



Early integrated management and characteristics of adult patients with overweight and obesity: a modified delphi consensus study in Italy

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Abstract

Purpose A comprehensive approach to the management of obesity, considering its complications besides the disease itself, may be advantageous, and effective obesity medications are now available. Several aspects of the integrated management of overweight/obesity are still unclear or are rapidly evolving.

Methods We conducted a multicenter, multispecialty consensus based on the iterative modified Delphi methodology. The study ensured the fundamental principles of anonymity, iteration, controlled feedback, and statistical stability of the consensus. Management of two main patient subgroups was investigated, i.e., patients with overweight (body mass index, BMI 27–<30 kg/m²) with ≥ 1 weight-related comorbidity, and patients with obesity (BMI ≥ 30 kg/m²). Fifteen panelists had the required criteria and participated in the survey. Two Delphi rounds were required to complete the study, for a total of 93 items investigated.

Results Almost all panelists (high consensus, 93% agreement) described their typical patient as one with overweight or obesity combined with other cardiovascular (CV) risk factors. Full consensus (100% agreement) emerged that early control of body weight in patients with overweight or obesity may exert a favorable long-term effect on CV risk and may decrease the risk of early mortality, and that early treatment with novel pharmacological treatments may decrease substantially the risk of CV events. The target for weight loss was agreed by the experts at 10% to 15% reduction in patients with overweight/comorbidities (full consensus, 100% agreement) and 15% reduction in patients with obesity (borderline consensus, 67% agreement). The panel recognized the improved control of multiple metabolic parameters (i.e., glycemia, blood pressure, lipids) among the main potential benefits of novel pharmacological treatments (full consensus, 100% agreement).

Conclusions Broad agreement was found across several topics related to obesity management, including the recognized value of an early, effective pharmacological treatment to control overweight/obesity, and the relevance of addressing multiple CV risk factors in addition to reducing body weight.

Keywords Delphi consensus · Obesity · Overweight · Treatment

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Introduction

Obesity is a complex condition involving an interplay of genetic, environmental, behavioral, and metabolic factors, defined by an excessive accumulation of body fat [1]. It is associated with the development of several other non-communicable chronic diseases such as type 2 diabetes and other acquired metabolic conditions, cardiovascular (CV) disease and cancer. A recent global study reported a strong increase in the prevalence of overweight and obesity in both female and male adults during the last three decades, and a three-fold increase in the prevalence of obesity in children and adolescents in the same period [2, 3]. The same study estimated that, in Italy, 46.2% of females and 60.9% of males were affected by overweight or obesity in the year 2021.

Effectively addressing the obesity epidemic is crucial for improving public health and reducing the strain on health-care systems at a national and international level. Growing evidence links obesity to an increased risk of CV through direct and indirect mechanisms, highlighting the priority to implement early and integrated strategies to mitigate the impact of cardiac morbidity and mortality [4]. A comprehensive approach towards the management of obesity, addressing its complications besides the disease itself, has been emphasized by European Association for the Study of Obesity (EASO) experts in a recent Consensus [5]. In this context, a major reduction in body weight can potentially exert a modifying effect on type 2 diabetes [6], and has been consistently associated with improvements in cardiac risk factors, metabolic comorbidities and quality of life [7, 8]. Individuals with body mass index (BMI) between 27 and < 30 kg/m² plus weight-related comorbidities represent a critical clinical population at high risk of progression to overt obesity and CV conditions, that deserves adequate consideration.

Lifestyle and behavioral changes, psychological support, pharmacological treatments and metabolic or bariatric surgery are the mainstay of overweight/obesity management [9]. The efficacy and safety of obesity medications in adults have been supported by a recent systematic review and meta-analysis, which highlighted a relevant weight loss effect (i.e., above 10% vs. placebo) for Glucagon-Like Peptide-1 (GLP-1) receptor agonist semaglutide and for the dual Glucagon-Like Peptide-1/Glucose-dependent Insulinotropic Polypeptide (GLP-1/GIP) receptor agonist tirzepatide [10]. These latter medications (reported as “novel pharmacological treatments” in this manuscript) were also associated with potential increases in the clinical remission of selected obesity-related comorbidities as well as with reported reductions in the occurrence of selected CV events. Early treatment — defined throughout the manuscript as intervention during the initial stages of weight gain

or at initial diagnosis — may be a key factor in potentially reducing visceral fat mass and preventing further increases in body weight. Further, it may aid in limiting weight recurrence, ultimately contributing to reducing the estimated risk of chronic diseases in the long-term [11]. The above issues are, however, still open to discussion. In Italy, a number of scientific associations have collaboratively developed, in 2023, the clinical practice guidelines to treat overweight and obesity resistant to behavioral therapy in adult patients with metabolic comorbidities [12]. However, several aspects of the integrated management of patients with excess body weight/obesity, including the role of early treatment, are still unclear or are rapidly evolving. With the aim to provide additional information on these topics, we performed an online, modified Delphi study involving a multidisciplinary panel of Italian experts.

