An International Delphi Consensus on Patient Preparation for Metabolic and Bariatric Surgery

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Conflict of Interest

All of the participating authors can confirm they have no conflict of interest which would affect their involvement in this study.

Abstract

Introduction: Global obesity rates have risen dramatically, now exceeding deaths from starvation. Metabolic and bariatric surgery (MBS), initially for severe obesity (BMI ≥ 35 kg/m²), is performed globally over 500,000 times annually, offering significant metabolic benefits beyond weight loss. However, varying eligibility criteria globally impact patient care and healthcare resources. Updated in 2022, ASMBS and IFSO guidelines aim to standardise MBS indications, reflecting current understanding and emphasising comprehensive preoperative assessments. Yet, clinical variability persists, necessitating consensus-based recommendations.

Methods: This modified Delphi study engaged 45 global experts to establish consensus on perioperative management in MBS. Experts selected from bariatric societies possessed expertise in MBS and participated in a two-round Delphi protocol.

Results: Consensus was achieved on 90 of 169 statements (53.3%), encompassing multidisciplinary team composition, patient selection criteria, preoperative testing, and referral pathways. The agreement highlighted the critical role of comprehensive preoperative assessments and the integration of healthcare professionals in MBS.

Conclusion: These findings offer essential insights to standardise perioperative practices and advocate for evidence-based guidelines in MBS globally. The study underscores the need for unified protocols to optimise outcomes and guide future research in MBS.

What is already known about this subject

- **Rise in Obesity**: Since 1990, adult obesity has more than doubled, and adolescent obesity has quadrupled; by 2022, 890 million people were living with obesity, making up 16% of the global adult population.
- **MBS Effectiveness**: Metabolic and bariatric surgery (MBS) is proven safe and effective for individuals with a BMI of 35 kg/m² or higher, offering metabolic benefits such as type 2 diabetes remission. Over 500,000 MBS procedures are performed globally each year.
- **Guideline Variability**: Updated guidelines by ASMBS and IFSO in 2022 address patient selection and procedures but lack specifics on referral processes and preoperative management, resulting in inconsistent practices internationally.

What this study adds

- **Expert-Curated Guidelines**: The study produced 90 expert-curated statements on preoperative management in bariatric surgery, emphasizing the importance of multidisciplinary teams (MDTs) in handling complex patient issues.
- **Team and Criteria**: It stresses that MBS should be performed by fully trained teams, including surgeons, nurse specialists, dietitians, and psychologists, and establishes clear eligibility criteria and contraindications for surgery.
- **Patient Preparation**: The study highlights the importance of preoperative weight management and patient education, the need for informed consent, and lifelong follow-up, ensuring patients understand post-surgery expectations and lifestyle changes.

Introduction

Since 1990, global obesity rates in adults have more than doubled and adolescent obesity has quadrupled[1]. The World Health Organization reported that in 2022, 890 million individuals were living with obesity, representing 16% of the world's adult population[2-3]. Obesity-related health issues now cause more deaths than starvation[4].

Metabolic and bariatric surgery (MBS), initially developed for patients with a body mass index (BMI) of 35 kg/m² or higher, has been extensively researched and shown to be a safe and effective treatment for this high-risk group[5]. It is now globally recognized as a viable treatment for obesity due to its proven metabolic benefits. Today, over 500,000 MBS are performed annually worldwide[6]. Recent studies have also highlighted the additional metabolic benefits of bariatric surgery, particularly in patients with type 2 diabetes mellitus (T2DM), where remission of T2DM has been observed independently of weight loss[7-11]. This has led to the term "metabolic and bariatric surgery" (MBS) being used[9-10]. However, eligibility criteria for this surgery differ markedly across various regions[12-13]. The variability in global clinical guidelines for patient eligibility results in differences in the time and cost associated with the preoperative workup of patients between healthcare systems[12-13].

