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Multidisciplinary consensus on the management of patients with osteopenia and fracture risk in Spain

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Abstract

Background In Spain, over 3.5 million individuals are diagnosed with osteoporosis, while an even greater number are affected by osteopenia, the precursor stage of this severe condition. Unfortunately, osteoporosis and osteopenia frequently remain undetected until a fracture occurs, potentially resulting in permanent damage or even death.

Methods To improve the management of osteopenia, a multidisciplinary task force was established, consisting of 45 experts, including patients, doctors, nurses, pharmacists, and managers from 20 scientific organisations related to this pathology. With the scientific endorsement of the Spanish Society of Healthcare Quality (SECA) and using the Delphi qualitative research method. Although there was consistent agreement across the 75 variables analysed, a clear and consolidated consensus was reached on 56 of them (75%) after two rounds of consultation.

Results This agreement encompassed 13 variables related to general considerations, 10 of the 18 concerning diagnosis (55%), and 33 of the 44 regarding treatment (75%). Consistent agreement was reached on all issues consulted, strong consensus (≥ 80% agreement) was achieved for 50/57 variables (88%). Key recommendations highlight the importance of lifestyle modifications for people with osteopenia, including proper nutrition, fall prevention, regular physical exercise, weight control, smoking cessation, and alcohol consumption control.

Conclusions The study concludes that the current clinical management focuses excessively on the diagnosis of osteoporosis, neglecting previous stages of low bone mineral density, such as osteopenia, bone quality, and bone tissue structure. There is limited monitoring of risk factors such as previous fractures, despite their severe consequences. Therefore, a set of general recommendations related to diagnosis and treatment is proposed to improve the management of patients with this condition.

Keywords Osteopenia, Osteoporosis, Fragility fractures, Patients, Multidisciplinary, Delphi consensus

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Background

The skeletal system undergoes continuous remodelling throughout life. During growth and adolescence, bone formation exceeds bone resorption, resulting in increased bone mass. However, this process slows after age 20, with peak bone density typically reached between the ages of 30 and 35. The magnitude of this"peak bone mass"is a critical determinant of bone health later in life, as bone density naturally declines with age. This decline is particularly pronounced in women after menopause, whether natural or induced and progresses more rapidly than in men [1, 2].

Osteoporosis is a bone disease that develops when bone mineral density (BMD) and bone mass decrease, or when the quality or structure of bone changes. This can lead to a decrease in bone strength, which increases the risk of broken bones (fractures) [3]. Risk factors for osteoporosis are both non-modifiable—such as age, gender, and family history—and modifiable, including nutrition, physical activity, and lifestyle habits. In Spain, over 3.5 million individuals have been diagnosed with osteoporosis, but in many more people Dual-energy X-ray absorptiometry (DXA) indicates osteopenia, the preliminary phase of osteoporosis [4]. The Spanish Ministry of Health estimates that approximately 30% of people over 65 suffer a fall annually, increasing to 50% in those over 80, often resulting in fragility fractures. These fractures have substantial consequences: 20–30% of patients die within a year after a hip fracture, and only 40% recover their previous quality of life [5].

Osteopenia is densitometrically defined as a decrease in BMD below average reference values but not severe enough to meet the criteria for osteoporosis [6]. Osteopenia is a descriptive category signifying increased fracture risk compared to normal BMD, but it is not an inevitable precursor to osteoporosis. According to the World Health Organization (WHO), osteopenia is classified as a BMD T-score between −1.0 and −2.5, while osteoporosis is diagnosed when the T-score falls to −2.5 or below. Although osteopenia represents only a modest decline in BMD, even a decrease of one standard deviation in BMD doubles the risk of fracture. In fact, at least 40% of fragility fractures occur in patients who have BMD values in the osteopenic range [7–11]. This highlights the importance of monitoring bone health.

DXA is the gold standard for measuring BMD and diagnosing osteoporosis. It is well established that traditional DXA does not provide an assessment of the quality of bone material or the structural integrity of bone tissue. Furthermore, the presence of normal BMD values does not preclude the risk of osteoporosis and fragility fractures. Its limited sensitivity means that these fractures often occur in individuals who do not meet the diagnostic criteria for osteoporosis based solely on BMD values [12–15]. While the WHO diagnostic criteria for osteoporosis is based exclusively on T-score thresholds obtained from DXA, it is increasingly recognised that fragility fractures frequently occur in patients whose BMD falls within the osteopenic range. In response, several international jurisdictions have broadened the diagnostic approach by integrating additional tools such as the Fracture Risk Assessment Tool (FRAX), which combines BMD with clinical risk factors, as well as complementary imaging methods like the Trabecular Bone Score (TBS), Quantitative Computed Tomography (QCT), 3-Dimensional DXA, and even biochemical markers of bone turnover (e.g., CTX and PINP) [11]. However, international guidelines (e.g., ACP, NOF, ESCEO, NOGG) emphasise that clinical management decisions should be based on an individual's absolute fracture risk [16]. This consensus adapts these principles to Spain's unique healthcare context, and, more importantly, aims to put them into practice by involving a large number of scientific societies that routinely participate in the approach.

Bone strength and fracture risk are influenced by a range of factors, including structural aspects (e.g., shape, cortical thickness, and surrounding muscle), functional factors (e.g., stress exposure), and the quality of both organic (collagen density) and inorganic (mineralisation) matrices. While mineralisation is a key determinant of BMD, it is only one of many factors influencing bone strength [2].

The risk of osteopenia and osteoporosis is associated with numerous factors, including age, gender, early menopause (natural or induced), previous fractures, low body mass index (BMI) 19, sedentary lifestyle, inadequate calcium intake, vitamin D deficiency, smoking, and excessive alcohol consumption [15]. Certain medical conditions, such as cancer, rheumatoid arthritis, diabetes and hyperthyroidism, as well as long-term use of treatments like glucocorticoids and aromatase inhibitors, commonly used in postmenopausal women with hormone receptor-positive breast cancer, increase the risk of osteoporosis and osteopenia [17]. That is why, in this consensus, while we primarily adopt the WHO-based criteria, we emphasise the importance of also considering these additional assessment methods to identify patients at high risk (even if their T-scores fall in the osteopenic range) and to tailor clinical management strategies better.

Pharmacological treatments are widely accepted for individuals diagnosed with osteoporosis or with a history of fragility fractures. Still, there is ongoing debate regarding their use for those with osteopenia who face elevated fracture risk due to low BMD. For instance, the National Osteoporosis Risk Assessment (NORA) study, which involved 149,524 postmenopausal women, revealed that 82% of fragility fractures occurred in those with a T-score above −2.5 [8]. Similarly, a prospective study of

individuals aged 55 and older revealed that 44% of non-vertebral fractures occurred in those with a T-score above −2.5 (osteopenic range) [9].

Low BMD is often asymptomatic in its early stages, resulting in delayed diagnosis until a fracture occurs. Once this happens, patients usually experience chronic pain, restricted mobility, reduced quality of life, and increased mental health challenges, such as anxiety [18].