Materials and methods

Study design

We conducted a formal, multicenter, and multispecialty consensus study, based on the iterative modified Delphi methodology (or e-Delphi), aiming to achieve the highest level of agreement among experts on unclear or controversial aspects related to the characteristics and integrated management of patients with overweight or obesity in Italy [13, 14].

This structured consensus approach was chosen to consolidate expert opinions in a context often characterized by a scarcity of specific quantitative data and high-quality scientific evidence. The study was designed and conducted following recommended methodological criteria for Delphi reporting (e.g., ACCORD guidelines), ensuring the fundamental principles of anonymity, iteration, controlled feedback, and statistical stability of the consensus [15, 16].

Phase 1: Study definition and literature review

Firstly, a critical review of the scientific literature (through PubMed/MEDLINE) and relevant grey literature was conducted, to identify current knowledge gaps and the most debated issues within the Italian context. The bibliographic review was non-systematic and was conducted by one of the authors (C.G.) in May 2025. In consideration of the large amount of available literature on the topics investigated, the focus of the bibliographic search was restricted to clinical practice guidelines and consensus studies published between 2021 and 2025. Separate literature searches were performed to explore available information on the clinical management of overweight and obesity, and on the relation between overweight/obesity and CV risk. Search strings

included terms for the disease (i.e., “overweight” OR “obesity”), for the type of article (i.e., “guidelines” OR “consensus” OR “delphi”) and, in turn, for the aim to be investigated (i.e., “management”, “treatment”, “cardiovascular risk”, “cardiovascular diseases”). Since this study was specifically focused on the national clinical context and involved Italian experts, priority was given to Italian guidelines and consensus studies.

Based on the results of this review, the main thematic areas of investigation were defined. These areas specifically addressed: (i) characteristics of adult patients with overweight/obesity in the clinical practice and awareness of obesity-associated risks in Italy; (ii) changes in lifestyle habits of patients in relation to overweight/obesity control; (iii) pharmacological treatment (including early intervention) of overweight/obesity; and (iv) new drugs for overweight/obesity management.

Phase 2: Steering committee and definition of the questionnaire

A Steering Committee was established, composed of clinical (V.G., G.M., U.P. and P.S.) and methodological (C.G. and P.M.) experts, tasked with overseeing the entire project and ensuring methodological rigor. Virtual meetings and email correspondence between the Steering Committee members were held before, during and after the conduction of the Delphi iterations. The Committee defined the topics to be included in the Delphi study, selected and iteratively refined the set of 80 questions and statements (initially prepared on the basis of the results of the literature search) included in the first survey and of 13 statements included in the second survey, agreed the criteria to verify the expertise and thus the eligibility of each potential panellist, and reviewed and interpreted the Delphi study results. Steering Committee members did not take part in the voting rounds of the Delphi method.

Phase 3: Expert panel

The initial selection of expert panel members was based on pre-specified, objective criteria, including demonstrable clinical experience, scientific productivity, and geographical representation. The panel was multidisciplinary and comprised cardiologists, endocrinologists and internists with expertise in obesity management from various geographical areas of Italy, ensuring a national and diverse perspective. No fees nor reimbursements were given to the panelists for their participation.

A total of 18 clinicians were invited to participate. A pre-defined inclusion criterion (aimed at evaluating the real clinical practice expertise of each invited participant) requiring

the management of at least 10 patients with a prescription of novel pharmacological treatments for obesity during the previous 12 months was established, and this aspect was assessed through a preliminary question. In the first Delphi round, 15 (83%) panelists met the required criterion and completed the whole questionnaire. Out of 15 panelists, 9 (60%) were endocrinologists/internists and 6 (40%) were cardiologists. They worked in teaching and general hospital ($n=2$ in a Scientific Institute/Hospital of Medical Research [IRCCS], $n=4$ in a university hospital, $n=5$ in a general hospital and $n=4$ in other settings such as Local Health Units and private hospitals) distributed in 9 Regions in Northern, Central and Southern Italy. Four panelists (27%) were involved in the clinical management of obesity since less than 5 years, 6 (40%) since 5 to 10 years and 5 (33%) since more than 10 years. In the second Delphi round, 14 out of 15 (93%) experts, including 9 endocrinologists/internists and 5 cardiologists, completed the full survey.

