



Evidence of patient beliefs, values, and preferences is not provided in osteoporosis clinical practice guidelines

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Abstract

Summary We examined how patient beliefs, values, and preferences (BVPs) were included and conceptualized in international osteoporosis guidelines. The majority of guidelines did not mention BVPs. When mentioned, BVPs were conceptualized as preference for one medication over another. A broader conceptualization and inclusion of BVPs should be incorporated in osteoporosis guidelines.

Introduction Our objectives were to determine (1) the extent to which osteoporosis guidelines reflected patients' beliefs, values, and preferences (BVPs); (2) how BVPs were conceptualized; and (3) the methods used to elicit BVPs in the references cited by the guidelines.

Methods We conducted a document analysis of English-language international osteoporosis guidelines based on the International Osteoporosis Foundation website. We examined each guideline and extracted all instances of statements pertaining to BVPs. The statements were reviewed by two independent researchers. Discrepancies in data extraction were resolved by the first author. We developed categories based on five common elements that represented the BVP statements.

Results Twenty-seven of 70 (39%) guidelines included 95 statements about patient BVPs. Of the 95 statements, 32 statements (14 guidelines) were classified under BVP related to the choice of pharmacotherapy or general treatment, 10 (7 guidelines) under BVP related to adherence to pharmacotherapy or treatment in general, 5 (5 guidelines) under BVP related to financial costs and benefits, 43 (19 guidelines) under other BVP mentioned but not supported by a reference to a primary study or systematic review, and 5 (3 guidelines) under other BVP mentioned and supported by at least one reference to a primary study or systematic review. Twenty-nine references were cited to reflect the BVPs mentioned, including an editorial and quantitative studies.

Conclusions Twenty-seven (39%) of the guidelines included mention of patients' BVPs. In 19 guidelines, the importance of BVPs was mentioned but these statements were not supported by references to a primary study or systematic review. BVPs were most often (14 guidelines) conceptualized as preference for one medication over another. We suggest that qualitative data be included as evidence of BVPs in guidelines.

Keywords Clinical practice guidelines · Osteoporosis · Patient beliefs · Patient perspective · Patient preferences · Patient values

Introduction

Patients' beliefs, values, and preferences (BVPs) are fundamental tenets of evidence-based practice [1, 2] and the development of clinical practice guidelines [3]. BVPs have been shown to determine patients' acceptance of clinical guidelines which in turn may affect patients' behaviors and outcomes [4] and physicians' adherence to those guidelines [5]. Patient preferences are also one component of building consensus about treatment in shared decision-making during the medical encounter [6].

There appear to be inconsistencies in how the terms “beliefs, values, and preferences” are defined. The terms “values

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and preferences” are often the concepts highlighted [7] and sometimes “beliefs” have been incorporated under the term “preference” [8]. Patient “values and preferences” has been defined as the “underlying processes we bring to bear in weighing what our patients and our society will gain or lose when we make a management decision” (p. 1291) [7].

Montori and colleagues consider patient preferences as an overarching term that includes patient perspectives, beliefs, expectations, and goals for health and life, and also to the process used by individuals in considering the potential benefits, harms, costs, and inconveniences of management options in relation to one another [8]. Patient preferences have been conceptualized as preferences for any type of treatment such as counseling, exercise, and surgical techniques [9] and preferences for medication [10, 11]. In one study, Utens and colleagues [12] reported that the definition of preference differed for patients and for guideline developers; patients defined preferences as their views and wishes in terms of treatment, whereas guideline developers defined preferences in terms of treatment *choices*. Thus, the wishes of patients to take or not take medication are conceptually different than the wishes of patients to take one medication over another.

Regardless of the definition of BVPs, there has been a call to include patients and their preferences in guideline development in conditions such as infertility [13] and kidney disease [14] because patients and providers have different clinical issues of concern [13] and different priorities [14]. Previous authors have reviewed clinical practice guidelines for treatment thresholds [15], declarations and conflicts of interest [16], and whether recommendations are supported by evidence [17]. We are not aware of any comprehensive reviews of patient BVPs in clinical practice guidelines for a particular disease group, such as osteoporosis.

We believe that an examination of BVPs in clinical practice guidelines is important for several reasons. Because BVPs are fundamental to the development of clinical practice guidelines [3], it is important to determine if, and how, they are included in guidelines. Further, because clinical decisions are value-laden [7], we believe it is important to examine how BVPs are described in these guidelines and whether there are common elements to the descriptions. Our objectives were to determine (1) the extent to which osteoporosis guidelines reflected patients’ BVPs, (2) how patients’ BVPs were conceptualized, and (3) the methods used to elicit BVPs in the references cited by the guidelines.

Methods

We conducted a document analysis [18] of English-language osteoporosis guidelines based on the International Osteoporosis Foundation (IOF) website (www.iofbonehealth.org). As a non-profit organization, the IOF

promotes the maintenance of bone, muscle, and joint health as a worldwide priority. Using the IOF website as a source of guidelines promoted the inclusion of guidelines written as reports. These guidelines may not have been captured through a search of the scientific databases such as PubMed. The IOF also produces educational resources to advance understanding of osteoporosis and related musculoskeletal disorders, and promotes medical innovation and improved patient care.

The purpose of the document analysis was to review, interrogate, and analyze the text in the guidelines which was considered our primary source of data [18]. These guidelines were considered an “authoritative source” under the assumption that they were produced as “unbiased knowledge” [18]. As individual countries update their clinical practice guidelines regularly, the document analysis was conducted on guidelines posted on the International Osteoporosis Foundation website as of May 10, 2018.

We examined each guideline and extracted all instances of statements (or related consecutive statements) pertaining to BVPs. The statements within each guideline were reviewed by two independent researchers (AM, FN) who met with each other regularly to discuss their independent extractions, and then with the first author to discuss the data overall. Discrepancies in data extraction (for example, how many of the consecutive statements were relevant) were resolved by the first author. After significant review of the statements as a team, we developed the following categories based on five common elements that appeared to represent BVP statements in the guidelines. Under the supervision of the first author, three of the researchers (AM, FN, WY) worked together to assign the statements into the five categories. The final assignment of the statements was reviewed and approved by the first author.

BVP related to the choice of pharmacotherapy or general treatment This classification included patient BVPs about a specific medication or medications or general treatment for osteoporosis, including calcium and vitamin D. These statements were sometimes supported by references to other studies that included information related to side effects of specific treatments and information related to the efficacy of a particular medication or treatment option.

BVP related to adherence to pharmacotherapy or treatment in general This classification included statements that linked patients’ BVPs to adherence and to patients’ ability to comply with their medications or treatment recommendations in general.