Recognising and understanding osteoporosis and osteopenia early on is important for promoting self-care, slowing the progression of the disease, and improving quality of life. This proactive approach is key to effectively managing patients and reducing the risk of fractures from osteopenia, especially if other risk factors are present. Thus, patient self-responsibility and engagement are essential to improving individual health outcomes and easing the burden on healthcare systems.

The primary aim of this Delphi process was to establish agreement among musculoskeletal health patient organisations, scientific societies, and healthcare professionals to promote the early diagnosis and treatment of osteopenia and the presence of risk factors for fragility fractures. With this in mind, this multidisciplinary consensus targets those patients with osteopenia, who have additional risk factors such as a history of falls, low BMI, suboptimal nutrition, or other predisposing conditions, even before the occurrence of a fragility fracture. By shifting the clinical focus toward early identification and proactive management at this intermediary stage, the recommendations aim to slow progression and ultimately prevent the debilitating outcomes associated with full-blown osteoporosis.

Secondary objectives included evaluating modifiable and non-modifiable risk factors, reaching a consensus on pharmacological and non-pharmacological interventions, and placing patients at the centre of care. Non-pharmacological interventions emphasised in the consensus include adequate nutrition, fall prevention, regular physical exercise, weight management, tobacco and alcohol cessation.

This consensus seeks to improve outcomes for individuals with osteopenia by prioritising early diagnosis, encouraging patient self-care, and adopting a comprehensive treatment approach. The ultimate goal is to prevent fragility fractures and improve quality of life.

Methodology

This study was led by the Osteoarthritis Foundation International (OAFI) in partnership with the Spanish Association for Osteoporosis and Osteoarthritis (AECOSAR). Both patient organisations are independent, non-profit entities dedicated to musculoskeletal health, patient advocacy, research and collaboration with administrations, scientific societies, and healthcare professionals at multiple levels.

The study was based on the hypothesis that current clinical practices disproportionately focus on diagnosing osteoporosis, often overlooking osteopenia as an intermediate stage, thereby delaying both diagnosis and treatment until the occurrence of a fragility fracture. The central research question for this Delphi consensus study, framed using the PICO method, was: *Is it advisable to promote early diagnosis to identify individuals at risk for osteoporosis and fracture for timely intervention, even at the intermediate osteopenia stage?*

Study design and participants

This study was conducted and monitored by OAFI from April to September 2024.

On April 5, 2024, relevant scientific and medical Spanish societies received electronic invitations to participate. OAFI, as the promoting organisation, invited 20 national scientific societies, each of which was requested to nominate experts with a range of 1–4 in some cases, based on their demonstrated expertise and experience in bone health. Additionally, expert patients from OAFI and AECOSAR were invited. These bone health professionals and expert patients constituted the multidisciplinary Task Force.

Consequently, the geographical distribution of the Task Force reflects the expertise available through these organizations rather than serving as a representative sample of the population in each autonomous community in Spain.

The joint participation of expert patients and experienced healthcare professionals allows for integrating lived expertise with clinical and scientific knowledge. All participants were selected by their respective organisations based on proven expertise, ensuring the strength and representativeness of the consensus reached.

Data confidentiality and ethical considerations

All data collection and handling adhered to the European General Data Protection Regulation (GDPR) (Regulation 2016/679) and the Spanish Organic Law 3/2018 on Personal Data Protection and Digital Rights. Data were used exclusively for this study's objectives, and confidentiality was rigorously maintained.

Variable selection process

A preliminary scoping review was conducted to identify relevant patient-centred aspects of osteopenia and osteoporosis management using PubMed, the Cochrane Library, Google Scholar, and scientific society websites. It is important to note that this literature review was not performed with rigorous systematic methods; rather, it aimed to capture key topics raised in the published

literature and by the experience of the expert patients involved with OAFI and AECOSAR. This input generated an initial list of 50 variables and was distributed electronically to the Task Force members. The variables were organised into three categories: general information, diagnosis, and treatment.

The multidisciplinary Task Force provided additional suggestions during the two-week review. This collaborative process resulted in the inclusion of 25 new variables, bringing the total to 75 (Additional file 1). The updated list was shared in a videoconference with all Task Force members, where the wording of the statements was reviewed and ratified, the study methodology and the final list of 75 variables were revised and agreed upon.

This iterative expansion reflects the strength of combining patient experience with expert opinion rather than a limitation in our search strategy.

Delphi process

The Delphi process was conducted in two rounds to assess the degree of consensus. The first round of the process followed on June 5, 2024, when the questionnaire containing the variables was distributed to all Task Force members. This questionnaire was designed as a secure, protected, self-monitoring Microsoft Excel file compatible with multiple operating systems. Participants rated each variable on a 1–9 Likert scale, based on the RAND/UCLA methodology, where 1–3 indicated disagreement, 7–9 agreement, and scores between 4–6 were considered undefined. The responses from this round were analysed, and the second round began on June 24, 2024, with the distribution of a revised questionnaire. This version included the median (M) and interquartile range (IQR) from the first round's responses to provide participants with aggregated feedback. Participants were encouraged to re-evaluate their responses anonymously based on this additional information. The second round concluded on July 20, 2024, and an initial draft of the study report was subsequently shared with participants on September 11, 2024, for review.

Data analysis

The statistical analysis was conducted using Microsoft Excel 2012, focusing on several key parameters to evaluate and interpret the responses to the Delphi process variables. Central tendency metrics, including the M, mode (mo) and mean (m), were calculated for each variable. In addition, dispersion and variability metrics were analysed to assess the consistency of responses among participants. The standard deviation (SD), the IQR and the coefficient of variation (CV) were calculated to provide a multi-faceted view of response distribution and agreement levels. Variability levels of the CV were classified into four categories: very low ($CV \leq 0.1$ (10%)), relatively low (CV 0.11–0.25 (11%–25%)), relatively high (CV 0.26–0.5 (26%–50%)) and very high ($CV > 0.5$ (50%)).

Consensus criteria

Two primary criteria defined consensus. First, consistency of responses was considered, with consensus being achieved if the median fell within the range of 7–9 (indicating agreement) or 1–3 (indicating disagreement). Medians 4, 5, or 6 were considered inconclusive, representing a neutral or undefined position. Second, response cohesion was evaluated using variability indicators. The SD, IQR, and CV values had to be as low as possible to confirm the agreement. Specifically, thresholds were set at $IQR \leq 1.00$, $SD \leq 1.00$, and $CV \leq 0.25$. An agreement was deemed to be consolidated only when all three criteria—consistency of responses and low variability—were simultaneously met (Fig. 1).

Results

A total of 50 experts were registered for the Delphi process, with 45 completing both rounds and forming the multidisciplinary Task Force. Among these participants, eight were representatives from two patient organisations (OAFI and AECOSAR), while 37 came from 20 professional and scientific societies (Table 1). These organisations include groups focused on family and community medicine, healthcare quality, geriatrics, endocrinology, pharmacy, gynaecology, pain management, and more. The representatives included 23 physicians, eight pharmacists, five nurses, and one healthcare manager.

