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RESEARCH

Treatment Algorithm for Patients with Obesity in India: A Joint Consensus by Endocrine Society of India and Obesity Surgeons Society of India

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Abstract

Introduction Obesity is a global health crisis affecting developing nations, including India. The management of obesity continues to evolve with newer drugs, metabolic and bariatric surgery and endoscopic interventions, requiring family physicians and specialists to adapt their clinical practice accordingly. There is an urgent need for a standardized algorithm to diagnose, stage, and treat obesity.

Methods The Endocrine Society of India (ESI) and the Obesity Surgeons Society of India (OSSI) appointed a steering committee to develop an evidence-based algorithm for managing patients with obesity in India. This was put to vote by 80 specialists (38 from OSSI and 42 from ESI) in a physical meeting.

Results A proposed stage-wise algorithm based on Edmonton Obesity Staging System, Asian definition of obesity, and resources in India, received 100% consensus.

Conclusion This algorithm may help the physicians and specialists in India to manage patients with obesity in a uniform and practical manner and also help choose adjuncts – medical or surgical.

Keywords Algorithm · Obesity · Clinical pathway · India · Weight loss

Abbreviations

EOSS	Edmonton Obesity Staging System
OMM	Obesity Management Medications
MBS	Metabolic and Bariatric Surgery
IBT	Interventional Behavioral Therapy
GA	General anesthesia
TWL	Total weight loss
AE	Adverse events

Extended author information available on the last page of the article

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ORC	Obesity-related complications
RWG	Recurrent Weight Gain
SOCR	Suboptimal clinical response
WL	Weight loss

Introduction

Obesity is a chronic, complex, and multifactorial disease rooted in lifestyle factors and biological mechanisms, including genetics, requiring long-term multidisciplinary management. It is associated with numerous complications including diabetes, hypertension, cardiovascular diseases, dyslipidemia, metabolic-associated fatty liver disease, obstructive sleep apnea, gastroesophageal reflux disease (GERD), arthritis, and mental health disorders. Globally, obesity represents a growing public health burden, with the World Obesity Federation predicting that one billion people will live with obesity by 2030 [1].

The economic impact of obesity is substantial, encompassing both direct treatment costs and indirect costs from lost productivity [2]. One study estimated that productivity is reduced by 4–9 years in Southeast Asian countries [3], resulting in a significant economic burden and loss of productive workforce capacity.

With rapid economic development, India faces an escalating obesity epidemic affecting both urban and rural populations. Recent National Family Health Survey data demonstrated that the prevalence of overweight/obesity among Indian women and men aged 15–49 years increased dramatically from 10.6% to 24% and 9.3% to 22.9%, respectively, between 2005 and 2015 [4, 5]. Recognizing this growing health crisis, the Government of India has prioritized prevention and holistic management of obesity [6].

Given India's large population, delivering long-term obesity care requires a large healthcare workforce. While specialists serve important referral functions, the massive disease burden necessitates that family physicians provide primary obesity care. However, several challenges exist. First, widespread misconceptions about obesity's definition persist even among healthcare providers. Second, obesity management continues to evolve with emerging modalities including metabolic and bariatric surgery (MBS), obesity management medications (OMMs)—particularly newer GLP-1 analogues—and endoscopic bariatrics, making it difficult for general and family physicians to adopt a uniform treatment strategy. Third, since obesity requires multidisciplinary management involving nutritionists, physical trainers, psychologists, endocrinologists, and bariatric and plastic surgeons, physicians must understand appropriate referral pathways. Therefore, educating family physicians represents the essential first step in delivering effective obesity care.

To address these challenges, family physicians require practical tools, such as a simple algorithm for diagnosing and staging patients into risk categories for comprehensive care. Additionally, the algorithm should guide specialists regarding the appropriate use of OMMs and MBS in different clinical contexts.

The Endocrine Society of India (ESI) [7] and Obesity Surgeons Society of India (OSSI) [8] are two prominent organizations that have separately published guidelines on surgery and medication management of obesity. However, a jointly developed algorithm from both societies would provide significant benefit to physicians and specialists. To this end, the two societies collaborated to develop consensus statements on obesity (including definition, prevention, general treatment guidelines, monitoring and follow-up, dietary and lifestyle modification, obesity management medications, metabolic and bariatric surgery, and palliative therapy) and to create a unified algorithm to guide family physicians and specialists in managing patients with obesity. This paper focuses on the algorithm; consensus statements are submitted separately for publication.

