checklist to be used during follow-ups

Following points should be considered during the follow-up visits/contacts with the participants:

Have you followed a balanced diet comprising foods from various food groups? .
 Have you followed the concept of small and frequent meals (three major and three minor meals)? .
 Have you consumed more complex carbohydrates rather than refined cereals and added sugars? .
 Have you included protein-rich foods in your diet? .
 Have you included good quality fat in your diet? .
 Have you focused on the intake of fiber-rich and micronutrient-rich seasonal and local fruits and vegetables? .
 Have you restricted/avoided HFSS foods? .
 Have you taken the prescribed micronutrient supplement? .
 Have you maintained a food diary? .
 Have you started to walk more and sit less? .
 Have you increased the frequency, duration and time of physical activity? .
 Have you initiated other aerobic and/or strengthening exercises that can be done apart from walking? .

Based on the above observation, counsel participants as:

Address their barriers related to diet and physical activity, if any.
 Give a new customized diet plan based on the current need of the participant.
 Give a recipe booklet on low calorie snacks.
 Give an exercise booklet on easy-to-do activities.
 Ensure appropriate micronutrient supplementation.

Group III: Weight Management Module for Women during Postpartum Period

Step 1: Weight management counselling at preconception stage

WHO should get?

Women in the age group of 18-45 years, have delivered after at least 37 weeks gestation, have had a singleton pregnancy and it has been at least 6 weeks since their delivery.

From WHERE should get?

Health clinics
 Immunization centres
 Paediatric clinics

By WHOM should get?

Primary Care Physicians/Family Physicians
 Clinicians and Specialists: Obstetricians, Gynaecologists and Endocrinologists
 Community Health Nurses
 Registered Dietitians/Nutritionists
 Behavioural Health Specialists/Psychologists/Psychiatrists

WHAT should get?

Weight management advice related to diet, physical activity and behavioural modification.
 Awareness regarding appropriate weight maintenance.

HOW should get?

Message/advice disseminated through short videos, PowerPoint presentations, posters, booklets, diet charts, recipes etc.

Step 2: Assess the Readiness and Motivation to Initiate Weight Management Counselling

If the participant is eager to initiate lifestyle modification:

Counsel the women for next stages of lifestyle modification (screening, management and follow-up).
 Evaluate the participant's degree of obesity, associated risk factors and lifestyle-related behaviour.

If the participant is indecisive and reluctant to initiate lifestyle modification:

Be supportive and invite discussion.
 Reinforce the benefits of weight loss.
 Assess the reason associated with unwillingness.
 Try to solve the individual's issues and motivate her to initiate lifestyle modification.

Step 3: Take the anthropometric measurements to identify the target group

Measure height, weight, body fat, waist circumference and hip circumference.

Calculate BMI using the height and weight measurements,

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

Identify following indications for initiating weight management:

BMI in the overweight category ($23\text{--}24.9 \text{ kg/m}^2$) or obese category ($\geq 25 \text{ kg/m}^2$) and/or;

Contd...

Retained more than 4-5 kg weight as compared with their pre-pregnancy body weight and/or,
 Body fat greater than 38% and/or;
 Waist circumference more than 80 cm and/or;
 Waist to hip ratio >0.81.

Step 4: Take the detailed history and make biochemical assessment
 Assess pregnancy-related complications such as:
 Gestational diabetes mellitus
 Hypertensive disorders of pregnancy
 Anaemia
 Polycystic ovary syndrome.

Detailed medical history may include assessment of:
 Metabolic complications of overweight and obesity such as non-alcoholic fatty liver disease, hypertension, impaired glucose regulation and dyslipidaemia;
 Family history related to obesity-associated complications.