The average age of participants in the Task Force was 53.87 years (SD = 13.03), and the average experience was 24.70 years (SD = 12.99), based on years of practice for professionals or years since diagnosis for patient representatives. One participant was from outside Spain, while the remaining 44 were from 11 of Spain's 17 autonomous communities. The most significant representation came from the Community of Madrid (20 participants), followed by Catalonia (6 participants), Andalusia, Castilla-La Mancha, and the Valencian Community (4 participants each), with one participant from Aragón, Cantabria, Castilla y León, Extremadura, Galicia, and the Basque Country.

As described in the methods sections, 50 variables were initially sent to the Task Force members, and 25 new variables were suggested by the members and included in the final version, for a total 75 variables.

Following the first round of the Delphi process, all variables yielded median scores greater than 7, indicating a consistent agreement among participants. Only 9 out of the 75 variables showed an $IQR \geq 2$ (12%). This number was reduced to 8 variables in the second round with an $IQR \geq 2$ (11%). Despite some variability in the second round, all 75 variables consistently showed agreement

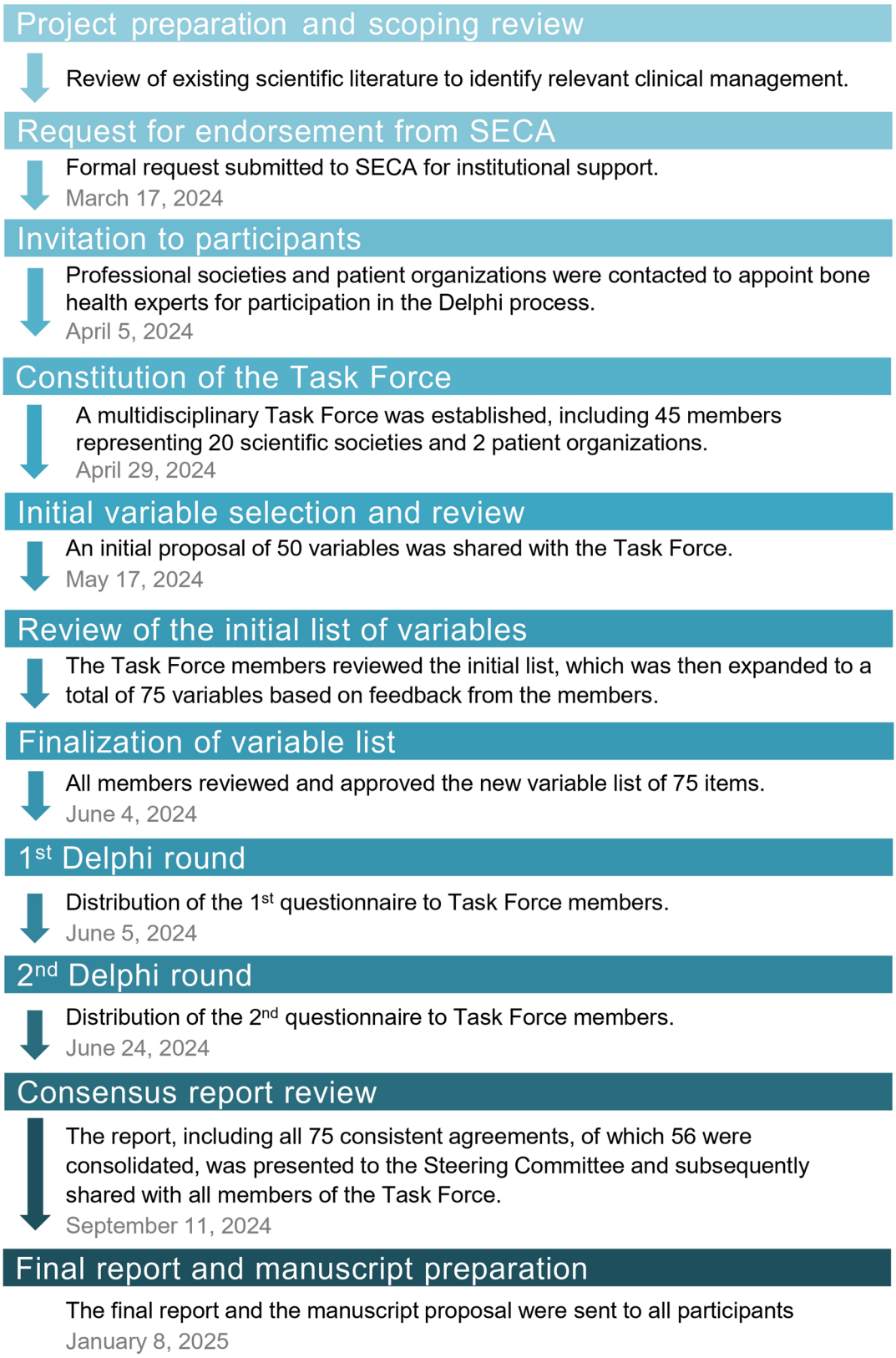

Fig. 1 Flowchart of variable determination and the Delphi consensus process

Table 1 Professional and scientific organisations involved in the Delphi process

Participants	*Name*
Patient Organizations	OAFI: Osteoarthritis Foundation International
	AECOSAR: Spanish Association with Osteoporosis and Osteoarthritis
Professional Organizations	FAECAP: Federation of Family and Community Nursing Associations
	GTESER: Nursing Working Group of the Spanish Society of Rheumatology
	RNFC: National Hip Fracture Registry
	SEAUS: Spanish Society for User Healthcare
	SECA: Spanish Society of Healthcare Quality
	SEDISA: Spanish Society of Healthcare Managers
	SEEGG: Spanish Society of Geriatric and Gerontological Nursing
	SEEN: Spanish Society of Endocrinology and Nutrition
	SEFAC: Spanish Society of Community and Family Clinical Pharmacy
	SEFAR: Spanish Society of Rural Pharmacy
	SEFYNC: Spanish Society of Pharmacists and Community Nutritionists
	SEGO: Spanish Society of Gynecology and Obstetrics
	SEIOMM: Spanish Society of Bone Research and Mineral Metabolism
	SEMDOR: Spanish Multidisciplinary Society of Pain
	SEMEG: Spanish Society of Geriatric Medicine
	SEMERGEN: Spanish Society of Primary Care Physicians
	SEMG: Spanish Society of General and Family Physicians
	SEMI: Spanish Society of Internal Medicine
	SIBOMM: Iberoamerican Society of Osteology and Mineral Metabolism
	SOCFIC: Iberoamerican Professional Scientific Community Pharmacy Society

based on median scores, with no instances of disagreement. Applying the cohesion criteria resulted in 56 variables (75%) being classified as having irrefutable agreement.

The consensus was particularly strong across the different domains. In the **General Aspects** section, all 13 proposed variables reached a mode of 9, reflecting unanimous agreement (Table 2). The variables that showed exceptionally low variability, such as"individualised patient information"(No. 4, SD = 0.15, IQR = 0) and"a multidisciplinary approach"(No. 8, SD = 0.39, IQR = 0), underscored the need for a multifaceted approach to managing osteoporosis and osteopenia. This consensus also highlighted the importance of active patient involvement and a participatory role for patients in managing their conditions alongside healthcare professionals.