In 2022, the American Society for Metabolic and Bariatric Surgery (ASMBS) and the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) released updated international guidelines on the indications for MBS[5]. These guidelines, developed in response to significant advancements in understanding obesity as a disease, aim to modernise the previous recommendations set by the National Institutes of Health (NIH) in 1991[14]. They incorporate the latest evidence-based research, particularly concerning patient selection criteria and the various types of operative procedures available. Widely recognized and utilised by bariatric specialists globally, these guidelines are considered the gold standard of practice. However, they do not address aspects such as the referral process, the specialists providing MBS services, or the preoperative investigation and management. Previous studies using questionnaires have shown considerable variation in international practices regarding patient preparation for MBS and referral criteria from medical weight management programs to surgical interventions[12-13]. This inconsistency highlights the need for more comprehensive and expertly crafted guidance to standardise the preoperative assessment and management of patients undergoing MBS.

This modified Delphi study aims to fill this gap in the literature by providing a comprehensive set of expert recommendations to support bariatric surgical teams worldwide.

Methods

A committee of 7 bariatric healthcare professionals (D.C., A.R., K.M., W.Y., P.L., C.P., B.M.) was established to design this Delphi study; with two moderators overseeing the whole process (D.C. (non-voting) and A.R. (voting)). A further 40 recognised opinion makers and highly experienced MBS specialists were invited to participate in this consensus-building exercise.

Experts were invited based on the following inclusion criteria:

1. Member or committee member or a recognised council representation of any bariatric society affiliated with the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO)
2. Self-confirmation as an expert in their field of MBS
3. Working knowledge of the English language
4. Participation in both rounds of the Modified Delphi protocol

All experts were given 2 weeks to respond to our email invitation. Responses were received from all invitees, with 39 (97.5%) accepting the invitation to join the advisory committee. The committee included representation from various healthcare professional roles (surgeon, anaesthetist, dietitian etc.) as well as current and past presidents of national and international bariatric surgical societies. There was representation from 25 countries, including IFSO continental participation.

Following acceptance, all committee members were invited to submit their own statements relating to their own clinical practice. These included statements relating to the following areas:

1. Preoperative testing
2. Patient criteria for selection
3. Pre-operative weight loss
4. Members of the Bariatric Team
5. Referral Pathways

The lead committee members conducted a literature review and generated a list of statements for voting. Any additional statements provided by the committee were compiled by the lead authors and included in the document, which was then shared with the committee for feedback. Voting for each round only began once all committee members agreed on the wording of each statement. No adaptations were made to the statements during the process and all were written in English.

Voting was conducted virtually using Google Forms™ and individual responses were anonymised. The survey was designed so that committee members had to agree or disagree on every statement with no option given to skip (Appendix 1). An agreement or disagreement of $\geq$70% of experts was considered a consensus this was based on similar previously published bariatric consensus papers[15-18].

The first round of voting was opened on 6th February 2024 and included 170 statements. Statements that did not reach the consensus threshold of ≥70% but had achieved ≥60% agreement/ disagreement were carefully reviewed and adjusted according to the committee's recommendations. A further 29 statements were submitted for a second round of voting which concluded on 31st May 2024. All statements which received <60% consensus in the first round of voting were excluded from the second round of voting as previous consensus-building exercises have shown that these statements rarely achieve consensus.

Results were analysed by lead committee members and were shared with the rest of the members of the committee. Participation in by committee members in the modified Delphi process was rewarded by co-authorship in any successful publications.

No prior Institutional Review Board (IRB) approval or Statement of Informed Consent was deemed necessary for this type of consensus-building exercise. All committee members have given permission for their named involvement in this exercise to be shared.

An Accurate Consensus Reporting Document (ACCORD) checklist was referred to when presenting the results of this modified Delphi study (Appendix 2). This study was not formally registered.

Results

A total of 45 MBS experts from 25 countries voted on a total of 169 statements. All 45 voting experts (100%) participated in the first and second rounds of voting.

Consensus agreement was achieved following 2 rounds of voting in 90 (53.3%) of the 169 proposed statements. The committee disagreed on 6 (3.6%) statements, and there was no consensus for the remaining 73 offered statements. Tables 1 – 5 summarise the results of voting following 2 rounds.