Biochemical assessment may include evaluation of:
 Biochemical parameters such as Haemoglobin, Serum ferritin, Lipid profile, Blood glucose level, Thyroid profile, Calcium and Vitamin D

Step 5: Carry out the dietary, physical activity and psychosocial assessment of the target group
 Carry out the dietary assessment by using:
 24-h recall for dietary evaluation;
 Dietary diversity questionnaire to evaluate the consumption of various macronutrients and micronutrients through the analysis of intake of foods from various food groups;
 Validated set of questions to assess dietary behaviour including meal patterns, skipping meals, consumption of HFSS foods, frequency of eating out, emotional/stress eating, methods of cooking, reading food labels and barriers in maintaining a healthy diet.

Carry out the physical activity assessment by:
 Assessing categories of activity: dedicated physical activity, work-related activity, leisure-related activity, transport-related activity and sedentary activity;
 Assessing the type, frequency, duration and intensity of physical activity one is indulged in;
 Assessing the number of sedentary hours (screen and sitting time) spent in the entire day;
 Using MPAQ for physical activity evaluation;
 Using a validated set of questions to assess barriers faced in being physically active.

Carry out the psychosocial assessment by:
 Assessing the presence of a diagnosed psychiatric disorder (Depressive, Anxiety or Eating disorder);
 Using PHQ-2 for screening depressive symptoms;
 Referring to a mental health professional, if needed.

Step 6: Disseminate advice for weight management
 Establish realistic and sustainable patient-centric weight loss goals.
 Advise to reduce body weight to the BMI equal to or <23 kg/m².
 Advise stepwise body weight loss goal of 0.5 kg per week acquiring 5% to 10% of clinically significant weight loss.
 Advise lifestyle modification including dietary, physical activity and behavioural modification.

Step 7: Deliver dietary advice for weight management
 Provide an individualised diet chart based on the energy requirement, principles of a balanced diet, economic, regional and cultural preferences.
 Counsel women to spread meals throughout the day (three major meals and two-three snacks).
 Use a healthy plate concept to raise awareness about the portion of foods to be included from various food groups.
 Increase awareness about food products rich in complex carbohydrates, proteins, good quality fats, iron, calcium, vitamin D, vitamin A, vitamin C, vitamin B12 and folic acid.
 Discourage the consumption of HFSS foods, processed and packaged foods rich in saturated fats and trans fats, alcohol and caffeine.
 Encourage the consumption of nutrient-dense galactagogues such as nuts, flax seeds, sesame seeds etc.
 Discourage the consumption of galactagogues loaded with added fat and refined sugar.
 Show them a sample of a food diary and teach them to write a food diary.
 Encourage them to buy a weighing scale.

Step 8: Deliver physical activity advice for weight management
 Advise mothers with uncomplicated delivery to resume physical activity.
 Advise mothers with caesarean or complicated delivery to resume physical activity at 6-8 weeks after their first postpartum check-up.
 Encourage women to participate in dedicated exercise, household related, work-related and leisure-related physical activities.
 Advise lactating mothers to either pump their breast milk or breastfeed the infant an hour prior to the initiation of the activity.
 Encourage women to indulge in physical activity for at least 150 min/week.
 Prescribe stepwise progressive and personalized physical exercise regime.
 Encourage mothers to begin with low-impact activities such as walking, strengthening exercise for abdomen, pelvic floor exercises etc.

Contd...

Recommend combination of aerobic exercise (30 min moderate intensity), muscle strengthening (15 min engaging major muscle groups), work-related and/or household related activities (15 min).

Advise mothers to use the talk-test to self-monitor their intensity of aerobic exercise.

Generate awareness about various types of aerobic and muscle-strengthening exercises.

Emphasize on sitting less and walking more.

Advise to reduce the screen time to less than 2 h per day.

Consider barriers and facilitators while prescribing physical activity advice.

Step 9: Impart behavioural skills for weight management

Use realistic goal setting, motivational interviewing and self-monitoring strategies.

Train women regarding problem-solving skills (Defining problems, creating solutions and opting for the best possible choices).

Train women regarding cognitive restructuring skills (Identifying and correcting the negative thoughts faced during the weight loss process).