In the **Diagnosis section**, there was strong agreement on several key points. Of the 18 proposed variables, 10 achieved consensus, as shown in Table 3. Variables such as the creation of national and regional fracture records, the promotion of early prevention campaigns, and the stratification of patients by clinical and bone health risk factors demonstrated a high level of agreement, with minimal variability (IQR = 0). However, other variables, particularly those related to advanced diagnostic tools, biochemical markers, and the integration of risk assessment tools, showed greater variability in responses.

In the general **treatment domain**, consensus was also high, particularly for patient-centred approaches to managing osteopenia (Table 4). The variables related to implementing health education guidelines (No. 32, M = 8.91, SD = 0.29), establishing personalised protocols (No. 34, M = 8.91, SD = 0.37), and promoting shared decision-making (No. 35, M = 8.93, SD = 0.26) showed strong support. Participants also supported the creation of a Fragility Fracture Code (No. 37, M = 8.77, SD = 0.53) and early intervention measures (No. 38, M = 8.83, SD = 0.54), emphasising proactive strategies to prevent fragility fractures. The data obtained from expert consensus highlights the importance of early intervention in patients with osteopenia who are at high risk of fractures, with little variation in their responses. (No. 39, M = 9, SD = 0.65). Support for patient and family education (No. 47, M = 8.77, SD = 0.75) was noted. However, there were different opinions regarding the most effective ways to deliver patient and family education. Some topics revealed slightly more divergence. For instance, the development of protocols specifically for patients with osteoarthritis and low BMD showed greater dispersion (No. 46, SD = 1.53) than other subgroups, like patients with oncological, renal or cardiovascular conditions.

Regarding the **pharmacological interventions** (Table 5), this section demonstrated a high level of consensus across key clinical considerations. There was near-unanimous agreement on the need for periodic clinical monitoring to ensure treatment effectiveness and patient safety (No. 54, M = 8.93, SD = 0.26). Participants strongly supported individualising drug selection based on fracture risk stratification (No. 48, M = 8.90, SD = 0.30), reinforcing the importance of tailored treatment approaches. Similarly, the evaluation of factors that may compromise adherence was broadly endorsed (No. 53: M = 8.81, SD = 0.45), highlighting the need for proactive strategies to support treatment continuity. While most items reflected strong consensus, certain variables, such as the preferential use of anabolic agents after fracture (No. 52: M = 7.46, SD = 1.86), exhibited greater variability, suggesting differing clinical practices or uncertainties in specific therapeutic pathways.

The results regarding **non-pharmacological interventions** (Table 6) revealed a high level of consensus regarding the importance of addressing modifiable

Table 2 Results related to general aspects

No	General Aspects Variables	Min Value	Max Value	mo	m	SD	M	IQR	CV
1	We support the change in the paradigm of chronic disease management, giving an active and participatory role to the patient and their personal and healthcare environment (micro level)	7	9	9	8.77	0.48	9	0	0.05
2	We support the change in the chronic disease management paradigm, giving patient organisations an active and participatory role in the disease management strategy (meso level)	7	9	9	8.60	0.66	9	1	0.08
3	A well-informed and empowered patient knows how to manage their disease and self-care better	6	9	9	8.77	0.57	9	0	0.07
4	Individualised patient information is a key point, ensuring they understand what has been explained	8	9	9	8.98	0.15	9	0	0.02
5	Since we only sometimes have time and doubts may arise later, the professional should provide the patient with reliable sources of information	4	9	9	8.58	0.98	9	0	0.11
6	Incorporating the patient's experience and improvement proposals in prevention, management, and scientific research adds excellent value to each	6	9	9	8.44	0.83	9	1	0.10
7	We support a holistic and comprehensive approach to the person, addressing physical, emotional, and social aspects	7	9	9	8.77	0.61	9	0	0.07
8	We support a multidisciplinary approach, facilitating interconnectivity among all involved professionals	7	9	9	8.88	0.39	9	0	0.04
9	We support a multidisciplinary approach involving doctors, nurses, community pharmacists, managers, and healthcare administrators	6	9	9	8.72	0.67	9	0	0.08
10	The professional should be motivated to become aware, awaken interest, and know and apply action protocols	7	9	9	8.84	0.43	9	0	0.05
11	Longevity and continuous ageing make this pathology a public health problem due to the number of affected people and its economic and healthcare costs, among other factors	7	9	9	8.77	0.57	9	0	0.06
12	Review international health strategies and plans to apply them in our local context	6	9	9	8.53	0.70	9	1	0.08
13	Follow recommendations from international scientific societies, such as the "Capture the Fracture" program by the International Osteoporosis Foundation (IOF)	7	9	9	8.74	0.49	9	0	0.06

No Delphi variable number, *mo* Mode, *m* Mean, *SD* Standard Deviation, *M* Median, *IQR* Interquartile Range, *CV* Coefficient of Variation

risk factors, particularly nutrition, physical activity, fall prevention and weight control. Strategies to reduce these risks received strong support (No. 56, M = 8.93, SD = 0.34), with high agreement for fall prevention tailored to the patient's environment (No. 63, M = 8.93, CV = 0.03), promotion of personalized exercise regimens (No. 65, M = 8.77, CV = 0.07), and the Mediterranean diet (No. 68, M = 8.79, CV = 0.05). Similarly, encouraging at least 30 min of moderate physical activity daily was broadly endorsed (No. 66, M = 8.77, CV = 0.06), demonstrating its recognised benefits for overall health and fracture prevention. Nutritional recommendations, including adequate vitamin D, calcium, and protein intake, were also well supported, as was the combination of dietary and resistance training strategies to combat the loss of skeletal muscle mass and strength (No. 60, M = 8.84, CV = 0.05). Managing extremes of body weight (No. 69, M = 8.81, CV = 0.05) and assessing muscle mass and body composition (No. 71, M = 8.40, CV = 0.18) were recognized as important measures to reduce fracture risk.

Across the variables where consensus was not reached, we examined whether healthcare professionals and patient representatives had differing opinions. Although the observed differences were not statistically significant (a finding that may be influenced by the relatively small number of patient representatives), two noteworthy divergences emerged.

Despite an overall consistent consensus among professionals on the importance of calcium and vitamin D, the responses from healthcare professionals exhibited a wider dispersion than the threshold typically required to confirm agreement. In contrast, patient representatives' responses were more cohesive and consistent.

Although there is a categorical stance, as reflected in the Spanish Ministry of Health's guideline that "any alcohol consumption implies a risk to health", the responses from healthcare professionals showed considerable variability. Conversely, the patient representatives demonstrated a more unified agreement on this issue.

Discussion

As global life expectancy rises, low BMD and fragility fractures are becoming an increasingly significant public health concern. The economic and healthcare burdens are substantial [19]. Interventions focused on early diagnosis, fracture risk assessment, and improved treatment adherence are projected to reduce healthcare costs by 15.2% by 2040 [20].