Table 1 presents the results of voting on the delivery of MBS by a specialised multi-disciplinary team (MDT). There was consensus agreement in 8 of the 23 statements in this category. A second round of voting for 3 statements was conducted with 2 achieving a ≥70% after this.

The results of voting on patient selection criteria for MBS are shown in Table 2. A total of 49 statements were voted on in this section with 30 statements reaching consensus; 27 statements in agreement and 3 in disagreement.

Table 3 presents the results of voting on the referral pathways for MBS. There was consensus in 8 of the 15 statements, with 1 statement gaining consensus following a second round of voting.

Statements relating to pre-operative testing and preparation for patients undergoing MBS were voted on, and the results are presented in Table 4. There was consensus agreement in 27 and disagreement in 2 of the 59 proposed statements

Table 5 presents the consensus statements relating to the consent process for MBS. There was consensus agreement in 21 out of the 23 considered statements.

Table 1: Results of voting on the delivery of Metabolic and Bariatric Surgery by a specialised multi-disciplinary team		
	Statements	**Final voting results**
1	MBS should only be performed by fully trained bariatric surgeons and teams.	Agree 100%
	Minimum (core) members of the Bariatric MDT should include:	
2	- Bariatric Surgeon	Agree 100%
3	- Bariatric Nurse Specialist	Agree 84.4%
4	- Dietitian	Agree 97.8%
5	- Psychologist	Agree 75.6%
6	- MDT Coordinator	Agree 80.0%
7	MBS Teams should follow national (country) guidelines (e.g. NICE Guidelines)	Agree 93.3%
8	MBS teams should follow ASMBS/IFSO 2022 criteria for determining the appropriateness of MBS.	Agree 95.6%

*MDT (Multi-disciplinary team); NICE (National Institute for Clinical Excellence); ASMBS (American Society for Metabolic and Bariatric Surgery); IFSO (International Federation for the Surgery of Obesity and Metabolic Disorders).

Table 2: Results of voting on patient selection criteria for Metabolic and Bariatric Surgery		
	Statements	**Final voting results**
1	All patients being considered for MBS should be discussed in an MBS MDT	Agree 73.3%
2	Patients should only proceed to MBS if there is MDT agreement	Agree 73.3%
3	Patients selected by the core MDT team should be reviewed by relevant members of the extended MBS MDT if appropriate	Agree 100%
	Variables determining appropriateness for MBS:	
4	- BMI	Agree 95.6%
5	- Presence of Type 2 Diabetes	Agree 95.6%
6	- Presence of other obesity-related medical conditions	Agree 91.1%
7	- Mental health status agreed	Agree 91.1%
8	- Weight percentile/BMI z-score (for paediatric and adolescents)	Agree 73.3%
9	Patients must stop smoking prior to surgery	Agree 75.6%
10	At least 6 weeks of smoking cessation should be recommended prior to surgery to decrease post-operative complications	Agree 84.4%
11	Pre-operative Weight Management Programmes may be recommended if the MDT feels it is medically appropriate	Agree 97.8%
12	MBS should only be offered to patients >18 years old	Disagree 75.6%
13	MBS should only be offered to patients <65 years old	Disagree 88.9%
14	MBS may be offered to patients >65 years old if they are fit enough for a general anaesthetic	Agree 82.2%

15	MBS may be offered to paediatric patients (<18 years old) if BMI > 120% of the 98th percentile with appropriate comprehensive MDT evaluation and support and family involvement both before and in the long-term after surgery	Agree 88.9%
16	Patients should be prescribed a very low calorie diet (or liver diet) 2 weeks prior to surgery	Agree 80.0%
17	Patients should be prescribed weight loss pharmacotherapy prior to surgery	Disagree 77.8%
18	Micronutrient deficiencies should be corrected before surgery	Agree 86.7%
19	Patients should receive counseling from a trained dietitian with experience in postoperative nutritional requirements.	Agree 100%
20	Patients should participate in a mandatory session to prepare for psychosocial changes after surgery so they are aware of the non-clinical aspects of life after surgery	Agree 82.2%
21	Patients must demonstrate a commitment to lifelong dietary and lifestyle changes	Agree 82.2%
22	Type 1 Diabetes Mellitus is not a contraindication to MBS	Agree 95.6%
23	MBS should be offered to patients with Type 2 Diabetes Mellitus with a BMI > 30	Agree 93.3%
24	Patient should have tried a structured weight loss attempt in the past prior to referral	Agree 73.3%
25	Patients on life-sustaining medications (e.g. immunosuppressant medications for transplant patients) should be considered for a sleeve gastrectomy if gastric bypass surgery may affect the metabolism of these medications	Agree 88.9%
	MBS is contraindicated in the following patients:	
26	- Untreated eating disorder (e.g. Bulimia)	Agree 95.6%
27	- Unstable psychiatric disorder	Agree 95.6%
28	- Current/recent addiction to or use of recreational drugs	Agree 95.6%
29	- Current/recent addiction to or excessive use of alcohol	Agree 100%
30	- Active/ uncontrolled viral hepatitis	Agree 86.7%