Phase 4: Data collection and iterations

Data collection was conducted via structured questionnaires administered through a dedicated, secure online platform (i.e., SurveyMonkey®). The process involved two iterative cycles (Round 1 and Round 2).

An initial email introducing the project and aims and inviting the panelists was sent to all potential Delphi participants on September 26, 2025. The first iteration was conducted between September 27 and October 9, 2025. The questionnaire included a mix of 80 multiple-choice questions and statements, defined collectively by the members of the Steering Committee, where participants had to report their level of agreement/disagreement using a 5-point Likert scale (e.g., ‘strongly disagree’, ‘partially disagree’, ‘neither agree nor disagree’, ‘partially agree’, ‘strongly agree’). The aim was to explore expert opinions, identifying key points of agreement/divergence, and gathering frequency distribution of responses. Responses from Round 1 were subsequently analyzed. Based on the results, most topics reached consensus (see the next section for details) and were not considered anymore; for a few other topics that did not reach consensus, a total of 13 specific statements were formulated by the members of the Steering Committee and proposed during Round 2, which was conducted between November 27 and December 4, 2025. During the second iteration, participants evaluated their level of agreement/disagreement with these additional statements.

Phase 5: Consensus criteria and statistical analysis

The analysis of results was performed in an aggregated and anonymous form, evaluating the distribution of responses (stability and frequency).

The criteria for convergence to define consensus were established a priori by the Steering Committee. In the primary data analysis to define consensus, ‘partially agree’ and ‘strongly agree’ responses were always joined together, as were those expressing disagreement with each statement (i.e., ‘partially disagree’ and ‘strongly disagree’), in order to assess consensus among binary replies. A statement was considered to have reached consensus if the level of agreement reached a pre-defined threshold, i.e., 67% or higher of the total panel. This threshold aligns with established methodological recommendations and is commonly used in Delphi studies in research areas characterized by rapidly evolving clinical evidence [14, 15, 17]. While a 67% threshold represents a moderate level of consensus, such a selection allows identification of reasonable agreement while maintaining sensitivity to divergent opinions. Statements that did not meet this threshold, or showed significant polarization in responses, were flagged as areas of non-consensus or persistent uncertainty. In this manuscript, we report as “borderline consensus” a consensus achieved by 66.7% to < 80.0% of the panelists, “high consensus” a consensus achieved by 80.0% to 99.9% of the panelists, and “full consensus” when unanimous agreement emerged among all panelists. The proportion of ‘strongly agree’ and ‘partially agree’ responses was taken into account as a secondary indicator of consensus strength, mainly for items achieving full consensus.

Statistical analysis involved descriptive statistics (frequency distribution and percentages) to summarize the opinions of experts. For those items that did not achieve consensus threshold, stratified analyses were also performed in order to examine whether the different specialization of the experts (i.e., cardiologist vs. endocrinologist/internist) had a role in the polarization of responses.

Ethics

This study is a survey of expert clinicians providing insights based on their specialized knowledge and professional perspectives, with no collection of sensitive data and no involvement of any patient in the study. The study does not fall among those requiring ethical approval in Italy (AIFA Determination: 8th August 2024, <https://www.gazzettaufficiale.it/eli/id/2024/08/20/24A04320/sg>; 20th March 2008, <https://www.gazzettaufficiale.it/eli/id/2008/03/31/08A02109/sg>). Prior to commencing the survey, all panellists received electronic notification of the research objectives through

both a contact email and in a preliminary page of the electronic questionnaire.

Results

Patients with obesity managed and/or treated by each panelist in the year before the Delphi study were more than 300 for 47% of panelists, between 101 and 300 for 33% of panelists and between 51 and 100 for 20% of panelists. During the year preceding the interview, panelists reported to have managed with a prescription of novel pharmacological treatments for obesity a median of 150 patients (range: 15–578).

Thematic area #1: Characteristics of patients in the clinical practice and awareness of obesity-related risks in Italy

Panelists reported that, on average, about one-quarter (24%) of their patients had a history of excess body weight since the pediatric age and another quarter (25%) since more than 10 years. The typical patient managed was, for 93% of panelists (high consensus), a subject with overweight/obesity with concomitant CV risk factors. All experts agreed that their typical patient with excess body weight reported at least one failure in behavioral change (diet, physical activity, lifestyle).