Give feedback on the accomplishments, achievements and scope for better progress.

Step 10: Follow-up

Plan duration, frequency and mode of follow-up

Duration: 12 months, ranging from 6 to 18 months based on the targeted weight loss.

Frequency: Once or twice a month at initial stages followed by every 2 to 3 months at a later stage.

Mode: Face-to-face individualised/group counselling coupled with telephonic contacts.

Plan advice to be provided during follow-ups

Reinforce advice related to healthy diet and physically active behaviour.

Motivate and provide support to increase adherence to maintaining healthy lifestyle behaviour.

Encourage self-monitoring through technological devices such as mobile applications, pedometers etc.

Checklist to be used during follow-ups

Following points should be considered during the follow-up visits/contacts with the participants:

Have you lost 0.5-1 kg weight per week? .

Have you followed a balanced diet comprising foods from various food groups? .

Have you followed the concept of small and frequent meals (three major and three minor meals)? .

Have you consumed more complex carbohydrates rather than refined cereals and added sugars? .

Have you included protein-rich foods in your diet? .

Have you included good quality fat in your diet? .

Have you focused on the intake of fiber-rich and micronutrient-rich seasonal and local fruits and vegetables? .

Have you restricted/avoided HFSS foods? .

Have you consumed nutrient-dense galactagogues rather than energy-dense galactagogues? .

Have you maintained a food diary? .

Have you started to walk more and sit less? .

Have you increased the frequency, duration and time of physical activity? .

Have you initiated other aerobic and/or strengthening exercises that can be done apart from walking? .

Have you been breastfeeding your infant? .

Based on the above observation, counsel participants as:

Address their barriers related to diet and physical activity, if any.

Give a new customized diet plan based on the current need of the participant (weight loss or maintenance).

Give a recipe booklet on low calorie snacks.

Give an exercise booklet on easy-to-do activities.

Explain possible reasons to the patient, in cases where no progress is made.

Explain the plateau effect and measures to overcome it.

Set new weight loss and exercise targets for the patients, if required.

Annexure 1: Questionnaire to assess the risk factors, facilitators and barriers to postpartum weight management**Section A: Socio-demographic information**

1. Name:	2. Age:	3. Phone number:
4. House Address:		
5. Type of family:		
6. Occupation:		
7. Current Occupation Status:		
8. Educational qualification:		
9. Education of the Head of the Family:		
10. Occupation of the Head of the Family:		
11. Monthly Family Income (in INR)		
Anthropometric measurements:		
Height (cm):	Pre-pregnancy weight (kg)	Pre-pregnancy Body Mass Index (BMI) (kg/m ²)

Weight at the time of delivery (kg):

Present body weight (kg):

Present BMI (kg/m²):

Section B: Obstetric information:

Obstetrics is related to the treatment of women in childbirth as well as during, before and after delivery. Obstetric variables include various factors related to pre-conception, pregnancy, childbirth and post-pregnancy period.

Information about obstetric variables:

Age at first delivery (in years):

Age at current delivery (in years):

Number of children excluding current pregnancy:

Date of previous delivery/deliveries:

Date of the current delivery:

Mode of delivery:

Pregnancy induced complications:

Currently breastfeeding:

Yes

No

Exclusive breastfeeding is infants receiving only breast milk as the source of food.

Have you exclusively breastfed your infant for the first 6 months post-pregnancy?

Yes

No

Section C: Risk factors, facilitators and barriers to post-pregnancy weight management

Perceptions related to body weight

Statements 1C and 2C describe perception about current weight status and readiness to achieve appropriate body weight. Based on your current practice, mark the option that best describes your opinion.

1C. In your opinion, which statement does define your present body weight status?

(i) My weight is slightly less.

(ii) My weight is appropriate.

(iii) My weight is slightly more.

(iv) My weight is significantly more.

(v) Prefer not to comment

2C. In your opinion, which statement most closely describes your intention/motivation to initiate lifestyle-related changes (i.e. diet, exercise etc) to attain appropriate body weight?