Table 3: Results of voting on the referral pathways for Metabolic and Bariatric Surgery

	Statements	**Final voting results**
1	MBS teams should record referral pathways and guidelines in writing in a language that the patient can understand.	Agree 95.6%
2	Patients should be allowed to self-refer to MBS services	Agree 82.2%
3	Referrals to MBS should be received from general practitioners (family medicine practitioners)	Agree 82.2%
4	Referrals to MBS are ideally made following consultation with the bariatric physician or the general practitioner within the bariatric team, promoting a cohesive and well-coordinated approach to patient care	Agree 84.4%
5	All patients living with being overweight (definition: BMI >25) should be referred for assessment by the MBS MDT	Disagree 75.6%
6	Patients with Type 2 Diabetes should be assessed by an endocrinologist or general practitioner to optimise diabetic control preoperatively	Agree 91.1%
7	All healthcare professionals should be able to refer patients to MBS services	Agree 95.6%
8	No preoperative fixed time frame is necessary if the patient is adequately optimised.	Agree 77.8%

Table 4: Results of voting on pre-operative testing and preparation for patients undergoing Metabolic and Bariatric Surgery

	Statements	**Final voting results**
1	Patients undergoing MBS should have a pre-operative anaesthetic assessment	Agree 93.3%
2	All patients undergoing MBS should have routine screening for obstructive sleep apnoea (STOP-BANG)	Agree 77.8%

3	Patients undergoing MBS should be tested for obstructive sleep apnoea (STOP BANG) if deemed to be at risk (history of lung disease)	Agree 84.4%
4	All patients undergoing MBS should have routine screening for metabolic complications related to obesity	Agree 95.6%
5	Smoking status should be recorded for all patients being considered for MBS	Agree 97.8%
6	Alcohol status should be recorded for all patients being considered for MBS	Agree 97.8%
7	A formal nutritional assessment should be conducted for all patients being considered for MBS	Agree 93.3%
8	A formal cardiology assessment should be conducted for all patients being considered for MBS with a known cardiac comorbidity	Agree 75.6%
9	Patients undergoing MBS should have a routine Upper GI Series (Barium/Gastrografin Swallow, Oesophageal Manometry)	Disagree 86.7%
10	Patients undergoing MBS should have a preoperative upper gastrointestinal endoscopy if symptomatic	Agree 75.6%
11	Patients undergoing MBS should have a preoperative upper gastrointestinal endoscopy if they have a family history of upper GI cancer	Agree 82.2%
12	Patients undergoing MBS should have a routine preoperative ECG	Agree 88.9%
13	Patients undergoing MBS should have a preoperative echocardiogram in select patients	Agree 80.0%
14	Patients undergoing MBS should have a preoperative cardiopulmonary exercise stress test in select patients	Agree 80.0%
	Minimum pre-operative blood tests should include:	
15	- Fasting glucose	Agree 84.4%
16	- HbA1c	Agree 88.9%
17	- Thyroid Function Tests (TSH, T4)	Agree 88.9%
18	- Renal Function (creatinine, urea, electrolytes)	Agree 93.3%
19	- Full blood count (Hb, WCC, platelets)	Agree 97.8%
20	- Liver Function (ALP, ALT, GGT, Bilirubin)	Agree 95.6%
21	- Serum lipids	Agree 84.4%
22	- Calcium	Agree 73.3%
23	- Coagulation screen	Agree 86.7%
24	- Vitamin B12	Agree 80.0%
25	- Vitamin D	Agree 88.9%
26	- Iron Studies (according to local hospital testing)	Agree 84.4%
27	Patients with BMI >40 should demonstrate >10% mandatory weight loss preoperatively	Disagree 88.9%
28	Preoperative weight targets are not required prior to surgery	Agree 82.2%
29	Patients should be encouraged to maintain or lose weight pre-operatively	Agree 97.8%