Given the complexity and multidisciplinary nature of osteoporosis and fragility fracture management, as well as the variability in current clinical practices, a Delphi

Table 3 Results related to the diagnosis

No	Diagnostic Variables	Min value	Max value	mo	m	SD	M	IQR	CV
14	Multidisciplinary fracture records should be created at national and regional levels to analyse and implement corrective measures when necessary	7	9	9	8.79	0.47	9	0	0.05
15	Early diagnosis and prevention campaigns should be promoted based on risk factors	7	9	9	8.86	0.47	9	0	0.05
16	The aetiology should be considered and confirmed for any fragility fracture if it presents an osteoporosis or osteopenia diagnosis	7	9	9	8.70	0.67	9	0	0.08
17	In identified at-risk patients, prevention through action on modifiable risk factors is necessary	7	9	9	8.88	0.39	9	0	0.04
18	Stratifying patients according to fracture risk, falls, BMD, and clinical risk factors is essential	7	9	9	8.81	0.45	9	0	0.05
19	If a fracture has occurred in the last two years, it should be considered a multiplier of future fractures	7	9	9	8.81	0.45	9	0	0.05
20	DXA should indicate BMD from age 50 if there are clinical risk factors	4	9	9	8.23	1.06	9	1	0.13
21	In the initial evaluation, an analytical study should be performed to rule out secondary osteoporosis based on bone turnover markers (e.g., CTX and PINP)	1	9	9	7.13	1.89	8	3	0.27
22	Vitamin D and calcium analysis should be a routine protocol	1	9	9	8.09	1.84	9	1	0.23
23	Lateral spine radiography is always a test to consider in fracture risk assessment	3	9	9	8.03	1.37	8	1	0.17
24	Combining fracture risk assessment (with scales like FRAX® or QFracture®) and DXA improves diagnostic sensitivity	3	9	9	8.33	1.28	9	1	0.15
25	Combining fracture risk assessment (with scales like FRAX® or QFracture®) and QUS improves screening sensitivity	2	9	9	7.98	1.49	9	2	0.19
26	FRAX® in Spain underestimates fracture risk, so a high fracture risk should be considered when the FRAX value is ≥ 10% for major fracture and ≥ 3% for hip fracture	2	9	9	8.21	1.30	9	1	0.16
27	It is necessary to determine concomitant diseases, as they condition the management of osteoporosis	7	9	9	8.81	0.45	9	0	0.05
28	It is essential to consider the patient's cardiovascular profile when selecting treatment	7	9	9	8.79	0.47	9	0	0.05
29	It is essential to consider the patient's renal function when selecting treatment	8	9	9	8.86	0.35	9	0	0.04
30	In women with osteoporosis or osteopenia, the presence of osteoarthritis or the risk of developing it should be evaluated	2	9	9	7.90	1.57	8	1	0.20
31	Knowing current and past treatments is necessary to make optimal therapeutic decisions	8	9	9	8.88	0.32	9	0	0.04

No Delphi variable number, *mo* Mode, *m* Mean, *SD* Standard Deviation, *M* Median, *IQR* Interquartile Range, *CV* Coefficient of Variation, *BMD* Bone mineral density, *DXA* Dual-Energy X-ray Absorptiometry, *QUS* Quantitative ultrasound, *PINP* N-terminal propeptide of type I protocollagen, *CTX* C-terminal telopeptide of type I collagen, *FRAX®, QFracture®* Fracture risk assessment tools

method was employed to achieve expert consensus on key diagnostic, therapeutic, and preventive strategies. The Delphi method is scientifically validated and provides a robust framework for assessing collective, multidisciplinary subjective judgments, which are often more reliable than individual opinions, especially in areas where evidence is inconclusive [21]. A key strength of our study lies in its patient-centred approach to defining the variables for the Delphi consensus. Initially, a list of 50 variables was proposed, derived from the patients' expert experiences and insights from selected literature. However, during the subsequent two-week review period, which involved telematic feedback from the Task Force members' broader technical and clinical expertise, the list was expanded to 75 variables. The additional variables emerged from the exchange between patient experience and expert opinion, highlighting issues or uncertainties that might not have been identified in a traditional literature review alone. In this way, the iterative refinement of the variables underscores the strength of our methodology in addressing the complex, multifactorial nature of bone health management. The multidisciplinary Task Force comprised 45 experts whose collective input was invaluable in shaping the consensus. The high level of participation from scientific organisations and the consistency of agreement on the 75 issues raised are noteworthy. However, the rigorous cohesion criteria reduced the list to 56 variables that achieved irrefutable consensus.

Our findings highlight actionable strategies to bridge clinical guidelines and real-world practice, focusing on improving patient outcomes through early intervention, risk stratification, and personalized care. Below, we contextualize these results using recent evidence.

Strengthening diagnosis and risk stratification

The panel's strong agreement on diagnosis recommendations underscores the need for proactive measures, including screening for risk factors, establishing national and regional fracture registries, and implementing risk-based diagnostic campaigns. Alarmingly, 80% of patients with fragility fractures do not have a diagnosis of osteoporosis [22], and nearly half of fragility fractures occur in individuals with osteopenia [7, 23]. A study conducted in Spain found that the prevalence of fractures was 17.7% in individuals over 70 years old, and only 65.7% were diagnosed with osteoporosis (69.7% in women and 42.9% in

Table 4 Results related to the general treatment

No	Treatment Variables	Min value	Max value	mo	m	SD	M	IQR	CV
32	Implement health education guidelines for patients, including promoting healthy lifestyle habits	8	9	9	8.91	0.29	9	0	0.03
33	Implement clinical practice guidelines encompassing early diagnosis, treatment, follow-up, and patient support	8	9	9	8.88	0.32	9	0	0.04
34	Establish protocols while personalising the approach to adapt to individual needs and ensure optimal care	7	9	9	8.91	0.37	9	0	0.04
35	Shared decision-making between healthcare professionals and patients encourages patients to take responsibility for their care and treatment	8	9	9	8.93	0.26	9	0	0.03
36	Humanisation commits healthcare professionals to practice shared decision-making with patients	7	9	9	8.86	0.41	9	0	0.05
37	Create a Fragility Fracture Code to facilitate the implementation of multidisciplinary and multimodal processes (or clinical pathways) within an appropriate timeframe	7	9	9	8.77	0.53	9	0	0.06
38	Support early intervention with education and hygienic-sanitary measures for patients with any risk factors	7	9	9	8.83	0.54	9	0	0.06
39	Support early intervention starting at the osteopenia stage for patients at high fracture risk	6	9	9	8.77	0.65	9	0	0.07
40	The approach to restoring quality of life and preventing new fractures is a process that spans from initial diagnosis to treatment and the patient's subsequent social reintegration	6	9	9	8.67	0.78	9	0	0.09
41	Support a multidisciplinary approach and promote interconnectivity among professionals	8	9	9	8.86	0.35	9	0	0.04
42	Establish a protocol to prevent osteoporosis or osteopenia risk in cancer patients, particularly those undergoing hormonal blockade and/or chemotherapy	8	9	9	8.93	0.27	9	0	0.03
43	Establish a protocol for managing osteoporosis and osteopenia in patients with oncological conditions	8	9	9	8.88	0.33	9	0	0.04
44	Establish a protocol for managing osteoporosis and osteopenia in patients with cardiovascular conditions	7	9	9	8.74	0.54	9	0	0.06
45	Establish a protocol for managing osteoporosis and osteopenia in patients with renal conditions	7	9	9	8.81	0.51	9	0	0.06
46	Establish a protocol for managing osteoporosis and osteopenia in patients with osteoarthritis	1	9	9	8.29	1.53	9	1	0.19
47	Promoting patient and family education about the disease, healthy habits, nutrition, physical exercise, and treatment adherence is mandatory	5	9	9	8.77	0.75	9	0	0.09