Methods

A steering committee comprising representatives from OSSI and ESI was established in March 2025. The committee included five members from OSSI and five members from ESI. Conflicts of interest were declared by all group members at the initial meeting.

Experts from both OSSI and ESI were selected for voting based on the following criteria:

(1) Nomination by the guidelines development team
(2) At least a decade of clinical experience
(3) Clinical publications in peer-reviewed scientific journals
(4) Membership of the OSSI Executive Committee
(5) Membership of the ESI Obesity Task Force Initiative (ESI)
(6) All members of the guideline development team were also eligible to vote.

A total of 80 experts—38 from OSSI and 42 from ESI—were selected to participate after providing informed consent. All steering committee members were also eligible to vote.

The steering committee had two objectives: first, to develop jointly derived consensus statements from both societies using the Delphi method; second, to create an algorithm and obtain expert validation through anonymised voting at an in-person meeting. It was decided that consensus would be assumed if there was an agreement of > 70%.

Regarding the methodology of algorithm creation, it was developed by the steering committee following a comprehensive literature review on PubMed. It was decided after deliberations and publication research to use the Edmonton Obesity Staging System (EOSS) instead of BMI alone to stage the disease and formulate an algorithm with it.

It was subsequently subjected to expert voting in a meeting held in New Delhi on June 29, 2025. It was decided that if there was no consensus on the algorithm, it would be revised based on the inputs from the experts, and a new algorithm would be subjected for voting.

Results

Consensus statement results are published separately.

Diagnostic Criteria

Obesity in the Indian population is defined as BMI ≥ 25 kg/m². Waist circumference (WC) can also be used for diagnosis, with cutoff values of 80 cm for women and 90 cm for men. Body composition analysis (BCA) using Bioelectrical Impedance Analysis (BIA) or DEXA scan is recommended in patients suspected of having adiposity when BMI is 23-24.9 or when BMI > 25 but the patient appears muscular.

Disease Staging

Disease staging is based on the Edmonton Obesity Staging System (EOSS) [9], which evaluates medical, mechanical, and mental health complications associated with obesity. This system categorizes patients into Stages 1, 2, 3, and 4 based on complication severity.

Treatment Approach and Algorithm

The proposed algorithm (Fig. 1) achieved 100% consensus. The algorithm is detailed below.

Dietary modifications increased physical activity, and intensive behavioral therapy (IBT) constitute first-line treatment for all patients.

IBT implied a structured program comprising of dietary advice, physical training and counselling which is delivered by the primary physician or assistant physicians with face to face meetings at monthly intervals. If the patients do not achieve 5% TWL at 3–6 months, treatment should be escalated by adding adjuncts.