BVP related to financial costs and benefits This classification included patient BVPs that addressed financial costs and benefits of treatment, either to the patient and/or to society. If a statement or cluster of statements considered the socioeconomic status of patients when recommending therapeutic

interventions such as medication and surgery, these statements were included under this classification.

Other BVP mentioned but not supported by a reference to a primary study or systematic review This classification was assigned to statements that mentioned patient BVPs in general but were not supported by references to a primary study or systematic review or were supported or linked to a reference that was an editorial or another clinical practice guideline. These statements could refer to several topics including duration of treatment, discharge management, diagnostic testing, exercise, and the importance of individualized care plans. In other words, these statements were about BVPs but it was not specified what those BVPs were and/or the studies cited were not aligned with our classification “Other BVP mentioned and supported by at least one reference to a primary study or systematic review” (see below).

Other BVP mentioned and supported by at least one reference to a primary study or systematic review This classification was assigned to statements that were directly supported or linked to a reference that appeared to be a primary study or systematic review. A primary study was one that collected original data [19]. This classification excluded BVPs in relation to the above classifications, i.e., they were not BVPs for choosing between specific medications, or those related to adherence, or those related to financial costs and benefits. Further, the references cited were those that did not meet the criteria for pharmaceutical choice, adherence to medication, or financial costs and benefits. Statements under this classification encompassed patients’ needs, expectations, wishes, requests, concerns, interests, and perceptions. These statements also included patients’ wishes to take medication or not (as opposed to wishes to take one particular medication over another). Only statements that cited at least one primary study or systematic review related to BVPs were included in this classification.

For each classification, we calculated the total number of statements (or related consecutive statements) as well as the total number of guidelines with at least one statement (or related consecutive statements). All statements were placed in one classification only and are quoted directly from the guideline to minimize interpretation error. If a statement appeared to fit into more than one classification, it was assigned to the most appropriate classification based on the criteria described above. For example, Scotland B [20] included information about minor side effects of calcium supplementation influencing adherence but because the focus of this section of the guidelines was on adverse effects of calcium intake and calcium supplementation, we classified this statement as “BVP related to choice of pharmacotherapy or general treatment.” Similarly, statements from the UK G [21], Australia [22], and Hong Kong [23] also included elements related to

patient compliance but these statements appeared overall to be focused on the choice of pharmacological therapy and were classified as “BVP related to choice of pharmacotherapy or general treatment.” In one case (Lebanon E [24]), the statement about patient BVPs appeared in the introduction and referenced another guideline, not the Lebanon guidelines. We classified this statement as “other BVP mentioned but not supported by a reference to a primary study or systematic review.”

Statements repeated in more than one location of the guideline were considered as separate statements. For example, in South Africa [25], the same statement appeared on pages 25 and 150 and another statement appeared on both pages 26 and 151.

The statements were searched for the terms “belief(s)/believe,” “preference(s)/prefer,” and “value(s)” to calculate how many times these terms were mentioned in the respective guideline. Each statement was examined for inclusion of at least one mention of these three terms. If the term, for example, “values,” was mentioned more than once in a particular statement or related consecutive statements, it was counted as occurring once in that statement. However, if both the term “value” and “preference” occurred, these were considered as one count for “value(s)” and one count for “preference(s)/prefer.”

For statements that cited a supporting reference(s), the supporting reference(s) was also noted and the methods used in these references to elicit BVPs were reviewed. Supporting references for the BVP statements were documented but not included in our classification system and they were not considered in our count of the terms “beliefs,” “values,” and “preferences” but they helped us to define the classification of the statement *only if* we were unsure of where to classify the statement. For example, Belgium E [26] reported that calcium and vitamin D supplementation was sometimes perceived by patients and physicians as an excessive medication and easily dismissed. The reference cited was on adherence to osteoporosis treatment and thus, this statement was classified as “BVP related to adherence to pharmacotherapy or treatment in general.” If the reference cited was not accessible through PubMed or the library catalogue system at the University of Toronto or St. Michael’s Hospital, we made a team decision to assign the statement or related consecutive statements to an appropriate classification.

Results

Twenty-seven of 70 guidelines (39%) included 95 statements or consecutive statements about patient BVPs. Figure 1 demonstrates the screening process of the guidelines. In descending order, the number of statements or related consecutive statements was 11 (Hong Kong), 10 (South Africa), 9 (Australia), 7 (Canada, Scotland B), 6 (India B), 5 (USA A,

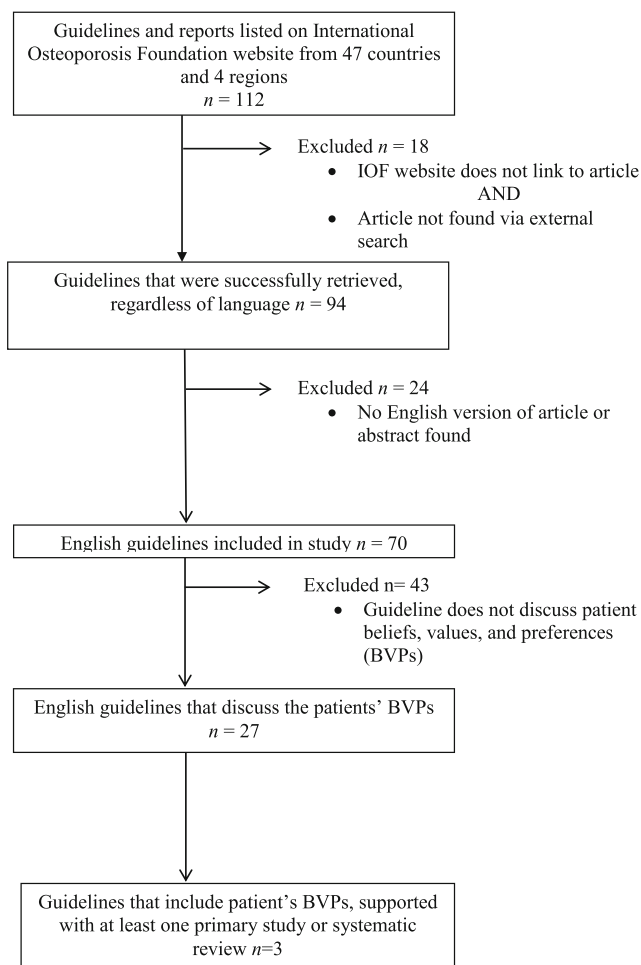


Fig. 1 Screening process for guidelines from the International Osteoporosis Foundation website

UK G, India C), 4 (Scotland A), 2 (USA B, Europe, Germany B, Greece A, Italy, UK E, UK F, Singapore, Middle East and North Africa A), and 1 (USA C, Latin America, Belgium C, Belgium E, Belgium F, Spain, Lebanon C, Lebanon E). The year of publication of the guideline ranged from 2008 to 2017 and the length of the guidelines ranged from 5 to 200 pages (with 24 of 27 guidelines being 10 pages or greater in length). No clear trends were noted in the number of statements by country/region, year of publication, or length of guideline (see Table 1).