During the first round of Delphi, four statements were focused on the evaluation of the CV risk during an outpatient visit, according to the degree of overweight/obesity of the patient. Thus, 80% of panelists strongly agreed and the other 20% partially agreed (full consensus) that CV risk should be systematically assessed during a visit in a patient with BMI 27–<30 kg/m², and 100% of panelists (full consensus) strongly agreed in case of patients with BMI 30–<35, 35–<40 or ≥ 40 kg/m². When we proposed a statement - based on the findings of the EASO consensus [5] - that increased BMI alone is not sufficient to quantify the risk of weight-related diseases, and that abdominal fat accumulation is a more reliable indicator of risk, 93% of panelists agreed (high consensus; 86% strongly agreed).

No agreement, on the other hand, could be reached among panelists when we posed three statements on the supposed awareness of obesity-related risks in Italian clinicians. 62% of experts (60% of cardiologists and 63% of endocrinologists/internists) supported a statement that, in the current community of Italian clinicians, there is adequate awareness on the role of obesity as a CV risk factor, 36% (50% of cardiologists and 25% of endocrinologists/internists) that there is adequate awareness on the role of overweight (BMI 27–<30 kg/m²) combined with a weight-related comorbidity as a CV risk factor. No agreement emerged not even

by stratifying the replies according to the specialty of the panelists. Further, 58% of panelists supported a statement that there is adequate awareness on the direct association between obesity and early mortality. This statement achieved high consensus among cardiologists (80% agreement), and no consensus among endocrinologists/internists (43% agreement).

Thematic area #2: Behavioral change and overweight/obesity control

A definition of resistance to behavioral change in adult patients with excess body weight was agreed as a “lack of clinically significant weight loss and/or low adherence to nutritional and physical activity advice” (high consensus, 86% agreement).

In the first round of Delphi, the same set of questions/statements was replicated twice to the panelists, once referring to patients with obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$) and once referring to those overweight ($\text{BMI} 27 < 30 \text{ kg/m}^2$) with at least one weight-related comorbidity. With reference to the evaluations to be performed by the clinician before starting any pharmacological treatment, experts agreed that - for both conditions (i.e., obesity; overweight plus one or more weight-related comorbidities) – patient-reported information on previous attempts to lose weight is sufficient to proceed with treatment (high consensus, 90% and 91% agreement, respectively, for patients with obesity and those overweight plus one or more weight-related comorbidities), even in the absence of earlier specialist visits for weight control.

Most experts agreed that less than one-fourth of patients with obesity (high consensus, 87% agreement) and less than half of patients with overweight (high consensus, 93% agreement) are capable of achieving a behavioral change (in diet, physical activity, etc.). When we asked for potentially relevant patient characteristics facilitating engagement in a period of behavioral change (with active patient monitoring) to decrease body weight before starting any pharmacological treatment, no specific factor emerged. In contrast, panelists agreed that sex, education and geographic area are not at all relevant for this aim in patients with obesity (with agreement levels ranging between 67% and 93%, i.e., borderline to high consensus) nor in those overweight with one or more weight-related comorbidities (with agreement levels ranging between 80% and 93%, i.e., high consensus).

Full consensus (100% agreement) emerged that early control of body weight in patients with obesity may exert a favorable long-term effect on CV risk (80% strongly agreed, 20% partially agreed) and may decrease the risk of early mortality (67% strongly agreed, 33% partially agreed). Exactly the same results were reported for early control of body weight in patients with overweight and at least one weight-related comorbidity (Fig. 1). The last question was focused on the minimum percent reduction in body weight required to prevent CV events. During the first round, there was borderline consensus (67% agreement) between panelists that, in patients with obesity, the target should be a 15% body weight reduction. For the same question for patients with overweight and at least one weight-related comorbidity, since no agreement was reached during the first round, in the second iteration we proposed the following question: “Do you agree that a 10% to 15% weight loss is required

In your opinion, an early control of body weight in an adult patient may determine a:

	Long-term protective effect from CV risk		Reduction in the risk of early mortality	
Patients with obesity	Frequency distribution	%	Frequency distribution	%
Strongly agree	12	80%	10	67%
Partially agree	3	20%	5	33%
Partially disagree	0	0%	0	0%
Strongly disagree	0	0%	0	0%
TOTAL	15	100%	15	100%