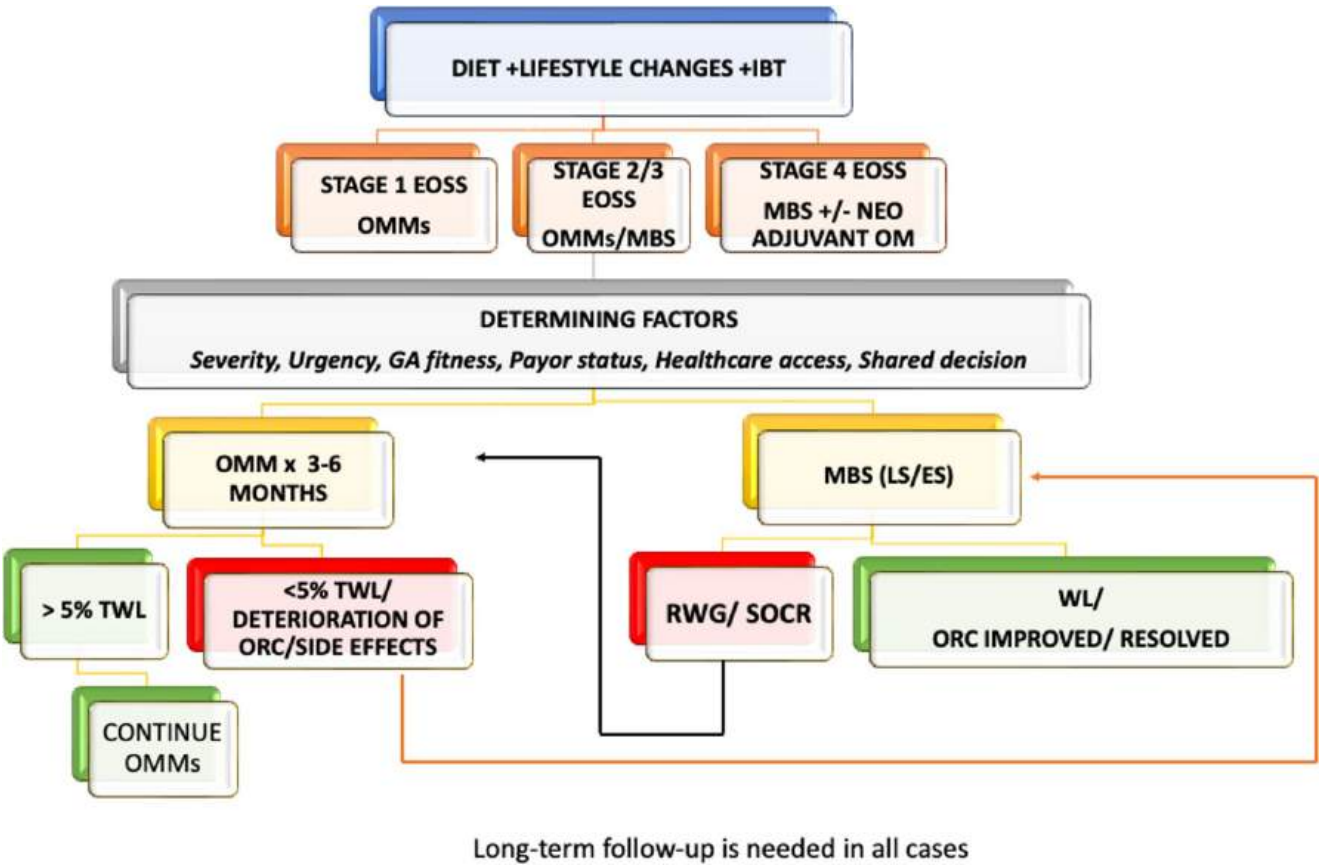

Fig. 1 Algorithm for Management of Clinical Obesity

Adjunctive therapies—OMMs and MBS (including both laparoscopic and endoscopic procedures)—are recommended if patients fail to achieve 5% TWL within 3–6 months. The choice of adjunct depends on obesity stage: experts prefer OMMs as the initial adjunct in Stage 1 disease, while MBS is preferred for Stage 4 disease. However, experts agreed on the use of OMMs before MBS in Stage 4 as a neoadjuvant therapy to optimise patients. For Stages 2 and 3, additional factors guide the choice between modalities.

The following factors influence the choice between OMMs and MBS: patient preference, staging, healthcare access, insurance coverage/reimbursement status, anesthetic fitness, and urgency of weight loss.

All patients require long-term follow-up. Recurrent weight gain (RWG) or Suboptimal clinical response (SoCR), as defined by IFSO position statement [10], should be managed by a multidisciplinary team (MDT). Treatment crossover is recommended when one adjunct proves inadequate, such that MBS may be considered for inadequate response after OMMs, or OMMs for inadequate response after MBS. Further, patients who have adverse events after OMMs and are unable to continue can also be considered for MBS. Experts opined that the OMMs should not be used in the first 18 months after MBS since it will not allow the distinction between medical and surgical weight loss.

Follow up of patients with obesity was recommended at 3 monthly intervals in general although individual patients may demand differently. The parameters were – body weight, waist circumference, HbA1c, LDL, TG and QLI of the patient. For patients undergoing MBS, the following tests were recommended – CBC, LFT, Iron, Ferritin, vitamin B12, and vitamin D. This is a part of another paper containing the consensus statements and has been submitted separately for considering publication.

Discussion

This represents the first clinical pathway/algorithm developed in India for managing patients with obesity. It incorporates existing knowledge of BMI-based definitions for Asian obesity, the EOSS stratification method, MBS indications, current evidence on GLP-1 analogues, and India's insurance system. The algorithm provides a simple, comprehensible pathway for family physicians managing patients with obesity, while also guiding specialists in selecting between OMMs and MBS and directing appropriate cross-referrals. This algorithm may serve as a template for other countries developing their own obesity management pathways.

Diagnosis of Obesity

While subjective obesity definitions exist, objective measurements are more practical. BMI and waist circumference have been used most extensively due to their simplicity. However, ethnic variations in these cutoff values are well established. For example, while the global obesity cutoff BMI is 30 kg/m² [11], the cutoff for Asian populations is 25 kg/m² per ESI guidelines [7].

This difference reflects that Asian adults [12] and children develop adiposity-related pathophysiologic changes at lower BMIs compared to other populations [13, 14]. Waist circumference serves as a simple anthropometric tool for assessing adiposity. Globally, standard cutoffs are 80 cm for women and 94 cm for men [15]. However, in India and most Asian countries, the recommended cutoffs are 80 cm for women and 90 cm for men [16].