As shown in Tables 2, 3, 4, 5, and 6, 32 statements (14 guidelines) were classified under “BVP related to choice of pharmacotherapy or general treatment” (28 of the 32 statements were about choice of pharmacotherapy) (Table 2); 10 (7 guidelines) were classified under “BVP related to adherence to pharmacotherapy or treatment in general” (Table 3); 5 (5 guidelines) were classified under “BVP related to financial costs and benefits” (Table 4); 43 (19 guidelines) were classified under “other BVP mentioned but not supported by a reference to a primary study or systematic review” (Table 5); and 5 (3

Table 1 Characteristics of the guidelines

Country/Region	Number of statements	Year of publication	Length of guideline (pages)
Canada [27]	7	2010	89
USA A [28]	5	2014	23
USA B [29]	2	2016	42
USA C [30]	1	2011	10
Latin America [31]	1	2009	49
Europe [32]	2	2013	35
Belgium C [33]	1	2012	25
Belgium E [26]	1	2010	24
Belgium F [34]	1	2007	12
Germany B [35]	2	2011	20
Greece A [36]	2	2012	5
Italy [37]	2	2016	39
Scotland A [38]	4	2009	56
Scotland B [20]	7	2015	128
Spain [39]	1	2015	12
UK E [40]	2	2008	87
UK F [41]	2	2008	82
UK G [21]	5	2010	60
Australia [22]	9	2010	83
Hong Kong [23]	11	2013	40
India B [42]	6	2013	30
India C [43]	5	2013	HTML document (no page numbers)
Singapore [44]	2	2008	94
Middle East and North Africa A [45]	2	2007	13
Lebanon C [46]	1	2012	6
Lebanon E [24]	1	2017	11
South Africa [25]	10	2010	200

guidelines) were classified under “other BVP mentioned and supported by at least one reference to a primary study” (Table 6). The category “other BVP mentioned but not supported by a reference to a primary study or systematic review” addressed a variety of topics. Many statements in this category mentioned the characteristics of patients such as risk of fracture, comorbidities, circumstances, abilities, indications for treatment, cognitive impairment, and mental status. Topics addressed within the category “other BVPs mentioned and supported by at least one reference to a primary study or systematic review” included fear of falling, falls reduction programs, exercises, menstrual problems or menopausal symptoms, and patient-clinician agreement on treatment goals. In the 95 statements, the term “preference(s)/prefer” appeared the most often ($n = 43$) followed by “value(s)” ($n = 7$) and then “belief(s)/believe” ($n = 4$). The term

Table 2 BVP related to the choice of pharmacotherapy or general treatment

Canada [27]	<p>“When deciding to initiate pharmacologic therapy, the clinician should take into consideration the benefit to harm ratio, particularly in patients at low risk. When choosing between therapies, the patient’s individual risk, co-morbid conditions, preferences and lifestyle should be considered.” (pg. 33)</p> <p>“For those at moderate risk of fracture, patient preference and additional risk factors (Appendix 1, Table A12) should be used to guide pharmacologic therapy [grade C].” (pg. 54)</p>
Latin America [31]	<p>“Studies on patients’ preference regarding the administration of bisphosphonates showed that a monthly ibandronate was preferable compared with weekly bisphosphonates. A recent study carried out in Germany in 13,000 postmenopausal women with osteoporosis showed that, after a year, 90% of the women kept taking ibandronate and 77% of them were satisfied with treatment at monthly intervals. Tolerance to treatment was good or very good in 95% of treated female patients (Börst et al, 2009).” (pg. 26)</p> <p>[Börst H, Bock O, Glaab J, et al. Compliance, persistence and patient satisfaction of patients with postmenopausal osteoporosis treated with 150 mg once-monthly ibandronate - A non interventional study. 31st Annual Meeting ASBMR; Denver, 2009.]</p>
Belgium C [33]	<p>“To select the best choice treatment for their individual patient, clinicians thus depend on indirect comparisons, with little possibility of reliable differentiation in terms of efficacy, taking into account a variety of drug characteristics in relation to the patient’s clinical profile and preferences.” (pg. 82)</p>
Belgium F [34]	<p>“Most men prefer treatment with a GnRH agonist because of the psychological implications of orchidectomy; especially that orchidectomy and treatment with GnRH agonists have equivalent response rates and duration of response.” (pg. 1444)</p>
Germany B [15]	<p>“With the exception of alfacalcidol (here: recommendation level B) a peripheral fracture reduction is not proved for those drugs. Indications for prescription are intolerance of drugs with recommendation level A or patient preference (D).” (pg. 69)</p>
Scotland B [20]	<p>“For ‘conditional’ recommendations on interventions that should be ‘considered’, the guideline development group is confident that the intervention will do more good than harm for most patients. The choice of intervention is therefore more likely to vary depending on a person’s values and preferences, and so the healthcare professional should spend more time discussing the options with the patient.” (no page number)</p> <p>“The ultimate judgment must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgment should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available.” (pg. 2)</p> <p>“There has been concern about potential adverse effects of calcium supplementation (such as increased risk of cardiovascular events), which do not apply to dietary calcium. The evidence investigating a possible association between calcium intake and cardiovascular outcomes has conflicting findings, although, if dietary calcium intakes are adequate, many clinicians prefer to supplement with vitamin D only because of patient concerns and other minor side effects attributable to calcium supplementation (such as constipation and renal calculi) as these may influence adherence.” (pg. 67)</p> <p>“Possible benefits and adverse effects of any treatment should be discussed and reassurance given that other options are available if adverse effects prove too onerous.” (pg. 90)</p>
Spain [39]	<p>“Alternatively, if one does not wish to use a SERM, alendronate or risedronate may be administered.” (pg. 522)</p>
UK F [41]	<p>“The Committee carefully considered the position of women who cannot take alendronate because of a condition which either makes alendronate contraindicated or which prevents individuals from complying with the instructions for administration for alendronate.” (pg. 55)</p>
UK G [21]	<p>“The Committee also accepted evidence from the patient experts that many women stop taking oral bisphosphonates because of adverse events, and often do not go back to their GP. Therefore a 6-monthly subcutaneous injection of denosumab could provide women with a prearranged opportunity to discuss their treatment and any adverse events with a healthcare professional, and this support may improve compliance and persistence with treatment.” (pg. 25)</p> <p>“The patient experts stated that the main concern women have about treatment for osteoporosis is the duration for which therapies are taken and whether they will experience adverse events over a long period of time.” (pg. 26)</p> <p>“The patient experts stated that some women who cannot take or cannot tolerate oral bisphosphonates have a preference for strontium ranelate or raloxifene as they do not like the intravenous infusion used for zoledronate treatment, whereas others prefer the convenience of a 12-monthly intravenous infusion (zoledronate) over taking oral treatments daily (strontium ranelate and raloxifene).” (pg. 23)</p>
Australia [22]	<p>“However, patient tolerance, compliance and side effect profile may suggest changing type or route of administration of therapy on an individual basis.” (pg. 44)</p>
Hong Kong [23]	<p>“Short-term 6-month cross-over studies demonstrated stronger patient preference for monthly ibandronate over weekly alendronate, which might imply a higher level of long-term adherence and compliance with therapy with ibandronate treatment.” (pg. 19)</p> <p>[Emkey R, Koltun W, Beusterien K, Seidman L, Kivitz A, Devas V, Masanauskaitė D. Patient preference for once-monthly ibandronate versus once-weekly alendronate in a randomized, open-label, cross-over trial: the Boniva Alendronate Trial in Osteoporosis (BALTO). <i>Curr Med Res Opin</i> 2005;21:1895-903.]</p> <p>[Hadji P, Minne H, Pfeifer M, et al. Treatment preference for monthly oral ibandronate and weekly oral alendronate in women with postmenopausal osteoporosis: a randomized, crossover study (BALTO II). <i>Joint Bone Spine</i> 2008;75:303-10.]</p> <p>“The Preference and Satisfaction Questionnaire (PSQ) study showed that patients had a greater preference for, and were more satisfied with, a 6-month injection regimen than a weekly oral regimen for osteoporosis treatment.” (pg. 23)</p> <p>[Kendler DL, Bessette L, Hill CD, et al. Preference and satisfaction with a 6-month subcutaneous injection versus a weekly tablet for treatment of low bone mass. <i>Osteoporos Int</i> 2010;21:837-46.]</p> <p>“In the Denosumab Adherence Preference Satisfaction (DAPS) study, a 24-month, randomized, open-label, crossover comparison with alendronate in 250 postmenopausal osteoporotic women, subjects were more adherent, compliant, and persistent with subcutaneous denosumab injections every 6 months than with once weekly alendronate tablets, and they reported increased treatment preference (92.4%) and satisfaction with injectable denosumab over oral alendronate.” (pg. 23)</p> <p>[Freemantle N, Satram-Hoang S, Tang ET, et al. Final results of the DAPS (Denosumab Adherence Preference Satisfaction) study: a 24-month, randomized, crossover comparison with alendronate in postmenopausal women. <i>Osteoporos Int</i> 2012;23:317-26.]</p>