Patients with overweight* and ≥ 1 weight-related comorbidity	Frequency distribution	%	Frequency distribution	%
Strongly agree	12	80%	10	67%
Partially agree	3	20%	5	33%
Partially disagree	0	0%	0	0%
Strongly disagree	0	0%	0	0%
TOTAL	15	100%	15	100%

Fig. 1 Level of agreement in the questions on early control of excess body weight, with separate reference to patients with obesity and those with overweight and one or more weight-related comorbidities. *

Patients with overweight were defined as those with body mass index of 27 to $< 30 \text{ kg/m}^2$. CV: cardiovascular

during the first year to observe an effect in the prevention of CV events in patients with BMI $27 < 30 \text{ kg/m}^2$ with at least one weight-related comorbidity?”, that achieved full consensus by the experts (100% agreement; 43% strongly and 57% partially agreed).

Thematic area #3: Pharmacological treatment of overweight/obesity

As in the previous section, the same questions/statements were repeated in patients with obesity (BMI $\geq 30 \text{ kg/m}^2$) and with overweight (BMI $27 < 30 \text{ kg/m}^2$) and at least one weight-related comorbidity.

Recommendations from the recent Italian Society of Obesity (SIO) Guidelines [18] to combine a pharmacologic treatment to clinico-nutritional therapy in selected patient subgroups were presented to the panelists in the Delphi survey. Almost all panelists reported that their everyday clinical practice was “adequately” or “strongly” aligned with the new Guidelines recommendations for all patient subgroups evaluated (Fig. 2). Specifically, for patients with BMI $27 < 30 \text{ kg/m}^2$ and obesity-related complications/comorbidities (Guidelines recommendation: conditional, based on low-quality evidence), 50% of panelists reported a strong and 50% an adequate alignment (full consensus). For patients with BMI $30 < 35 \text{ kg/m}^2$ (Guidelines recommendation: strong, based on moderate-quality evidence), 86% of panelists reported a strong and 14% an adequate alignment (full consensus). For patients with BMI $35 < 40 \text{ kg/m}^2$ (Guidelines recommendation: strong, based on moderate-quality evidence), 100% of panelists reported a strong alignment (full consensus). For patients with BMI $\geq 40 \text{ kg/m}^2$ (Guidelines recommendation: strong, based on moderate-quality evidence), 57% of panelists reported a strong, 36% an adequate, and 7% a modest alignment (high consensus).

In case pharmacological treatment is deemed appropriate, novel agents are most frequently chosen by experts both in patients with obesity (full consensus, 100% agreement) and in patients with overweight plus one or more weight-related comorbidities (high consensus, 93% agreement). A statement that “early treatment with novel pharmacological treatments in an adult patient with obesity can decrease substantially the risk of CV events” achieved full consensus of experts (100% agreement, 73% strongly and 27% partially agreed). The corresponding statement with reference to patients with overweight and at least one weight-related comorbidity was agreed by all experts, too (full consensus). Further, considering novel pharmacological agents, full consensus was achieved on a major positive impact on CV risk of early as compared to late treatment (100% agreement both in patients with obesity and overweight plus one or more weight-related comorbidities), and on the adoption

of a standard of care based on early treatment with novel agents in: (i) patients with obesity, independently of the number/severity of comorbidities (62% strongly agreed; 38% partially agreed); (ii) patients with obesity and high CV risk, in the absence of earlier CV events (85% strongly agreed; 15% partially agreed); (iii) patients with obesity and history of CV events (93% strongly agreed; 7% partially agreed); (iv) overweight (BMI $27 < 30 \text{ kg/m}^2$) patients with one weight-related comorbidity (46% strongly agreed; 54% partially agreed); (v) overweight (BMI $27 < 30 \text{ kg/m}^2$) patients with two or more weight-related comorbidities (64% strongly agreed; 36% partially agreed); (vi) overweight (BMI $27 < 30 \text{ kg/m}^2$) patients with high CV risk (79% strongly agreed; 21% partially agreed).