(i) I have already initiated.

(ii) I am planning to initiate within 1-2 weeks.

(iii) I am planning to initiate within 1-2 months.

(iv) I am planning to initiate within 3-4 months.

(v) I have no intention to initiate in the near future.

Eating Behaviour

Statements 3C-13C describe eating behaviour. Based on your current practice, mark the option that best describes your eating behaviour.

Annexure 1: Contd...

Section A: Socio-demographic information

3C. How often do you maintain a regular meal pattern comprising three major and two-three minor meals?

- (i) Not routinely
- (ii) 1-2 days a week
- (iii) 3-4 days a week
- (iv) 5-6 days a week
- (v) Almost daily

4C. How often do you include protein-rich foods (milk or milk products/pulses/egg/meat/fish/chicken) in every major meal (breakfast, lunch, dinner) of your daily diet?

- (i) Not routinely
- (ii) 1-2 days a week
- (iii) 3-4 days a week
- (iv) 5-6 days a week
- (v) Almost daily

5C. How often do you include 4-5 servings of fruits and vegetables in your daily diet?

- (i) Not routinely
- (ii) 1-2 days a week
- (iii) 3-4 days a week
- (iv) 5-6 days a week
- (v) Almost daily

6C. How often do you consume HFSS (high in fat, salt and sugar) food products such as namkeens, samosa, pakoras, mathri, kheer, halwa, sweets, puddings, cakes, pastries, sweet biscuits, chocolates, fast foods etc?

- (i) Once in a month or less
- (ii) Once in 15 days
- (iii) Once in a week
- (iv) 3-4 times in a week
- (v) Almost daily

Reasons associated with inability to follow a healthy eating behaviour.

Please select a response that best explains your opinion regarding the reason associated with inability to follow a healthy eating behaviour.

Reasons	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
7C. My food intake has increased as I have to breastfeed my child.					
8C. I don't have knowledge about food and dietary habits to be followed during this period for achieving appropriate body weight.					
9C. I don't make/am unable to make conscious dietary efforts (such as following a diet plan prescribed by a professional/reliable source) to reduce my weight.					
10C. Managing house, child and work leaves me with little time and energy to focus on healthy eating behaviour.					
11C. Mismatched eating habits of my family members make it difficult for me to follow healthy eating patterns for myself.					
12C. I am bound to eat high calorie foods as per my family's advice.					
13C. I tend to overeat or consume high calorie foods to make me feel better.					
Physical activity behaviour					
Statements 14C-25C describe physical activity behaviour. Based on your current practice, mark the option that best describes your physical activity behaviour.					

Contd...

Annexure 1: Contd...

Section A: Socio-demographic information

- 14C. Household chores include cooking, dish washing, laundry, cleaning etc., To what extent do you perform household chores on an average per day?
- (i) Not at all
 - (ii) Up to 25%
 - (iii) 25% to 50%
 - (iv) 50% to 75%
 - (v) 75% to 100%
- 15C. How often do you participate in household chores?
- (i) Not routinely
 - (ii) 1-2 days a week
 - (iii) 3-4 days a week
 - (iv) 5-6 days a week
 - (v) Almost daily
- 16C. Low-intensity exercises for the post-pregnancy period generally include walking slowly, pelvic floor exercises and gentle abdominal exercises. How much time do you currently spend doing low-intensity exercises in a day?
- (i) Not at all
 - (ii) Up to 15 min
 - (iii) 15-30 min
 - (iv) 30-45 min
 - (v) 45 min or more
- 17C. Moderate-intensity exercises for the post-pregnancy period generally include brisk walking, yoga, low-impact aerobics and light weight training. How much time do you currently spend doing moderate-intensity exercises in a day?
- (i) Not at all
 - (ii) Up to 15 min
 - (iii) 15-30 min
 - (iv) 30-45 min
 - (v) 45 min or more
- 18C. How often do you indulge in any physical activity (low intensity/moderate intensity)?
- (i) Not routinely
 - (ii) 1-2 days a week
 - (iii) 3-4 days a week
 - (iv) 5-6 days a week
 - (v) Almost daily
- 19C. How much time do you spend being sedentary [sitting, resting (other than sleep and naps), reading, watching television, using social media] in a day?
- (i) <2 h
 - (ii) 2-4 h
 - (iii) 4-6 h
 - (iv) 6-8 h
 - (v) More than 8 h

Reasons associated with inability to follow a physical activity routine.