Table 2 (continued)

	<p>“Intravenous bisphosphonates given at longer dosing intervals have also been reported to have a higher preference rate (>75%) by patients over oral bisphosphonates in short-term studies of 12 months’ duration.” (pg. 25)</p> <p>[McClung M, Recker R, Miller P, et al. Intravenous zoledronic acid 5 mg in the treatment of postmenopausal women with low bone density previously treated with alendronate. <i>Bone</i> 2007;41:122-8.]</p> <p>[Yood RA, Emani S, Reed JI, Lewis BE, Charpentier M, Lydick E. Compliance with pharmacologic therapy for osteoporosis. <i>Osteoporos Int</i> 2003;14:965-8.]</p> <p>“Preference for 6-monthly denosumab injection over weekly oral alendronate has also been demonstrated in two studies.” (pg. 25)</p> <p>“The choice of anti-osteoporosis medication may be influenced by the age of a patient, co-morbidities, anti-fracture efficacy, potential adverse effects and affordability of individual medications and, most importantly, the preference of individual patients” (pg. 33)</p>
India B [42]	<p>“When evaluating drug therapies, besides safety, and efficacy, it is important to know the effect of the drug on QOL” (pg. 83)</p> <p>[Kaur S, Walia I, Singh A. How menopause affects the lives of women in suburban Chandigarh, India. <i>Climacteric</i> 2004;7:175-80.]</p>
South Africa [25]	<p>“Osteoporosis is not a single disease entity, but a heterogeneous syndrome, and very few head-to-head studies comparing the relative efficacy and safety of bone-active drugs have been published. Accordingly, no ideal drug can be recommended for the prevention and treatment of osteoporosis. The choice of a pharmacological agent will, therefore, largely depend on: (i) the disease profile (the osteoporosis syndrome), (ii) the patient profile, and (iii) available resources and personal preferences.” (pg. 25)</p> <p>“Given the lack of comparative data on efficacy and safety, drug selection should be individualized and an attempt should be made to always accommodate the preferences of the patient.” (pg. 25)</p> <p>“Drug therapy must be individualized, taking cognisance of the disease profile (particularly the severity of bone loss and skeletal sites involved), the patient profile (age, general health, concomitant disease, the clinical setting), and the available resources and personal preferences.” (pg. 26)</p> <p>“Osteoporosis is a heterogeneous syndrome and no single ideal drug can be recommended for treatment of all patients. The choice of drug should be individualized and is largely determined by (i) the severity and nature of the disease (e.g. nonpharmacological measures, calcium/vitamin D, and regular follow-up should suffice in those with very mild osteopenia and no fractures; consider hormone therapy (HT) or strontium ranelate for those with more significant osteopenia; a bisphosphonate or strontium ranelate for subjects with DXA-proven osteoporosis; and anabolic agents for those with advanced fracturing disease, an ultra-low BMD, or failed treatment with antiresorptive agents, ARAs); (ii) the patient profile (e.g. a bisphosphonate or strontium ranelate for otherwise healthy individuals with osteoporosis; HT for 50- to 60-year-old women with menopausal symptoms in whom HT is not contraindicated; a selective estrogen receptor modulator (SERM) for postmenopausal women with predominantly vertebral osteoporosis at risk of breast cancer); and (iii) available resources and personal preferences.” (pg. 31)</p> <p>“As with many other chronic degenerative disorders, the choice of pharmacological agent will, therefore, have to be individualized according to (i) the disease profile, (ii) the patient profile, and (iii) available resources and personal preferences.” (pg. 149)</p> <p>“Age, general health, concomitant disease, patient preference and the clinical setting in which the patient presents may all have a bearing on the initial choice of drug therapy. Accompanying disorders may obviously contraindicate the use of certain drugs or favor the use of others. In younger women (50–60 years), particularly those with menopausal symptoms, HT should be considered, depending on contraindications and patient preferences.” (pg. 150)</p> <p>“Given the lack of comparative data on the efficacy and safety of osteoporosis agents, decisions on drug selection should be individualized and always attempt to accommodate the preferences of the patient.” (pg. 150)</p> <p>“Drug therapy must be individualized, taking cognisance of the disease profile (particularly the severity of bone loss and skeletal sites involved), the patient profile (age, general health, concomitant disease, the clinical setting), and the available resources and personal preferences.” (pg. 151)</p>
Middle East and North Africa A [45]	<p>“In conclusion, in addition to the evidence-based efficacy of the different drugs, safety, tolerability and patient preference should also be taken into account in the determinants of treatment choice.” (pg. 140)</p>

“preferences” appeared most often in the classification “BVP related to the choice of pharmacotherapy or general treatment” ($n = 24$), followed by the classification “other BVP mentioned but not supported by a reference to a primary study or systematic review” ($n = 17$).