All experts (full consensus) also agreed that, if CV risk is increased, it is recommended to start treatment using a novel pharmacological agent, both in patients with obesity (86% strongly agreed; 14% partially agreed) and in those overweight with one or more weight-related comorbidities (80% strongly agreed; 20% partially agreed). During the second round, all experts (full consensus) reported that novel agents should “always” or “often” be considered in high-risk CV patients, in both settings. An agreement emerged that treatment should start in parallel to (rather than after failure of) changes in lifestyle habits, both in patients with obesity (high consensus, 93% agreement) and in those overweight with one or more weight-related comorbidities (borderline consensus, 71% agreement). Clinicians also agreed that treatment with novel pharmacological agents should start immediately in patients with obesity, independently of CV risk (borderline consensus, 71% agreement). With reference to the same item in patients who are overweight with one or more weight-related comorbidities, no overall agreement could be reached over two rounds. More specifically, in the final round, 64% of panelists supported early treatment with novel pharmacological agents in this patient setting only when CV risk is high, and 36% voted in favor of early treatment independently of CV risk. In stratified analyses according to the specialty of experts, 80% of cardiologists (high consensus, limited to the subgroup analysis) agreed that immediate treatment in patients with overweight and one or more weight-related comorbidities should be restricted to patients at high CV risk, whereas no consensus was found among endocrinologists/internists (56% voted for early treatment restricted to patients at high CV risk, 44% to all patients).

Two questions were focused on metabolic memory. Its role in the management of obesity and in the prevention of CV risk was agreed by all panelists (full consensus; evaluated as “key role” for 33% and “relevant role” for 67% of them). Similarly, there was full consensus in favor of an early treatment with effective pharmacological

Fig. 2 Alignment with recommendations from the recent Italian Society of Obesity (SIO) Guidelines [18] according to different subgroups of patients with overweight/obesity. *Patients with overweight were defined as those with body mass index of 27 to < 30 kg/m²

To what extent do you find that SIO recommendation to combine drug therapy with medical nutrition therapy are aligned to your clinical practice, in the following subgroups of patients?

A) Patients with overweight* and ≥ 1 weight-related comorbidity (conditional recommendation, based on low-quality evidence)	Frequency distribution	%	Combined frequency	%
Strongly aligned	7	50%	14	100%
Adequately aligned	7	50%		
Modestly aligned	0	0%	0	0%
Not at all aligned	0	0%		
TOTAL	14	100%	14	100%

B) Patients with GRADE I obesity (strong recommendation, based on moderate-quality evidence)	Frequency distribution	%	Combined frequency	%
Strongly aligned	12	86%	14	100%
Adequately aligned	2	14%		
Modestly aligned	0	0%	0	0%
Not at all aligned	0	0%		
TOTAL	14	100%	14	100%

C) Patients with GRADE II obesity (strong recommendation, based on moderate-quality evidence)	Frequency distribution	%	Combined frequency	%
Strongly aligned	14	100%	14	100%
Adequately aligned	0	0%		
Modestly aligned	0	0%	0	0%
Not at all aligned	0	0%		
TOTAL	14	100%	14	100%

D) Patients with GRADE III obesity (strong recommendation, based on moderate-quality evidence)	Frequency distribution	%	Combined frequency	%
Strongly aligned	8	57%	13	93%
Adequately aligned	5	36%		
Modestly aligned	1	7%	1	7%
Not at all aligned	0	0%		
TOTAL	14	100%	14	100%

Table 1 Level of agreement on major endpoints to evaluate the effectiveness of novel pharmacological therapies for weight reduction in adults with excess body weight

Endpoint	Delphi round	% agreed (total)	% strongly agreed	% partially agreed
1) Decrease % in body weight	1	100%	33%	67%
2) Decrease in BMI	1	100%	38%	62%
3) Decrease in abdominal fat accumulation	1	100%	73%	27%
4) Decrease in overall CV risk	1	100%	67%	33%
5) Improvement in metabolic parameters	1	100%	83%	17%
6) Improvement or resolution in weight-related comorbidities	1	100%	73%	27%
7) Improvement in QoL and psychological status of patients	1	100%	53%	47%
8) Maintenance of decreased body weight over time	1	100%	67%	33%
9) Improvement in body composition (fat mass vs. lean mass)	1	100%	36%	64%
10) Improvement in physical functioning	1	100%	53%	47%

BMI: body mass index; CV: cardiovascular; QoL: quality of life

agents to avoid the negative impact of metabolic memory (100% agreement, “key” for 53% and “relevant” for 47% of experts).

Thematic area #4: New drugs for overweight/obesity management

This section examined the main endpoints to evaluate the impact of novel pharmacological treatments, their main benefits and barriers to their use in clinical practice.