No Delphi variable number, *mo* Mode, *m* Mean, *SD* Standard Deviation, *M* Median, *IQR* Interquartile Range, *CV* Coefficient of Variation

Table 5 Results related to pharmacological interventions

No	Variables of Pharmacological Treatment	Min value	Max value	Mo	m	SD	M	IQR	CV
48	The choice of the drug to initiate treatment should be made considering the fracture risk stratification of each patient	8	9	9	8.90	0.30	9	0	0.03
49	Patients who experience a fragility fracture should be treated regardless of their bone mineral density (BMD)	3	9	9	8.52	1.29	9	0	0.15
50	The criteria for pharmacological treatment of patients with osteopenia should be clearly defined and established in a protocol	3	9	9	8.49	1.40	9	0	0.17
51	Patients receiving chronic glucocorticoid therapy (equivalent to ≥ 5 mg/day of prednisone for more than 3 months) must be treated	3	9	9	8.58	1.08	9	0	0.13
52	In general, when a fracture occurs, it is often more beneficial to start with anabolic treatment (bone-forming drugs) and, if necessary, follow up with antiresorptive therapy	2	9	8	7.46	1.86	8	2	0.25
53	When establishing treatment, predictors of poor adherence should be assessed	7	9	9	8.81	0.45	9	0	0.05
54	Periodic clinical evaluations are recommended to monitor treatment adherence and effectiveness, the occurrence of fractures, and potential adverse effects	8	9	9	8.93	0.26	9	0	0.03
55	It is deemed necessary to review, adapt, and update medications generally, especially in cases of polypharmacy	8	9	9	8.93	0.26	9	0	0.03

No Delphi variable number, *mo* Mode, *m* Mean, *SD* Standard Deviation, *M* Median, *IQR* Interquartile Range, *CV* Coefficient of Variation

men) [24]. This highlights the severity of osteoporosis, often leading to fractures that cause chronic pain, disability, and even death. The mortality rate within the first year after a hip fracture is 20–30%, and only 40% of patients recover their prior quality of life [25]. Stratifying patients by fracture risk, BMD, and other clinical factors is essential to guide future action plans [4]. This aligns with Siris et al. (2014), who advocate for expanded

Table 6 Results related to the non-pharmacological treatment

No	Variables of Non-Pharmacological Treatment	Min value	Max value	mo	m	SD	M	IQR	CV
56	Strategies must be implemented to reduce modifiable risk factors	7	9	9	8.93	0.34	9	0	0.04
Modifiable Risk Factor: Nutrition									
57	Ensure a daily intake of 800 IU of vitamin D and 800–1,200 mg of calcium, especially in older adults	3	9	9	8.58	1.10	9	0	0.13
58	Assess calcium and vitamin D levels and supplement them if they are low	3	9	9	8.56	1.37	9	0	0.16
59	Guarantee a daily protein intake of 1–1.5 g/kg of body weight, particularly in older adults	7	9	9	8.73	0.51	9	0	0.06
60	Along with protein intake, establish a strength training plan to address the risk of sarcopenia	7	9	9	8.84	0.43	9	0	0.05
61	Address eating disorders such as anorexia and bulimia, as well as malabsorption syndromes	7	9	9	8.86	0.42	9	0	0.05
62	Limit the intake of caffeine and alcohol	1	9	9	8.50	1.35	9	0	0.16
Modifiable Risk Factor: Falls as a Common Cause of Fractures									
63	Promote fall prevention strategies that consider the individual's living environment	8	9	9	8.93	0.26	9	0	0.03
64	Encourage exercises that improve balance, coordination, and muscle strength to prevent falls	7	9	9	8.86	0.47	9	0	0.05
Modifiable Risk Factor: Physical Activity									
65	Implement personalised prescriptions for aerobic, anaerobic, and postural exercises	7	9	9	8.77	0.57	9	0	0.07
66	Encourage individuals to engage in at least 30 min of moderate-intensity physical activity almost every day of the week	7	9	9	8.77	0.53	9	0	0.06
67	Low-intensity physical activities (such as yoga, Pilates, or walking) can improve balance and strength, reduce falls, and decrease the risk of fractures	7	9	9	8.67	0.64	9	0	0.07
Modifiable Risk Factor: Weight Control									
68	Promote the Mediterranean diet	7	9	9	8.79	0.47	9	0	0.05
69	Monitor and combat both underweight and overweight	7	9	9	8.81	0.45	9	0	0.05
70	Using validated measures such as BMI and abdominal perimeter helps combat obesity and its complications	6	9	9	8.42	0.85	9	1	0.1
71	Studying body composition and muscle mass in patients at risk of fractures is necessary	2	9	9	8.40	1.51	9	0	0.18
Modifiable Risk Factor: Smoking									
72	Smoking is an addiction that is difficult to quit with the current available means	1	9	9	6.17	2.88	7	6	0.47
73	We consider it a priority to prevent tobacco consumption, but it is also necessary to provide adequate support to current smokers	7	9	9	8.60	0.63	9	1	0.07
74	The approach must be personalised and even consider harm reduction as a desirable alternative for those who want to quit smoking but find it challenging to do so	6	9	9	8.55	0.77	9	1	0.09
Modifiable Risk Factor: Alcohol Consumption									
75	Any alcohol consumption implies a health risk	1	9	9	7.58	2.21	9	2	0.29

No Delphi variable number, *mo* Mode, *m* Mean, *SD* Standard Deviation, *M* Median, *IQR* Interquartile Range, *CV* Coefficient of Variation

diagnostic criteria that include fracture history and FRAX® risk scores alongside BMD measurements to improve detection rates [26]. Implementing these criteria could reduce diagnostic delays, as demonstrated in studies where fracture registries and risk-based screening increased diagnosis rates by 30%. This also resonates with Kanis et al. (2020), whose algorithm categorises patients into low, high, and very high risk, guiding tailored interventions such as prioritising anabolic agents for imminent fracture risk [22]. By doing this, it would be easier to have an early intervention starting at the osteopenia stage for patients at high fracture risk, a key variable with which the panel strongly agrees.