Across all statements, 29 supporting references were linked with BVPs mentioned in the guidelines (see Tables 2, 3, 4, 5, and 6). Eight of the 29 cited references were not located through our external search of PubMed and the library catalogues at St. Michael’s Hospital or University of Toronto. We

sent an email to two authors of these references and did not receive a response. We were unable to locate the contact information for the six remaining references cited. The 21 cited references that were located included an editorial, a systematic review, other guidelines, a website, a case study, a study not related to BVPs, or quantitative studies utilizing measures of preferences or beliefs such as the Preference and Satisfaction Questionnaire [47], standard gamble [48], and Beliefs about Medicines Questionnaire [49]. No qualitative studies were included as providing evidence of patients’ BVPs.

Table 3 BVP related to adherence to pharmacotherapy or treatment in general

USA A [28]	“It is important to ask patients whether they are taking their medications and to encourage continued and appropriate compliance with their osteoporosis therapies to reduce fracture risk.” (pg. 2375)
Europe [32]	<p>“Improving adherence to osteoporosis therapy requires effective patient/provider communication and close patient monitoring for the early identification of declining adherence. Patients’ belief in a medication contributes to better adherence and can be improved by firmly associating treatment with expected benefits such as reduced risk of fracture and thereby an improved quality of life.” (pg. 45)</p> <p>“Non-adherence to medical therapy is a widespread public health problem. It is estimated that only half of the patients comply with long-term therapy of which a substantial minority do not even redeem their prescription. Overcoming non-adherence presents particular challenges in asymptomatic bone diseases and other chronic, asymptomatic conditions. In such settings, the level of perceived threat to health does not motivate the patient to adhere to therapy. In addition, risk of non-adherence with any therapy increases with increased duration of treatment.” (pg. 45)</p> <p>Solomon DH, Avorn J, Katz JN, Finkelstein JS, Arnold M, Polinski JM, Brookhart MA (2005) Compliance with osteoporosis medications. <i>Arch Intern Med</i> 165:2414–2419</p>
Belgium E [26]	<p>“Calcium and vitamin D supplementation is frequently perceived by patients and sometimes by their physicians as an excessive medication and is easily dismissed to avoid polypharmacy, especially in elderly patients. Lack of motivation is the most common reason for nonadherence to calcium and vitamin D3 supplementation, emphasizing the need for an active role of physicians in prescribing supplements to motivate patients.” (pg. 1660)</p> <p>[Rossini M, Bianchi G, Di Munno O, Giannini S, Minisola S, Sinigaglia L, Adami S (2006) Determinants of adherence to osteoporosis treatment in clinical practice. <i>Osteoporos Int</i> 17:914–921]</p>
Greece A [36]	“The panel also accepts that the most common cause of defective compliance to anti-osteoporotic treatment in Greece is either the treatment-induced problems of the upper gastrointestinal tract or the aggravation of the already existed gastrointestinal symptoms and signs. Thus, the treatment algorithms in Figs. 2 and 3 are taking into consideration the presence of these problems and/or conditions.” (pg. 41)
Scotland B [20]	<p>“All treatment options should be discussed with the patient and consideration should be given to the patient’s ability and motivation to adhere to treatment recommendations.” (pg. 90)</p> <p>“Concordance is defined as “agreement between the patient and healthcare professional, reached after negotiation, that respects the beliefs and wishes of the patient in determining whether, when and how their medicine is taken, and (in which) the primacy of the patient’s decision (is recognized).” (pg. 2)</p> <p>[Marinker M, Blenkinsopp A, Bond C. From compliance to concordance: achieving shared goals in medicine taking. London: Royal Pharmaceutical Society of Great Britain; 1997.]</p>
Australia [22]	<p>“Repeated scans may be useful for addressing patients’ concerns in relation to treatment adherence, but are more limited for monitoring response to treatment.” (pg. 45)</p> <p>Scottish Intercollegiate Guidelines Network. Management of osteoporosis. A national clinical guideline. Edinburgh: Scottish Intercollegiate Guidelines Network, 2003.</p>
India C [43]	<p>“Health-care professionals managing PMO [post menopausal osteoporosis] should be aware of the concepts of compliance, adherence, concordance, and persistence, and work to improve adherence in patients of PMO, in order to optimize therapeutic outcomes.” (HTML document with no page numbers)</p> <p>“In choosing therapy, drug-related (risk-benefit), patient profile (age, years since menopause, symptoms, comorbidities) and environment-related factors (economics and social) should be identified. Patients should be educated in PMO and its treatment and empowered to take part in shared decision making to improve adherence.” (HTML document with no page numbers)</p>

Table 4 BVP related to financial costs and benefits

Canada [27]	“Cost-effectiveness models and guidelines typically do not consider personal preferences and health priorities. It has been suggested that integration of individual-specific with population-specific factors could ideally lead to “individualized intervention thresholds”, thus aiding clinicians to maximize benefits to patients and society.” (pg. 49)
Greece A [36]	“Finally, the relation of financial cost and potential benefit is an issue that should be always considered in all diagnostic procedures and therapeutic decisions.” (pg. 41)
Scotland A [38]	“The ongoing substantial total cost of hip fracture care should take into account subsequent related health and social care costs required after discharge from hospital and costs met by the families of the patients.” (pg. 2)
Scotland B [20]	“Exercise is assumed to be a safe intervention as no adverse events are reported. Exercise is a low-cost, accessible intervention which could be implemented with minimal resources. Consideration must be given to the perceived risks or concerns, such as fracture or other injury, which some individuals may have when starting or resuming exercise in later life.” (pg. 40)
India B [42]	“Management depends on the cause, cost benefit analysis of therapy and the patient’s choice (R: Grade C).” (pg. 82)

Table 5 Other BVP mentioned but not supported by a reference to a primary study or systematic review