Full consensus (100% agreement) was achieved in the first round on several endpoints that were consistently considered important in order to evaluate the effectiveness of novel therapies for weight loss in adults with overweight/obesity (Table 1), including (i) decrease % in body weight (33% strongly agreed; 67% partially agreed); (ii) decrease in BMI (38% strongly agreed; 62% partially agreed); (iii) decrease in abdominal fat accumulation (73% strongly agreed; 27% partially agreed); (iv) decrease in overall CV risk (67% strongly agreed; 33% partially agreed); (v) improvement in metabolic parameters such as glycemia, lipids and blood pressure (83% strongly agreed; 17% partially agreed); (vi) improvement or resolution in weight-related comorbidities such as type 2 diabetes, obstructive sleep apnea, etc. (73% strongly agreed; 27% partially agreed); (vii) improvement in quality of life and psychological status of patients (53% strongly agreed; 47% partially agreed); (viii) maintenance of decreased body weight over time (67%

strongly agreed; 33% partially agreed); (ix) improvement in body composition, with reference to fat vs. lean mass (36% strongly agreed; 64% partially agreed); (x) improvement in physical functioning (53% strongly agreed; 47% partially agreed).

After the results of an exploratory multiple-choice question included in Round 1, during the second round we proposed a statement that “Besides rapid and significant weight loss, one of the main benefits of novel pharmacological treatments is an improved control of metabolic parameters (i.e., glycemia, blood pressure, lipids)”, and all panelists strongly agreed (full consensus, 100% agreement) with it. The most frequently cited barrier to the use of novel pharmacological treatments was the high cost of therapy to bear by the patients (high consensus, 87% agreement, Round 1).

Discussion

This modified Delphi study reported a broad convergence of expert opinion on many aspects of weight management considered, with a substantial proportion of statements achieving a high or full consensus among panelists. Several key points reflecting expert perspectives emerged regarding the management of excess body weight, not only for patients with obesity, but also for those with overweight and weight-related comorbidities. These include the expert-supported importance of considering metabolic parameters, CV risk factors and CV risk overall alongside reducing body weight; the perceived need to explore alternative, potentially more reliable, indicators of body weight (and related CV risk) beyond BMI; and the expert consensus regarding the clinical potential of early treatment and prompt control of overweight/obesity through effective pharmacological agents.

The comprehensive management of both overweight and obesity, necessitating a multi-dimensional approach, was a consistent expert consensus finding of this Delphi study. In particular, in the evaluation of the effectiveness of new treatments, our panelists agreed on the relevance of endpoints such as improving metabolic parameters (83%) and reducing overall CV risk (although in this case an agreement was borderline, 67%), rather than decreasing body weight (33%) and BMI (38%). Clinical trials focused on body weight loss through lifestyle intervention have generally failed to demonstrate a decrease in major adverse CV events (MACE) and CV mortality [19, 20], and it is increasingly recognized that effective interventions require modifying critical metabolic parameters and CV risk factors, such as glycemic level, insulin sensitivity, dyslipidemia and hypertension, besides reducing body weight/BMI [21]. The combined modulation of multiple factors through appropriate treatment strategies, also according to the specific obesity phenotype [22], is of

paramount importance to modify the drivers of CV disease and thus prevent CV complications and early mortality, as was shown in a randomized trial of patients with type 2 diabetes [23].

All panelists converged on a major role of early control of excess body weight on CV risk and mortality. Further, an important perspective emerging in this Delphi study is the shared view on the potential benefit of early therapeutic intervention using effective, novel pharmacological agents in the comprehensive management of excess body weight. This was agreed by the experts for both patients with overweight/comorbidities and with obesity. A proactive, prompt treatment strategy is central to prevent the establishment of inherent (and sometimes irreversible) adiposity-related comorbidities as well as the long-term, unfavorable effects associated with the metabolic memory [24–26]. Modern medications, particularly GLP-1 and dual GLP-1/GIP receptor agonists, facilitate clinically meaningful weight loss and also provide significant direct metabolic benefits, as evidenced by large RCTs demonstrating reduced rates of MACE [27–31]. Further, the use of these novel agents may decrease the need for other medications targeting metabolic parameters and CV risk factors, simplify the treatment scheme and increase adherence. Still, these and other approaches to the treatment of excess body weight remain largely underused [1], particularly in the early phases of disease when their relevance may be paramount to prevent the progression of obesity and its associated complications [11]. Our qualitative results based on expert opinion complement the existing body of evidence by providing additional guidance on the potential early integration of novel and effective pharmacological agents in the treatment algorithm for patients with overweight or obesity and at increased CV risk.