Waist circumference effectively differentiates individuals who have BMI≥25 but are muscular from those with BMI<25 but significant adiposity. This cost-effective alternative to more sophisticated body composition analysis is particularly valuable in resource-limited settings like India.

Disease Staging Using EOSS

All experts unanimously accepted the EOSS for disease staging to guide appropriate therapy. Published in 2009 [17], EOSS has gained widespread acceptance for its simplicity and appropriate incorporation of obesity-related complications—medical, mechanical, and mental health issues—into disease staging. Unlike BMI-only classification, EOSS captures both the presence and severity of complications in disease staging.

In this algorithm, Stage 1 represents mild disease with minimal complications. Stages 2 and 3 represent moderate and severe disease, respectively; we combined these stages for practical simplicity, recognizing this cohort requires individualized decision-making for adjunct selection. Stage 4 represents end-stage disease with severe functional limitations, such as wheelchair or bed-bound status, and severe obesity-related complications including heart failure, diabetic nephropathy and disabling psychological issues. The EOSS incorporation in published algorithms from Australia and Southeast Asia [18, 19] demonstrates its international acceptance and utility.

Treatment Strategy

Experts unanimously recommended multidisciplinary treatment, including dietary modifications, increased physical activity, and behavioral therapy as the cornerstone of obesity management. Both adjuncts—MBS and OMMs—were

recommended if these interventions fail to achieve minimum 5% TWL within 3–6 months. The 5% TWL threshold represents the accepted minimum outcome measure for any weight loss intervention [20].

MBS represents a proven effective, extensively studied intervention. A systematic review of 10-year post-MBS outcomes demonstrated excess weight loss (EWL) of 55.4% for Roux-en-Y gastric bypass (RYGB) and 57% for sleeve gastrectomy patients [21]. Another systematic review showed 77% EWL for patients who underwent One Anastomosis Gastric Bypass (OAGB) and completed at least 5 years [22].

Recent injectable OMMs—semaglutide (a GLP-1 agonist) and tirzepatide (a dual GLP-1/GIP agonist)—demonstrate impressive efficacy. The STEP 5 trial [23] showed mean weight loss of −15.2% with semaglutide 2.4 mg versus −2.6% with placebo at 104 weeks, with improvements in cardiometabolic risk factors including hypertension, atherogenic dyslipidemia, and benefits for physical function and quality of life. The SURMOUNT 1 trial [24] demonstrated mean weight loss of −15.0% with tirzepatide 5 mg weekly, −19.5% with 10 mg weekly, and −20.9% with 15 mg weekly at 72 weeks compared to −3.1% with placebo.

Factors Influencing Adjunct Selection

To our knowledge, this represents the first published attempt to systematically define factors guiding choice between OMMs and MBS. Experts recommended OMMs as the initial adjunct for Stage 1 disease, while MBS was preferred for Stage 4 disease, if the patient was fit for anaesthesia, given the urgency and severity. Experts agreed on the use of OMMs as neoadjuvant treatment before MBS in Stage 4 to optimise the patient, which has been published earlier. [25].

For Stages 2 and 3 EOSS, experts recommended considering the following factors when selecting adjuncts: patient preference, disease staging, healthcare access, insurance coverage and reimbursement status, anesthetic fitness, and urgency of weight loss.

Certain clinical scenarios demand urgent weight loss, including patients awaiting organ transplantation, those scheduled for joint replacement surgery, and those with large hernias that require weight optimization before definitive surgical repair. Experts recommend initial MBS for these cases. This staged approach for hernia repair and transplant has prior publication support [26, 27]. The rationale underlying these recommendations is that OMMs produce more gradual weight loss than MBS. Additionally, OMMs may cause side effects or SOCR, resulting in loss of critical time in urgent situations. These clinical contexts demand more predictable and dramatic weight loss, making MBS the preferred option.

The severity of obesity-related complications may influence adjunct selection. For example, uncontrolled diabetes or severe arthritis may favor MBS selection. Conversely, many patients with severe sleep apnea complicated by right heart failure, decompensated liver disease, or advanced renal failure may lack anesthetic fitness and would be better served by OMMs, either as monotherapy or as neoadjuvant therapy before definitive MBS.

Healthcare access varies considerably throughout India. Long-term multidisciplinary management of obesity patients may prove challenging for those in Tier 2–3 cities or rural areas. In these settings, choice may be limited to the most physiologic MBS option, such as SG, or OMMs.