Canada [27]	<p>“An integrated risk assessment and treatment model is desirable to ensure that there is a consistent approach to overall management. This should involve a participatory approach to clinical decision-making, with patient and health care provider reviewing the patient’s risk for osteoporotic fracture and health care preferences, leading to the formulation of an individualized care plan (Figure 2).” (pg. 45)</p> <p>“<i>Additional Considerations in Decision-Making</i> For those with moderate fracture risk and no other risk factors, treatment should be individualized and may include pharmacologic therapy, or basic bone health with monitoring. Patient preference and additional clinical risk factors that are not already incorporated in the risk assessment system will also help to guide management decisions.” (pg. 47)</p> <p>“Patients’ perceptions of future fracture risk are influenced by whether or not they believe they have osteoporosis. Furthermore, up to 46% of individuals who had experienced fragility fracture did not believe that they were at an increased risk for a future fracture.” (pg. 55)</p>
USA A [28]	<p>“Fractures can also cause psychosocial symptoms, most notably depression and loss of self-esteem, as patients grapple with pain, physical limitations, and lifestyle and cosmetic changes.” (pg. 2361)</p> <p>“The potential risks and benefits of all osteoporosis interventions should be reviewed with patients and the unique concerns and expectations of individual patients considered in any final therapeutic decision.” (pg. 2362)</p> <p>“The therapeutic thresholds proposed in this Guide are for clinical guidance only and are not rules. All treatment decisions require clinical judgment and consideration of individual patient factors, including patient preferences, comorbidities, risk factors not captured in the FRAX® model (e.g., frailty, falls), recent decline in bone density, and other sources of possible under- or overestimation of fracture risk by FRAX®.” (pg. 2367)</p> <p>“Patient preferences may indicate treatment for people with 10-year fracture probabilities above or below these levels” (pg. 2370)</p>
USA B [29]	<p>“Potential risks and benefits of available osteoporosis interventions should be reviewed and incorporated into local guidelines, while allowing physicians to individualize treatment decisions for patient preferences and circumstances.” (pg. 18)</p> <p>“It is incumbent on the clinician to provide this information to each patient in a manner that is fully understood, and it is equally important to learn from the patient about cultural beliefs, previous treatment experiences, fears, and concerns.” (pg. 27)</p>
USA C [30]	<p>“Although the USPSTF recommends using a 10-year fracture risk threshold of 9.3% to screen women aged 50 to 64 years, clinicians also should consider each patient’s values and preferences and use clinical judgment when discussing screening with women in this age group.” (pg. 359)</p>
Germany B [35]	<p>“There are many situations, like multimorbidity, short life expectation or the patient’s wish, in which a higher therapeutic threshold can be set for the 10-year fracture risk to be avoided, based on the total clinical context.” (pg. 67)</p>
Italy [37]	<p>“Surgery is also indicated for patients who cannot be followed up or in case of patient preference for surgery, even if the above indications are not met, and in the absence of contraindications.” (pg. 8)</p> <p>“Furthermore, evaluation of treatment appropriateness includes aspects of the patient’s interest in terms of treatment risk-benefit balance, but also social aspects related to proper resource use. Therefore, evaluation of the appropriateness of pharmacological treatment is complex, involving factors related to the drug (evidence of efficacy, safety data, reliability in terms of feasibility of treatment and sustained adherence, cost) but also to the patient (fracture risk, comorbidities, etc.).” (pg. 27)</p>
Scotland A [38]	<p>“The ultimate judgment must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgment should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient’s case notes at the time the relevant decision is taken.” (pg. 2)</p> <p><i>9.4 Discharge Management</i> “The patient should be central to discharge planning, and their needs and appropriate wishes taken into consideration. The views of a carer are also important.” (pg. 5)</p> <p>“The patient should be central to discharge planning, and their needs and appropriate wishes taken into consideration. The views of a carer are also important.” (pg. 28)</p>
UK E [40]	<p>“Commissioners and/or providers have a responsibility to provide the funding required to enable the guidance to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution.” (pg. 2)</p> <p>“The recommendations in this guidance represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgment, health professionals are expected to take this guidance fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this guidance are at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.” (pg. 2).</p>
UK F [41]	<p>“The recommendations in this guidance represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgment, health professionals are expected to take this guidance fully into account,</p>

Table 5 (continued)

	alongside the individual needs, preferences and values of their patients. The application of the recommendations in this guidance are at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.” (pg. 2).
UK G [21]	<p>“The recommendations in this guidance represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgment, health professionals are expected to take this guidance fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this guidance are at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.” (pg. 2)</p> <p>“This guidance represents the views of NICE and was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgment. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.” (pg. 59)</p>
Australia [22]	<p>“It is intended that the guideline be considered according to the limitations outlined below and used in conjunction with clinical judgment and patient preference.” (pg. 3)</p> <p>“The Working Group supports all 28 recommendations and intends that they are used in conjunction with clinical judgment and patient preferences. They do not cover complex medical conditions and comorbidities.” (pg. 3)</p> <p>“A normal bone density despite typical vertebral fractures also poses a problem with regard to the usefulness of anti-osteoporotic treatment. Such discrepant findings need to be resolved on an individual basis.” (pg. 17)</p> <p>“Exercise programs should be individualized to the patient’s needs, abilities and interests” (pg. 24)</p> <p>“Exercise programs should be individualized to the patient’s needs, abilities and interests” (pg. 33)</p>
Hong Kong [23]	<p>“The OSHK considers adherence to these guidelines to be voluntary, with the ultimate determination regarding their application to be made by the physician in the light of each patient’s individual circumstances.” (pg. 1)</p> <p>“These US criteria are for clinical guidance only. All treatment decisions require clinical judgment and consideration of individual patient factors, including patient preferences, co-morbidities, quality of life, life expectancy, and other risk factors not captured in the FRAX model such as frailty and falls.” (pg. 23)</p> <p>“<i>Recommendations:</i> It is reasonable to reassess the need for continuing treatment after an initial treatment duration of 5 years. Decisions to continue treatment must be based on individual assessment of risks and benefits and on patient preference. Physicians should re-evaluate in the context of the indications for treatment, progress while receiving therapy, current BMD measurements, and current bone marker levels (if available), and risk factors for fracture.” (pg. 28)</p> <p>“As more elderly people are enjoying an active lifestyle, the physical and psychological demands of a patient must also be taken into consideration when deciding whether early operative intervention should be performed.” (pg. 31)</p> <p>[Leung F. Surgery for wrist fractures in the elderly: for better form or better function? J Orthop Surg (Hong Kong) 2005;13:221-2.]</p> <p>“Adequate pain control, minimisation of bed rest or inactivity with early mobilization, early multidisciplinary rehabilitation with attention to a patient’s needs and environmental contextual factors are common keys to success in osteoporotic fracture rehabilitation.” (pg. 32)</p>
India B [42]	<p>“The WHO defines QOL as an individual’s perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards, and concerns. The two terms in common usage are global QOL and health-related Quality of life (HRQOL). WHO- Several questionnaires are used to assess HRQOL. QOL as it relates to menopausal women is usually referring to health-related QOL, taking into account a woman’s symptoms.” (pg. 83)</p> <p>“The decision to perform mammography should be determined with shared decision making about risks and benefits and by individual patient values.” (pg. 93)</p>
India C [43]	<p>“Psychiatric evaluation of patients with post-menopausal osteoporosis, structured unstructured, should be carried out whenever indicated, especially in patients with depression, psychosis, suicidal or cognitive impairment. Use brief screening instruments like Whooley’s 2-question screening test for depression” (GRADE B) (HTML document with no page numbers).</p> <p>“Duration of therapy has to be individualized depending on the patient’s profile, drug used, and response to therapy.” (HTML document with no page numbers).</p> <p>“There is no recommendation on combination therapies, sequential therapies and drug holidays; these should be planned as per individual patient’s need.” (HTML document with no page numbers).</p>
Singapore [44]	<p>“Patient’s concerns and expectations should be considered during the evaluation and treatment of osteoporosis.” (pg. 1)</p> <p>“Patient’s concerns and expectations should be considered during the evaluation and treatment of osteoporosis.” (pg. 17)</p>
Middle East and North Africa A [45]	“ <i>Exercise.</i> Regular weight-bearing exercise may maintain BMD and muscle strength and induce better balance and agility contributing to fall prevention. The type of exercise should be tailored to the individual’s needs and abilities.