Table 5: Results of voting on the consenting process for Metabolic and Bariatric Surgery (MBS) procedures

	Statements	**Final voting results**
1	Prior to MBS patients should be made aware of expectations in terms of weight loss, resolution of obesity-related complications and lifestyle effects	Agree 100%
2	Prior to MBS patients should be made aware of the need for life-long micronutrient supplementation	Agree 100%

3	Prior to MBS patients should be made aware of the need for life-long follow-up by specialist bariatric team	Agree 86.7%
4	Prior to MBS patients should be made aware that unexpected intraoperative findings requiring a change to a different procedure or abandonment	Agree 97.8%
	The following risks associated short and long-term complications of different bariatric procedures should be discussed during consenting:	
5	- Bleeding (including the need for blood transfusion)	Agree 100%
6	- Infection	Agree 88.9%
7	- Visceral/Vascular Injury	Agree 82.2%
8	- Conversion to Open Surgery	Agree 86.7%
9	- Leak	Agree 97.8%
10	- Obstruction	Agree 84.4%
11	- Internal Hernia	Agree 93.3%
12	- Vitamin and mineral deficiencies	Agree 93.3%
13	- Protein calorie undernutrition	Agree 84.4%
14	- Gastro-oesophageal reflux disease	Agree 91.1%
15	- Mortality	Agree 91.1%
16	- Dumping syndrome	Agree 93.3%
17	- Post-prandial hypoglycaemia	Agree 80.0%
18	- Diarrhoea	Agree 73.3%
19	- Risk of gallstone formation	Agree 75.6%
20	- Excess Skin	Agree 82.2%
21	- Hair loss	Agree 75.6%

Discussion

This modified Delphi study has generated 90 expert-curated statements covering various aspects relating to preoperative management in bariatric surgery.

While the use of multidisciplinary teams (MDTs) in MBS is widely recommended, there is limited conclusive evidence supporting their effectiveness. Patients undergoing MBS often have complex medical and social issues that are difficult for a surgeon to manage alone[19-20]. Historically, comorbidities frequently went undiagnosed before surgery, increasing patient risk[23]. The National Institute for Health and Care Excellence (NICE) advises that bariatric surgery should only be conducted by an MDT capable of delivering comprehensive preoperative assessments, including risk-benefit analysis, thorough information on available procedures, consistent postoperative dietary care, and effective management of comorbidities[23].

The committee achieved a unanimous consensus that MBS should only be performed by fully trained bariatric surgeons and teams. There was also agreement on the composition of this specialist team, which should include a bariatric surgeon, bariatric nurse specialist, dietitian, psychologist, and an MDT coordinator. Previous reports have highlighted the essential members

of a bariatric MDT as a metabolic physician, bariatric surgeon, and dietitian, noting that additional personnel may be valuable, although there is a lack of research-based evidence on the impact of each individual team member[19-22]. While there was no consensus that a bariatric physician must be a core member of the MDT, there was agreement that referrals for MBS should ideally be made by a general practitioner (family medicine doctor) or a bariatric physician.

Previously published international guidelines have not specified absolute contraindications to MBS, but they have mentioned certain medical comorbidities that may serve as relative contraindications[24-25]. These comorbidities include severe heart failure, unstable coronary artery disease, end-stage lung disease, active cancer treatment, portal hypertension, drug or alcohol dependency, and impaired intellectual capacity[24]. Establishing clear eligibility criteria for MBS is crucial, as is defining situations where surgery is not appropriate to protect both the surgeon and the patient from undue harm. Consistent with previous reports, the consensus among this group is that the following conditions should be considered absolute contraindications to surgical weight management: untreated eating disorders, unstable psychiatric disorders, current or recent addiction to recreational drugs or alcohol, and active or uncontrolled viral hepatitis.