Patient preference plays a crucial role in adjunct selection. Fear and misconceptions about MBS persist in Indian society, leading to surgical reluctance and low referral rates. While similar biases may exist toward OMMs, medications generally experience higher acceptance.

Cost considerations significantly impact decision-making in India's cost-sensitive healthcare environment. Patients unable to afford the recurring costs of OMMs may benefit from single-intervention MBS, which offers superior long-term cost-effectiveness. Insurance reimbursement for MBS has recently begun in India, covering select patients based on insurance contracts. Notably, OMMs remain unreimbursed by insurance in India, further influencing practical decision-making.

Treatment Sequencing and Crossover

Experts agreed that SOCR or adverse events with one adjunct may necessitate switching to alternative therapy.

Serious adverse events (SAEs) have been reported with both tirzepatide and semaglutide in clinical trials. In SURMOUNT-5, tirzepatide was associated with gastrointestinal SAEs in 4.5% of participants, gallbladder disease in 1.1%, and hepatic disorders in 0.3% [28]. For semaglutide, STEP-UP reported SAEs in 6.8% (7.2 mg) and 10.9% (2.4 mg) of participants, predominantly gastrointestinal [29]. Non-responders—defined as TWL < 5%—represented approximately 9% in SURMOUNT-1 with tirzepatide [24] and 10–17% across STEP trials with semaglutide. These cohorts represent candidates for escalation to MBS for effective weight management.

Similarly, patients experiencing RWG after MBS—reported at 26.2% at 5 years in one study [30]- may benefit from OMM therapy [10, 31]. This approach recognizes obesity's chronic, relapsing nature and emphasizes the importance of sequential use of various treatment modalities. Patient counseling should reflect these expectations appropriately.

Comparison with Existing Algorithms

Two clinical pathways have been previously published. An Australian publication [18] classified obesity based on BMI, waist circumference, and obesity-related complications, using different cutoff values than this algorithm. Management varied by stage: mild disease was managed in primary care with lifestyle interventions and optional pharmacotherapy; moderate disease was referred to specialists for consideration of pharmacotherapy or MBS; severe disease was always managed by specialists. While this algorithm shares similar principles, it provides less specific guidance on adjunct utilization.

Tham et al. [19] published a consensus on obesity care and management in South and Southeast Asia, emphasizing dietary changes, increased physical activity, and behavioral therapy as the foundation of management. The algorithm incorporated Asian cutoffs for BMI and waist circumference, EOSS staging, and multidisciplinary team involvement with individualized goal-setting based on obesity-related complications and 3-month assessment intervals. If treatment goals were unmet, adjuncts were recommended, with OMMs for BMI > 27 and MBS for BMI > 30. However, this guidance also lacked specificity regarding indications for different adjuncts.

Our algorithm represents an effort by two respected Indian organizations to create a practical tool for obesity management. Uniquely, it clarifies specific indications for different adjunct therapies. The three algorithms are compared in Table 2.

Table 2 Comparison with other published algorithms

	Tham et al. (Asian)	Markovic et al. (Australian)	OSSI-ESI (India)
BMI cut-off to define obesity	25 OR 27.5 depending on country	30	25
Obesity staging	EOSS 1–4	Based on BMI and ORC – mild, moderate, severe	EOSS 1–4
Treatment providers	MDT	Mild – primary care Moderate – primary care/ specialist Severe - Specialist	Physician, assistants initially. Specialists for stage 1–4 when using adjuncts
Factors influencing choice of adjuncts – OMMS/ MBS	OMM may be considered for BMI ≥ 27 MBS may be considered for BMI ≥ 30	Not mentioned	Staging, urgency, GA fitness, healthcare access, payor status, patient's decision

Limitations

The algorithm and the choice of adjuncts mentioned therein is purely based on expert opinion since no Indian literature exists on the subject. Hence, this is Grade 4 evidence based recommendation. Further, since there is a lack of evidence and data from India, this group recommends future research to capture data on OMMs - indications, dose, outcomes - so that this algorithm can be validated.

Conclusion

This proposed algorithm is simple, objective, and provides practical guidance for family physicians and specialists in diagnosing, staging, and managing patients with obesity. It assists in identifying factors for choosing between OMM and MBS and in integrating these modalities for holistic, comprehensive treatment.

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Author contributions Authors from 1 to 10 were instrumental in conceptualising the manuscript - SJB, AGB, CP, RW, SS, SS, NK, SD, KVSH, NK. All the other authors were voting experts.

Data Availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

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