Table 5 (continued)

	People with osteoporosis must take special care when exercising to reduce the risk of fracture due to impact or falls.” (pg. 140)
Lebanon C [46]	“Adopt a full clinical evaluation: causes of fall, comorbidities, previous level of mobility, social support, and mental status on admission.” (pg. 154)
Lebanon E [24]	<i>The Canadian Model</i> : “Individuals at moderate risk with additional risk factors (e.g., rapid bone loss, use of aromatase inhibitors or androgen deprivation therapy) may be offered pharmacologic therapy depending upon patient preferences.” (pg. 128) [Papaioannou A, Morin S, Cheung AM, Atkinson S, Brown JP, Feldman S, Hanley DA, Hodsdman A, Jamal SA, Kaiser SM (2010) 2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. <i>CMAJ</i> 182(17): 1864–1873]
South Africa [25]	“Assess patient preferences, compliance, potential drug side-effects, and financial resources.” (pg. 12) “Assess patient preferences, compliance, potential drug side-effects, and financial resources.” (pg. 88)

Table 6 Other BVP mentioned and supported by at least one reference to a primary study or systematic review

Canada [27]	“Loss of confidence and fear of falling have been reported with all types of fractures and less than 40% of those who experience a hip fracture return to their prior walking abilities.” (pg. 8) [Cranney AB, Coyle D, Hopman WM, Hum V, Power B, Tugwell PS. Prospective evaluation of preferences and quality of life in women with hip fractures. <i>J Rheumatol</i> 2005;32:2393-9.] [Pasco JA, Sanders KM, Hoekstra FM, Henry MJ, Nicholson GC, Kotowicz MA. The human cost of fracture. <i>Osteoporosis International</i> 2005;16:2046-52.]
Australia [22]	“To be successful, a falls reduction program needs to be tailored to the individual’s needs and includes a range of strategies. A falls reduction program may include: Pfeilschifter J. DVO-guideline for prevention, diagnosis, and therapy of osteoporosis for women after menopause, for men after age 60: executive summary guidelines. <i>Experimental and Clinical Endocrinology and Diabetes</i> 2006;114(10):611-20. American Geriatric Society, British Geriatrics Society, American Academy of Orthopedic Surgeons. Guideline for the prevention of falls in older persons. <i>Journal of the American Geriatrics Society</i> 2001;49(5)664-72. Gillespie L, Gillespie W, Roberson M, et al. Interventions for preventing falls in elderly people. <i>Cochrane Database of Systematic Reviews</i> 2003; Issue 4; Art. No.: CD000340. DOI: https://doi.org/10.1002/14651858 . CD000340. - Education on the risk of falling and prevention strategies - Medication review and modification - Exercise programs tailored to the individual’s specific needs and abilities” (pg. 22) “Exercise should be appropriate to the patient’s ability and preferences, but needs to be regular, vigorous and varied to influence bone density.” (pg. 24) [Osteoporosis Australia. Preventing osteoporosis – exercise. 2007 [updated 2007; cited 2009 Jun]. Available at www.osteoporosis.org.au/osteop_prevention_exercise.php#weight .]
India B [42]	“Each woman needs an individualized health plan management. It is most important to distinguish between a symptomatic and an asymptomatic menopausal woman. Women may present at the menopausal clinic with menstrual problems, menopausal symptoms or request for a general health check-up, or as an opportunistic contact to be picked up by the health professional” (pg. 80) [Herbert B. Peterson, MD Discussant – A 40 year-old Women considering contraception. <i>JAMA Contraception Information Center</i> , vol. 279. p. 1651-8. May 27, 1998. p. 1.] [Welling K, Field J, Johnson AM, Wadsworth J. Contraception in the Over-40s. <i>Menopause Digest</i> , Vol. 13, 2001. p. 5.] [Haines CJ, Ludicke F. Contraception in the late premenopause. Geneva: Proceedings of the First Consensus Meeting on Menopause in the East Asian Region; 1997. p. 55.] [Lakshmi RM, Kusumalatha K, Shradha S. Analysis of 200 Perimenopausal Women: A Prospective Study. 12th National Indian Menopause Society Meeting, Rajkot; 2007 p. 25.] [Bhavna S. Quality of Life During Menopause, 9th National Indian Menopause Society Meeting. Souvenir, Surat, Souvenir; 2009.] “The objectives of counseling include addressing women’s questions and concerns, providing patient education, and enhancing the patient’s confidence in the decision making. If a therapy is chosen, the patient and clinician should agree on the goals, risks, and benefits, whether they are short-term (menopause symptom relief), long-term (primary or secondary prevention of diseases associated with aging), or both.” (pg. 98) [Hina K, Manju T, Mehandale SS, Wagh GN. Mid life management clinic for screening of metabolic disorders and osteoporosis in women aged above 35 years. 17th National Indian Menopause Society. Faridabad, Souvenir. 2012. p. 45.] [Kakkar V, Arshdeep K, Darshanjot K, Kanwaljit C, Indu Pal K. Combined effect of drug therapy and counseling in the relief of menopause symptoms. 11th National Indian Menopause Society Meeting. Chandigarh; 2003. p. 209.] [Bharati A. Awareness of health check up in peri-menopausal women. 15th National Indian Menopause Society Meeting. Chennai, Souvenir; 2010. p. 67.] [Nimala V. Counselling 12th women: Is it worth the time? National Indian Menopause Society Meeting. Rajkot, Souvenir; 2007. p. 34.]