Please select a response that best explains your opinion regarding the reason associated with inability to follow a physical activity routine.

Reasons	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
20C. I don't have knowledge about physical activities to be followed during this stage that will lead to weight loss.					
21C. I don't make/am unable to make conscious physical activity efforts (such as participating in physical activities/exercises advised by a professional/reliable source) to reduce my weight.					
22C. I find it difficult to initiate/carry out physical activities due to excessive body pain/backache etc.					
23C. Managing house, child and work leaves me with little time and energy to engage in physical activity.					
24C. My family does not let me engage in physical activity during this stage.					
25C. I have no access to parks, walking tracks and fitness centres.					
Sleep pattern					
Statements 26C-29C describe sleeping patterns. Based on your current practice, mark the option that best describes your sleep pattern.					
Adequate sleep is defined as 7-9 h' sleep per day with the person not feeling sleep deprived throughout the day.					

Contd...

Annexure 1: Contd...

Section A: Socio-demographic information

26C. On average, how many hours do you sleep at night?

- (i) <5 h
- (ii) 5-7 h
- (iii) >7 h

27C. On average, how much time do you nap during the day?

- (i) <30 min
- (ii) 30 min to 1 h
- (iii) >1 h
- (iv) Not applicable

28C. How would you rate your current sleep quality?

- (i) Excellent
- (ii) Good
- (iii) Average
- (iv) Poor
- (v) Very poor

29C. How often do you get family support to meet high infant needs at nighttime so that you can have comfortable sleep?

- (i) Always
- (ii) Mostly
- (iii) Sometimes
- (iv) Rarely
- (v) Never

Common beliefs/myths associated with the post-pregnancy period

Statements 30C-36C describe common beliefs associated with the post-pregnancy period. Based on your practice, mark the option that best describes you.

30C. I choose to overeat so that my baby gets adequate nutrition.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

31C. Galactagogues are foods such as Ladoos-mawa ladoo, saunth ladoo, til ladoo, gond ladoo/Dry fruit panjiri/Gud-jeera sheera/Dry fruit milk/ Excessive ghee that are believed to increase milk formation. I believe that excessive galactagogue consumption during the first 40-days post-pregnancy leads to higher milk formation.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

32C. I believe that reducing calories in my diet may lead to reduced milk production.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

33C. I had excessive consumption of ghee in the last trimester of my pregnancy.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

34C. I believe that physical activity may affect the breast milk composition.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

Contd...

Annexure 1: Contd...**Section A: Socio-demographic information**

35C. I believe that breastfeeding helps in natural weight loss automatically.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

36C. A 40-day period of confinement post-delivery involves no restriction on high calorie food intake, but involves restricted physical activity with the belief of healing of a new mother. I believe that this period of confinement after delivery is essential.

- (i) Strongly agree
- (ii) Agree
- (iii) Neither agree nor disagree
- (iv) Disagree
- (v) Strongly disagree

Annexure 2: Haemoglobin and serum ferritin cut-offs for the assessment of iron deficiency anaemia in women**Anaemia Status**

Haemoglobin Levels

12.1-15.1 g/dL	Normal
11-11.9 g/dL	Mild
8-10.9 g/dL	Moderate
<8 g/dL	Severe

Serum Ferritin Levels

12-263 ng/mL	Normal
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Source: WHO, 2017^[143]

Annexure 3: Quick assessment of approximate dietary calcium intake per day

Source	Calcium (mg)	Number of serving*
Dairy Products (Milk, curd, paneer, Channa, Khoa, Cheese and Milk powder)	300-525	
Non Dairy Products (Non-dairy milk and milk products, Soy and Soy products Green leafy vegetables, nuts and oilseeds)	200-300	
Approximate Total Calcium intake (mg) = (Number of servings from dairy products*300–525) + (Number of servings from non-dairy products* 200-300).		
RDA for Indian Lactating Women: 1200 mg/day		
*Number of servings: Added according to daily intake of the postpartum woman.		