The benefits of medical weight management programs for patients awaiting MBS have been debated[12,26-28]. There was a 97.8% consensus that pre-operative weight management programs should be supported if deemed medically appropriate by the MDT. Additionally, 82.2% of the committee agreed that all patients being considered for MBS should participate in a mandatory teaching session to prepare for psychosocial changes after surgery, ensuring they are aware of the non-clinical aspects of life post-surgery. Despite recognizing the importance of pre-operative patient education, the committee did not reach a consensus on the required waiting period for MBS, including the duration of participation in a medical weight management program before surgery. Instead, 77.8% of the committee felt that a fixed preoperative timeframe was unnecessary if the patient was adequately optimized for surgery. For patients with T2DM, this optimization involved a formal review by either an endocrinologist or general practitioner, as additional members of the MDT, to ensure optimal diabetic control preoperatively. This measure was supported by 91.1% of the committee.

Pre-operative weight loss targets before MBS have been extensively studied, yielding conflicting results[27,29-31]. Although pre-operative weight loss has been linked to better patient compliance post-operatively, it does not appear to affect operative outcomes or complication rates[27-30]. The consensus, agreed upon by 82.2% of participants, is that pre-operative weight loss targets are not necessary before surgery. However, 97.8% agreed that patients should be encouraged to maintain or lose weight pre-operatively. More importantly, there was unanimous agreement (100%) that all patients undergoing MBS should receive counseling from a trained dietitian. Additionally, 93.3% agreed on the need for a formal nutritional assessment, and 86.7% supported the correction of micronutrient deficiencies before surgery.

With significant advances in operative procedures over the last decade, adjustments to patient counseling and consent processes have become necessary. However, there is still very little organizational guidance on what exactly should be discussed[32-33]. When properly obtained,

informed consent helps patients develop a realistic expectation of outcomes and enables them to participate more effectively in their own care. This is especially important in MBS as often significant lifestyle changes and motivation to maintain these will be required from the patient postoperatively[33]. Identifying the importance of highlighting this to patients, there was an undisputed agreement (100%) that all patients should be made aware of expectations in terms of weight loss, obesity-related complications, lifestyle effects and the need for life-long micronutrient supplementation. It was also agreed that patients should be made aware of the need for life-long follow-up by specialist bariatric team (86.7%).

Strengths and Limitations

This modified Delphi study involved 45 globally renowned experts in the MBS field, including current and former office bearers of the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) and editors-in-chief of prominent MBS journals. The consensus statement addresses the global differences in perioperative practices for patients undergoing MBS, which were previously highlighted by the PACT study[13]. By producing a list of expertly curated and validated statements, and with representation from 25 countries, these statements represent a globally recognized consensus opinion aimed at reducing variations in clinical practice and improving patient outcomes.

In this study, we defined consensus as 70% agreement or disagreement, an arbitrary threshold commonly used in consensus-building exercises. While this approach provides expert-level guidance for current practices in the absence of clinical trials specifically designed to address each statement, it should not be considered a substitute for high-quality research evidence.

In designing statements for this modified Delphi study, we consistently referred to a 'psychologist' as a valued member of the core MBS MDT. However, upon reflection, the term 'licensed behaviour specialist' is more appropriate and inclusive of all behavioural health specialists. While we retained the term 'psychologist' to reflect the original consensus voting, we support the broader designation of 'licensed behaviour specialist.'

Conclusion

This modified Delphi study represents the first attempt to reach a consensus on various perioperative considerations relating to MBS. Forty-five bariatric surgeons from 25 different countries participated in this modified Delphi consensus study. The experts evaluated various statements related to referral criteria, the composition of the multidisciplinary team, preoperative testing, and patient preparation for surgery. The results of this study aim to provide essential guidance for individual surgeons on these topics and to shape future research directions.

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