Discussion

In this document analysis, 27 of 70 (39%) guidelines included mention of patients' BVPs. This suggests that there is room for improvement in consideration of BVPs of the patients for whom osteoporosis guidelines are targeted. These 27 guidelines accounted for 95 individual statements or related consecutive statements, of which less than half ($n = 43$) included the term "preferences." There were fewer instances of the terms "values" ($n = 7$) and "beliefs" ($n = 4$) in the 95 statements. Patients' BVPs were mentioned as an important factor to consider in 19 guidelines but appeared to be conceptualized mostly as preferences for one medication over another in 14 guidelines. Of interest, only 5 statements from 3 guidelines (Canada [27], Australia [22], India B [42]) fit within the classification "other BVP mentioned and supported by at least one reference to a primary study or systematic review." This suggests that guidelines need to go beyond discussing BVPs as an important factor to consider in general and include relevant evidence in guideline development. Conceptualizing BVPs as the choice of pharmacotherapy, adherence to pharmacotherapy, and financial costs to individuals or society is also of concern as they do not appear to reflect BVPs of individuals with bone health issues. Rather, these conceptualizations appear to reflect the agenda of pharmaceutical companies and/or financial constraints of the individual or health care system, rather than health.

Our findings are specific to osteoporosis clinical practice guidelines but they may not be unique. McCormack and Loewen [1] reviewed 5 Canadian clinical practice guidelines for diabetes, dyslipidemias, hypertension, and osteoporosis and reported that while 3 of the 5 guidelines mentioned the importance of patient values and preferences, little attention was paid to patients' values and preferences in therapeutic decision-making.

When guidelines accounted for BVPs, the conceptualization of BVPs appeared to focus on choosing between medications or adhering to medication. One reason for this may be the lack of patient involvement in the development of the guidelines themselves. Selva and colleagues [50] reported that most guidance documents for developing guidelines recommend the inclusion of patients and/or their views in the guideline development process. In the practice of guidelines examined in this study, patient characteristics were often conceptualized as proxies for BVPs. This is also potentially problematic. Tailoring treatment based on a patient's disease severity and risk profile is not the same thing as taking an individual's values into account [51]. As mentioned, only 3 guidelines provided what we considered to be evidence of patient BVPs based on studies cited. Further, no study cited by the statements in this document analysis used qualitative research to elicit patient BVPs. Krahn and Naglie [51] offer the explanation that narratives about patient experiences are not often regarded as evidence. These authors propose that preference-related evidence includes decision analyses in which preferences are represented using health utilities, preferences for health

outcomes, or qualitative studies of patients' experiences [51]. They also propose that recommendations should be preference-sensitive in that guideline developers should "distinguish between recommendations that nearly all patients will accept and recommendations that are likely to vary depending on an individual patient's preferences for outcome, process, or choice" (p. 437).

Our study has several implications. In guidelines which mentioned BVPs, the term "preferences" was most often included, while "beliefs" and "values" were mentioned fewer times. In our study, preferences most often referred to the choice of one medication over another. As Guyatt and colleagues [7] point out, one challenge to evidence-based medicine is the ability to study the process of eliciting and understanding patient values and the best ways to incorporate them in the clinical decision-making process. Having said this, some authors appear to question the ability or desire of sick patients to examine their preferences and values [52]. They propose that patients may not be able to absorb complex information and make decisions under the stress and distraction of pain and illness. One option is to examine the experiential knowledge of patients as described by Caron-Flinterman and colleagues [53]. These authors refer to experiential knowledge as the implicit, lived experiences of individual patients with their bodies, their illnesses, and care. In the midst of this debate, it is important to note the rising interest in having patients as active participants in research related to their health. These include the Strategy for Patient-Oriented Research sponsored by the Canadian Institutes of Health Research (www.cihr-irsc.gc.ca/e/41204.html) and the Patient and Clinician Engagement Program of the North American Primary Care Research Group (www.napcrg.org/).

We believe that if preferences are not explicit in guidelines, physicians will rely on other patient factors in their decision-making. Otte and colleagues [54] reported that physicians' assessment of age and general condition or prognosis of the patient played a role in treatment recommendations and that patient preferences were not generally considered. If osteoporosis clinical practice guidelines are not explicit in their conceptualization of BVPs, previous work suggests that patients may seek advice about bone health and fracture risk from their family physician and/or specialist [55, 56], yet may receive different messages from these providers [57, 58].

We distinguished a patient's preference between two or more medications and a patient's preference to take any medication at all because a patient's beliefs, values, and preferences to *not* take medication is an option and should be acknowledged. For example, Rittenmeyer and colleagues [59] examined "watchful waiting" as an alternative approach to the medical management of certain diseases. They reported that the process to choose watchful waiting is a complex one that often leads to uncertainty and anxiety. However, the burden of this process can be lessened if patients have a reassuring relationship with their health care provider.

Our study has several strengths. Two individuals (AM, FN) independently extracted data and then met to consolidate their data extraction. All the authors met regularly to discuss and refine the categories developed. Three individuals (AM, FN, WY) then worked together to assign the statements to the five categories. The first author resolved any discrepancies with the grouping of statements into the categories and another author (WY) verified all data extraction at the end of the study. We have developed a classification scheme that others can use or revise further to examine guidelines in their own disease groups. One limitation of our study was that we were not able to examine guidelines that were written in languages other than English ($n = 24$) so cannot comment on whether these guidelines included data on patient BVPs. Also, we relied on the IOF website as a resource for the guidelines. The IOF site may not include the most current version of guidelines published by each country or region. Countries with multiple guidelines would be reliant on the various organizations within that country to send their guidelines to the IOF. Finally, we did not extract information on the methodology used to develop the guidelines or the presence of a patient in the development of the guidelines. Future studies should examine whether the methodology used to develop guidelines or the presence of a patient in guideline development influences the number and content of BVP statements.

In conclusion, 39% ($n = 27$) of English-language osteoporosis guidelines included mention of BVPs. In 19 guidelines, the importance of BVPs in general was mentioned. Of 95 BVP statements across the 27 guidelines, the term “preferences” occurred much more frequently ($n = 43$) than “values” ($n = 7$) and “beliefs” ($n = 4$) and when described, most often referred to the choice of one medication over another (32 statements in 14 guidelines). We propose that guideline developers consider strategies for a broader conceptualization and inclusion of BVPs in future osteoporosis clinical practice guidelines and provide clinicians with information about benefits and harms in a way that allows for shared decision-making.

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Compliance with ethical standards

Conflict of interest None.

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