Despite its limitations in sensitivity and specificity, DXA is considered the gold standard of diagnosis, and it is associated with other predictive tests. New technologies such as computational and statistical 3D-DXA, which is based on 3D dual-energy X-ray absorptiometry, allow estimating bone strength and fracture risk more accurately than the conventional 2D DXA method, providing volumetric information on bone morphology and quality at the trabecular and cortical levels [23].

Patient-centred approach

The consensus among the expert panel underscores the importance of patient-centred care, which emphasises actively involving patients, fostering patient organisations, and adopting a multidisciplinary approach [27]. Patient organisations were recognised as legitimate representatives, essential for helping individuals throughout their journey, from diagnosis to long-term management, and complementing healthcare systems. They are credible partners by health authorities [25], underlining the importance of a holistic approach that prioritises the patient rather than focusing solely on the disease. As recommended by health advocacy groups, educating

patients and their families and caregivers is critical for informed decision-making, improving self-management, and addressing the risks of misinformation [23]. Additionally, given the structural challenges in healthcare systems, engaging healthcare professionals and motivating them to support these initiatives effectively is crucial.

A patient-centred approach is crucial because nearly 60% of individuals over 65 in Spain have four or more chronic conditions [24, 28]. This approach must account for comorbidities, such as oncological, cardiovascular and renal conditions, and current and past treatments. It must also consider the polypharmacy common in these patients, which increases their risk of medication side effects and falls. A Spanish study involving 2,461 individuals over the age of 65 found that 47.4% were taking more than six medications, with prescription rates significantly higher among women, highlighting the importance of careful pharmacological oversight in this population [29].

In line with this comprehensive approach, the expert panel strongly supported implementing patient education programs focused on healthy lifestyle habits and clinical practice guidelines for early diagnosis, treatment, follow-up, and patient support. Educating patients and their families empowers them to understand the disease better, take an active role in managing risk factors, adhere to treatments, and make informed decisions [30]. This improves health outcomes and quality of life and supports more efficient use of healthcare resources in a population increasingly affected by chronic, complex conditions [31].

Pharmacological treatment

In pharmacological treatment, the multidisciplinary Task Force strongly agreed on the importance of tailoring medication choices to an individual's fracture risk and ensuring routine monitoring to evaluate adherence, efficacy, and safety, aligning with recommendations from other studies [30–34]. Given the complexities of managing patients with comorbid conditions, it is necessary to review and adjust medications regularly to optimise outcomes, especially in cases of polymedication, aligning with Cosman et al. (2024), who advocate for"goal-directed treatment"with regular BMD assessments to evaluate therapeutic success [35].

Individualised care plans, which foster shared decision-making, were highly recommended to promote patient responsibility for their care and improve treatment adherence [36]. Early intervention, starting from osteopenia in high-risk patients, is advocated, covering diagnosis, treatment, patient support, and social reintegration.

Specific patient groups, such as those undergoing long-term treatment with corticosteroids, heparin, or those with cancer, require targeted prevention and treatment strategies for osteoporosis and osteopenia due to disease or treatment effects [37]. Protocols should be developed for patients with cancer, cardiovascular, or renal conditions, acknowledging their unique needs.

Non-pharmacological interventions

Patient and family education on disease management, healthy lifestyle, nutrition, exercise, and treatment adherence remains a cornerstone of comprehensive care [38].

The expert panel has unanimously supported non-pharmacological interventions, emphasising their importance in managing bone health and addressing modifiable risk factors, like diet, exercise, and lifestyle choices. It is essential to consider each individual's unique circumstances, as strategies must be tailored to minimise the impact of risk factors effectively. While non-modifiable risk factors such as age and genetics cannot be changed, appropriate preventive and treatment interventions can help reduce their impact on bone health.

Diet and nutrition are recognised as vital components of healthcare, particularly for older adults. Addressing eating disorders and malabsorption issues, while ensuring adequate intake of protein, calcium, vitamin D and essential minerals, is a key priority, as demonstrated by an extensive literature [39, 40]. However, guidelines now discourage routine vitamin D supplementation due to a lack of net benefit [39]. While there was consensus, the participants in this Delphi process did not reach a unified agreement on the routine analysis of vitamin D and calcium. This divergence may be due to factors such as local influences, such as sun exposure and the Mediterranean diet prevalent in Spain, or the lack of a more personalised approach to supplementation rather than applying generic doses, as supported by the literature [39–41]. This aligns with emerging frameworks advocating nutrient stratification based on localised dietary patterns, comorbidities, and biomarker-guided assessments rather than uniform dosing [42].

Moreover, fall prevention strategies should be customised to each patient's living environment and include exercises to enhance balance, coordination, and strength [43]. Programs like"OAFI Space"assess residential environments for safety and accessibility, identifying potential hazards. Patients can significantly reduce their risk of falls by making necessary modifications, such as installing grab bars, improving lighting, and removing tripping hazards. This holistic approach empowers individuals to take charge of their safety and fosters a supportive environment that encourages independence and confidence in daily activities. As emphasised by the expert panel, fall prevention strategies should be tailored to the patient's environment, with high agreement on the need for individualised interventions. Evidence supports the effectiveness of tailored home modification programs in preventing falls, with studies showing a 21% reduction

in falls through environmental interventions [44] and up to a 39% decrease when interventions are customised to individual needs and risk factors [45, 46]. These findings underscore the importance of a personalised, environment-focused approach in fall prevention, ensuring the strategies employed align with the specific needs of older adults.

As mentioned above, regular and personalised physical exercise is essential in managing osteopenia and reducing fracture risks. Programs should be customised to each individual's capabilities and include aerobic, strength exercises, and postural exercises. Activities like daily walking for at least 30 min and balance-focused practices such as yoga, tai chi, and Pilates are strongly recommended [47–49].

Weight management is another crucial component, particularly when coupled with promoting the Mediterranean diet, which is known for its benefits to bone and overall health. Despite its proven advantages, adherence remains low, with only 12% of the population following its principles [50]. Monitoring underweight and overweight patients through indicators like BMI and abdominal circumference enables targeted interventions that address specific nutritional deficiencies or excesses, fostering optimal bone health.

Efforts to prevent and address smoking are also pivotal, as smoking significantly impairs bone quality [51]. Smoking cessation programs should leverage validated tools like FRAX®, which recognise smoking as a key risk factor for fractures [15]. WHO identifies smoking as a behavioural mental disorder, underscoring the need for tailored interventions. Personalised cessation plans, including harm reduction strategies for those unable to quit entirely, are critical to improving patient outcomes. Studies have shown that smoking cessation significantly lowers the risk of fractures compared to current smoking [52], for individuals who are unable to quit smoking, heated tobacco devices, which heat rather than combust tobacco, may serve as a harm reduction strategy. While these devices are not risk-free, evidence suggests they could represent a less harmful alternative to traditional cigarettes by reducing exposure to certain toxic substances [53]. While this may potentially mitigate some of the adverse effects of smoking on bone health, complete cessation of tobacco use remains the most effective way to protect overall and bone health and reduce fracture risk.