An additional, relevant indication emerging from this study is the consensus on the potential benefit of moving beyond the simplistic use of the BMI classification and of taking into account other key indicators, i.e., abdominal fat accumulation and other markers of adverse health outcomes and CV risk. This is consistent with a scientific statement from the American Heart Association [19] and with the distinct inflammatory and endocrine activity of visceral fat compared to subcutaneous fat [32]. Therefore, in order to meaningfully assess the effect of weight management interventions, facilitate earlier identification of high-risk phenotypes and adequately estimate long-term CV risk of patients, our panel supported the implementation of increasingly reliable indicators in routine clinical practice.

The limitations of this Delphi survey reflect those commonly associated with consensus-based methodologies (Jandhyala 2020). Our findings reflect the opinions of experts rather than evidence-based data, and thus exhibit a

low level of evidence. The generalizability of our findings may be limited by specific factors linked to the composition of the panel. First, the consensus study was conducted exclusively within Italy, and a few specific items referred to Italian Guidelines for the management of obesity [18]. Although most topics discussed were broad and not specific to a national context, our results are, therefore, chiefly relevant to the Italian framework. Second, panel size was relatively small, with 15 experts participating in the first and 14 in the second round. Third, considering that the inclusion criterion required experience with novel pharmacological treatments for obesity during the previous 12 months, the risk of selection bias is high. This criterion involved clinicians already familiar with, and possibly favorable toward, newer obesity medical medications, and may thus partly explain the strong consensus observed for several statements concerning early pharmacological treatment. Therefore, caution is needed when generalizing our findings to the national and particularly to the international clinical setting. The consensus threshold that was chosen a priori, i.e., 66.7% [14, 15], is relatively permissive, also considering the limited size of the panel [17]. To try to overcome this issue, we reported agreement results using three different levels, i.e., borderline, high and full consensus. Other potential limitations are: (i) the lack of involvement of patients or patient representatives in the Delphi study; and (ii) the limited representation of other key professionals involved in obesity care, such as dietitians, psychologists, bariatric surgeons, and general practitioners. For a few topics considered, including perception of the awareness of obesity-related risks in the national clinical community and the target population of early treatment with novel pharmacological agents in patients with overweight plus comorbidities (i.e., all patients or only those at high CV risk), an overall agreement could not be reached. This lack of consensus highlights that: (i) from a methodological point of view, the sensitivity of our Delphi process was adequate enough to capture the heterogeneity of clinical opinions without necessarily forcing a consensus; (ii) from a clinical point of view, both the awareness of the risks of obesity and the timing for starting treatment with novel therapies are still evolving topics – with limited evidence-based data – in the ongoing clinical debate. When we stratified the responses according to the specialization of panelists, however, for selected items an agreement emerged within expert subgroups. This observation may indicate the need for collaborative contributions of endocrinologists and cardiologists on their specific clinical aspects (i.e., a multidisciplinary approach) to improve patient management.

In conclusion, this Delphi study gathered expert information on the management of adult patients with overweight and obesity for which quantitative data are still relatively

infrequent. A selected panel of Italian experts participating to this study expressed broad agreement on the perceived importance of a number of relevant, currently debated management aspects, with particular focus on early, integrated treatment and on the potential role of novel pharmacological agents, aimed not only at reducing body weight but also at favourably modulating metabolic and CV correlates.

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Declarations

Competing Interests V.G.: Eli Lilly, Novo Nordisk. C.G.: Eli Lilly (participation in advisory board). N.Co.: Alnaly, Astra Zeneca, Aurora Biopharma, Bayer, Boehringer Ingelheim, Eli Lilly, Pfizer. L.D.G.: Eli Lilly, Roche Diabetes Care, MOVI SpA, Sanofi, Theras (honoraria); Abbott, Eli Lilly, Novo Nordisk, Sanofi (support for attending meetings or travels); Eli Lilly, Sanofi (participation on Advisory Boards). M.M.: Lilly Italia, Novo Nordisk, Astra Zeneca (travel grant and honoraria). S.M.: Eli Lilly, Novo Nordisk, Regeneron. G.R.: Eli Lilly, Bruno Farmaceutici, Astra Zeneca. U.P.: Advisory Board: Novo Nordisk, Boehringer Ingelheim, Lilly Italia; Speaker fee: Novo Nordisk, Astra Zeneca, Bruno Farmaceutici, Rhythm Pharma, International Medical Press, Lilly Italia, Merck; Unrestricted grant: Novo Nordisk; Editor in Chief of the Journal of Endocrinological Investigation. P.S.: serves/ed on scientific advisory boards and received honoraria or consulting fees from Boehringer Ingelheim, Chiesi, Eli Lilly, Novo Nordisk, Roche and Theras. Other authors have no competing interests to declare that are relevant to the content of this article.

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