Source: Cosman *et al.* (2014)^[144]

Annexure 4: Cut-off for Serum 25-Hydroxyvitamin D [25(OH) D]

Serum 25-Hydroxyvitamin D (ng/mL)	Vitamin D status
<20	Vitamin D Deficiency
21-29	Insufficient Vitamin D levels
≥30	Sufficient Vitamin D levels
>150	Toxicity

Source: Aparna *et al.* (2018)^[145]

Annexure 5: Estimated Average Requirement for Indian Lactating Women

Nutrient	Value
Iron (mg/day)	16
Calcium (mg/day)	1000
Vitamin D (IU/day)	400

Source: ICMR 2020^[146]

Annexure 6: Dietary Sources of Calcium

Food Products	Servings/Portion Size	Calcium (mg)
Quinoa	30 g	59.4
Ragi	30 g	109.2
Bengal gram, whole	30 g	45.0
Rajmah	30 g	37.8-40.2
Soybean	30 g	58.5-71.7
Bathua leaves	100 g	211
Fenugreek leaves	100 g	274
Mustard leaves	100 g	191
Radish Leaves	100 g	234
Spinach	100 g	82.29
Corn, baby	100 g	76.51
French beans	100 g	55.99
Ladies finger	100 g	86.12
Almonds	25 g	57.0
Sesame seeds, white	25 g	320.75
Pistachio nuts	25 g	33.75
Walnuts	25 g	26.25
Milk, whole, Buffalo	1 glass (250 ml)	302.5
Milk, whole, Cow	1 glass (250 ml)	295
Curd (Cow's milk)	200 g	298
Paneer	50 g	238
Egg, poultry, whole, raw	50 g	24.72
Catla	100 g	43.53
Rohu	100 g	39.37

Source: NIN-IFCT 2017^[146]**Annexure 7: Dietary Sources of Iron**

Food Products	Servings/Portion Size	Iron (mg)
Bajra	30 g	1.93
Quinoa	30 g	2.25
Ragi	30 g	1.39
Rice flakes	30 g	1.34
Wheat flour, <i>atta</i>	30 g	1.23
Bengal gram, <i>dal</i>	30 g	1.82
Bengal gram, whole	30 g	2.03
Black gram, whole	30 g	1.79
Cowpea	30 g	1.51-1.77
Lentil <i>dal</i>	30 g	2.12
Lentil whole	30 g	2.27-2.37
Peas, dry	30 g	1.53
Rajmah	30 g	1.84-1.89
Soyabean	30 g	2.47-2.49
Amaranth leaves	100 g	4.64-7.25
Bathua leaves	100 g	2.66
Fenugreek leaves	100 g	5.69
Mustard leaves	100 g	2.84
Spinach	100 g	2.95
Onion, stalk	100 g	3.09
Dates, unprocessed	25 g	0.8-1.2
Raisins, dried, golden	25 g	1.07
Almonds	25 g	1.15
Cashew nut	25 g	1.48
Sesame seeds, white	25 g	3.77
Groundnut	25 g	0.87
Pistachio nuts	25 g	0.68
Walnut	25 g	1.13
Egg, poultry, whole, raw	50 g	0.91
Chicken, poultry, skinless	100 g	0.83-1.38
Goat Chops	100 g	1.87
Beef Chops	100 g	1.95
Pork Chops	100 g	1

Source: NIN-IFCT 2017^[146]