Alcohol consumption is a modifiable factor that requires attention due to its adverse effects on bone density and its contribution to an increased risk of falls resulting from a lack of balance [54]. While patients generally support reducing alcohol intake, variability in professional responses reflects differing perceptions of alcohol's risks, shaped by cultural and individual factors [45]. The discrepancy observed in the responses of patients and professionals may be due to the categorical nature of the tested expression (the Spanish Ministry of Health's guideline states that"all alcohol consumption poses a health risk") [55]. Clear guidance and education addressing these disparities are essential to foster a unified approach to reducing alcohol-related harm.

These interventions collectively contribute to a more holistic, patient-centred approach for managing osteoporosis, osteopenia and their associated risks. Raising awareness and educating about both modifiable and non-modifiable risk factors empowers patients and the broader public to take an active role in their care, promoting healthier habits and more informed decision-making regarding diagnosis and treatment.

This consensus, endorsed by 20 scientific societies and led by Spain's two main patient organisations on musculoskeletal health, aims to generate impact at three key levels:

1. Public Administrations: At both national (Ministry of Health) and regional levels (17 autonomous communities responsible for healthcare management and delivery), by promoting prevention and the early identification of risk factors. Currently, these efforts are limited by consultation time, structural limitations, and budgetary pressures on the public system.
2. Healthcare Professionals: To ensure that, in line with these experts recommendations, both national and international guidelines are implemented proactively, not only after a fracture has occurred.
3. Patients and the General Public: To increase awareness of the importance of adopting healthy lifestyle habits and assuming responsibility in maintaining one's health.

Successful execution will require: (1) Integrated risk calculators in EHRs, (2) Dedicated funding pathways for high-risk osteopenia management, and (3) Regional pilot programs to test feasibility. Barriers include budgetary constraints and clinical inertia.

Limitations

There are limitations to acknowledge in this study. First, the study primarily focuses on the Spanish context, which may restrict its applicability to other countries or healthcare systems. Secondly, clear consensus was achieved on 56 out of 75 variables analyzed (75%), indicating that not all evaluated aspects reached complete or irrefutable agreement. Also, the study relies on expert opinions gathered through the Delphi method, which, while valuable, does not provide direct empirical evidence.

Conclusions

Osteoporosis is a severe and highly prevalent disease, particularly among women. It poses significant risks to patients' health, and its late diagnosis and treatment often result in serious complications such as fragility fractures. These complications drastically affect the quality of life, increasing healthcare costs and can even lead to death. The findings of this study confirm the initial hypothesis: current clinical practices are overly focused on diagnosing and treating osteoporosis. At the same time, intermediate conditions like osteopenia receive insufficient attention, particularly in the absence of a fragility fracture.

This research unequivocally underscores the importance of addressing osteopenia as a part of a comprehensive osteoporosis management approach. The study highlights the need for a paradigm shift in chronic disease management, emphasising prevention, patient empowerment, and multidisciplinary care. By adopting this approach, healthcare systems can improve patient outcomes and alleviate the economic and societal burdens associated with osteoporosis, osteopenia and fragility fractures.

The Final Decalogue, developed through consensus with the panel of experts, outlines essential actions to address osteoporosis and osteopenia:

Final decalogue:

1. The high and increasing prevalence, along with the severity of osteoporosis and its consequences, establish it as a significant public health problem.
2. Early diagnosis and prevention of osteoporosis and osteopenia are essential, emphasising the need to identify and assess risk factors for fractures and other pathologies.
3. A multidisciplinary, protocol-driven approach is vital, involving active participation from patients and healthcare professionals to slow disease progression and improve quality of life.
4. Patients should actively participate in shared decision-making concerning their treatment and follow-up care.
5. Implementing registries and follow-up systems is essential to enhance osteoporosis management and decrease fracture rates.
6. Information pamphlets, prevention strategies, treatment options, and effective support plans should be designed for the general public and healthcare professionals.
7. A comprehensive approach is required, focusing on the whole person while considering comorbidities and simultaneous treatments.
8. Treatment should be tailored to each patient's fracture risk, whether due to osteoporosis or osteopenia(regardless of BMD), with regular monitoring of adherence, effectiveness, and medication adjustments as necessary.
9. Preventive strategies should aim to minimise the impact of non-modifiable risk factors and address modifiable ones, providing personalised support from the health system.
10. Promoting a healthy lifestyle that includes adequate nutrition, fall prevention, regular physical exercise, and weight control is essential. Efforts should also focus on smoking prevention or cessation, harm reduction strategies, and refraining from consuming alcoholic beverages.

Abbreviations

AECOSAR	Spanish Association of Osteoporosis and Osteoarthritis
BMD	Bone mineral density
BMI	Body mass index
CTX	C-terminal telopeptide of type I collagen
CV	Coefficient of variation
DXA	Dual-energy X-ray absorptiometry
FRAX®	Fracture Rrisk Assessment Tool
GDPR	European General Data Protection Regulation
IOF	International Osteoporosis Foundation
IQR	Interquartile range
m	Mean
M	Median
mo	Mode
NORA	National Osteoporosis Risk Assessment
No	Delphi variable number
OAFI	Osteoarthritis Foundation International
PINP	N-terminal propeptide of type I protocollagen
QFracture®	Fracture Risk Assessment Tool (UK-specific)
QUS	Quantitative ultrasound
SD	Standard deviation
SECA	Spanish Society of Healthcare Quality
WHO	World Health Organization

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12891-025-08997-y.

Additional file 1.

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Authors' contributions
J.V.M. and J.-L.B. conceived and designed the study and were responsible for overall direction and planning. J.V.M., J.-L.B., and N.M.F. formed the scientific committee, which included S.G.D., J.-C.G.M., R.M.M.-P., I.M., J.-L.N., P.S.L., and M.S.V. J.V.M., J.-L.B., and N.M.F. conducted the literature review and proposed the initial study variables to the scientific committee. All authors selected the variables, with J.V.M., J.-L.B., and N.M.F. contacting experts from all related fields to participate and forming the Task Force, which consisted of 45 experts. J.V.M. and J.-L.B. led the management and execution of the Delphi process, coordinating meetings, distributing questionnaires, analysing responses, and providing feedback during the rounds. J.-L.B. and N.M.F. conducted the statistical analysis and the interpretation of the data, supervised by J.V.M. All authors discussed the final results. J.V.M., J.-L.B., and N.M.F. wrote the manuscript with support and revisions from S.G.D., J.-C.G.M., R.M.M.-P., I.M., J.-L.N., P.S.L., and M.S.V. All authors and participants read and approved the final manuscript.

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Data availability
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Not applicable. According to the Spanish Royal Decree 1090/2015, of December 4th, which regulates clinical trials with medicines, the Ethics Committees for Research with Medicines, and the Spanish Clinical Studies Registry, it is not included or foreseen that permission or ethical approval is required for Expert Consensus. The study was not conducted with patients or human tissue, and it does not contain personal or health data from them. Spanish regulations exempt consultations with healthcare professionals with expertise in the subject matter from the approval of the ethics committee. In any case, all participants expressly consented to the use of their responses, and the research was conducted according to the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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