DETERMINATION OF SELF-ASSESSMENT OF OSTEOPOROSIS AND FRACTURE RISK AMONG WOMEN UNDERGOING OSTEODENSITOMETRY

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Abstract. *Osteoporosis (OP) is a metabolic bone disease that leads to a decrease in bone density and deterioration of the bone microarchitecture, increasing the risk of fractures. Its early detection, the calculation of fracture risk and the patient's self-assessment of the bone health status is a key moment for the prevention of osteoporotic fractures. The aim of this study was to investigate patients' self-assessment of OP and subsequent fracture risk. Among 324 women, before examining bone mineral density (BMD) with radiofrequency echographic multispectrometry (REMS), a survey with a self-report questionnaire for self-assessment of OP and fracture risk was conducted. It was found that 51.9% of women consider that the examination for OP is necessary, and 46.6% consider OP as a threatening disease. Unfortunately, only 8.3% knew they could self-assess their fracture risk and 0.6% had ever had their 10-year fracture risk assessed using the "FRAX" model. Interestingly, the older the women were, the less often they consider OP as a threatening disease. 77.5% of the women studied had a decreased bone density, measured with REMS. This demonstrates poor education and self-awareness of the patients regarding OP, as well as the lack of an objective assessment of the risks associated with it, and the need to conduct osteodensitometry.*

Key words: *self-assessment, osteoporosis, fracture risk, REMS*

Introduction

Osteoporosis (OP) is also called the "silent disease" because it is characterized by a lack of symptoms and therefore patients are not always aware of their disease or the associated risk of fractures. Thus, they become aware of the disease only after a fracture has occurred, failing to take the necessary measures in time.

Health self-assessment and the perceived risk of disease occurrence have a mediating role in shaping the health behavior of the individual and the frequency of medical visits performed [1, 2]. In the world as a whole, awareness of OP, as well as other chronic diseases, is defined as low. Raising awareness is the first step to ensure long-term compliance with therapy [3, 4].

The World Health Organization identifies five areas that influence awareness of chronic diseases and, accordingly, compliance with long-term therapy, including OP [5]. According to these five directions, it is assessed whether after the diagnosis the patient would follow the recommendations regarding the therapy. The factors that influence these directions are grouped into 5 groups:

• Factors related to therapy (including side effects and established benefit)

• Socio-economic factors (including age and education)

• Patient-related factors (including fear, expectations, knowledge and motivation)

• Disease-related factors (severity of symptoms)

• Factors related to the health care system (physician–patient relationship, cost bearing).

A large study on OP investigating the awareness of OP in a group of women who underwent quantitative ultrasound osteodensitometry was done in China [6]. After completing the examination, individuals were asked if they would be willing to complete a OP awareness questionnaire designed by three OP experts, which include demographic characteristics (gender, age, height, weight, menopause, education, history of fracture in details, including the age at which the fracture occurred and its anatomical location and cause) and six simple basic awareness questions. The majority of people with a history of fracture in this study were not yet aware of OP.

For people undergoing a dual-energy X-ray absorptiometry (DXA) scan, it is important to understand the doctor reporting their results so that they are aware of the need for action to be taken regarding the problem. A survey regarding awareness of OP found a poor understanding of the problem – only 36% of the population with an

average age of 58.6 years, of which 51.8% were men with BMD in the osteoporotic range after DXA examination [7].

Lack of medication adherence is also a well-documented problem for the OP population. It is estimated that between 30-50% of patients do not continue to take medications as recommended [8]. Health literacy may play a role in those who do not undergo DXA scans and do not adhere to treatment. A population with lower health literacy is not only less likely to have a DXA scan, but also less likely to adhere to prescribed therapy.

Although there are studies assessing whether women with peri- and postmenopausal fractures believe their fracture is related to OP, it is unknown whether they understand that they are at increased risk of future fracture. Furthermore, no study evaluated factors such as age, sex, or OP diagnosis that may be associated with perception of subsequent fractures in patients with pathologic ones. The aim of previous studies was to assess whether patients with a low-energy fracture perceive themselves as a risk individual for future fractures and to identify the factors that lead the patient to believe that they are at risk for future fractures [9].

The perception of OP in a studied group of people is related to the current use of some drugs [10]. In this case, previous bone density testing or the diagnosis of OP were the only factors associated with active consideration or current use of medication for OP in patients with hip fracture. Therefore, communicating to patients with a pathologic fracture that they are at risk of future fracture may be critical in increasing the likelihood that these patients will accept OP therapy [11]. It has been shown that if women understand the beneficial impact of a behavior (e.g. calcium intake) associated with OP, they are more likely to benefit from this knowledge. Self-management is an important component of the OP treatment.

The aim of the current study was to determine the self-assessment of osteoporosis and fracture risk among women undergoing osteodensitometry.

Materials and Methods

An anonymous survey among 324 women was conducted before the examination with radiofrequency echographic multispectrometry (REMS). For this purpose, a self-assessment questionnaire for OP and fracture risk was developed and applied. The questionnaire contains information about age, body measurements (height and weight) and current self-assessed health status using a visual numerical one-dimensional rating scale. Subjects were asked to indicate the level of the rating scale that corresponds to their subjective perception of the characteristics. “0” corresponds to full health (= completely healthy) and “10” corresponds to severe disease (= very sick). Additionally, a symbolic rating scale in the form of smiles was used to facilitate older patients who no longer have the abstraction required for numerical scales [12].

In order to assess the awareness of the problem of osteoporosis risk, questions were included with the answer generated in dichotomous nominal scale as yes/no response options, which aim to assess not only the awareness of belonging to the disease OP, but also the willingness of the patients to conduct screening for OP as well as to assess their awareness of fracture risk. Questions included information about patients’ own need for OP testing and self-reported perception of the threat of the disease. It is also assessed whether OP is already known or diagnosed, and whether a fracture risk assessment has been carried out.

Statistical evaluation was performed using the SPSS version 19.0 program.

Results

Out of a total of 324 women, 44 women (13.6%) were known to have OP. They represented 46.8% (44/94) of the women with diagnosed OP with the REMS examination, Fig. 1A. 168 women (51.9%) believed that the examination for OP is necessary. Of these, 62 women (36.9%) had OP, 92 women (54.8%) had osteopenia, and the remaining 14 women (8.3%) had normal BMD. 156 women from a total of 324 examined patients did not consider the OP examination necessary, but nevertheless decided to undergo it. Of these, 32 women (20.5%) had OP, 65 women (41.7%) had osteopenia and 59 women (37.8%) had normal BMD, Fig. 1B. Out of 324 examined women, 151 women (46.6%) considered OP as a threatening disease, and the remaining 173 women (53.4%) did not define OP as a threatening disease, Fig. 1C. Of the 324 examined patients, only 27 women (8.3%) knew that they could self-assess their fracture risk, and the remaining 297 women (91.7%) did not know that they could self-assess their fracture risk, Fig. 1D.

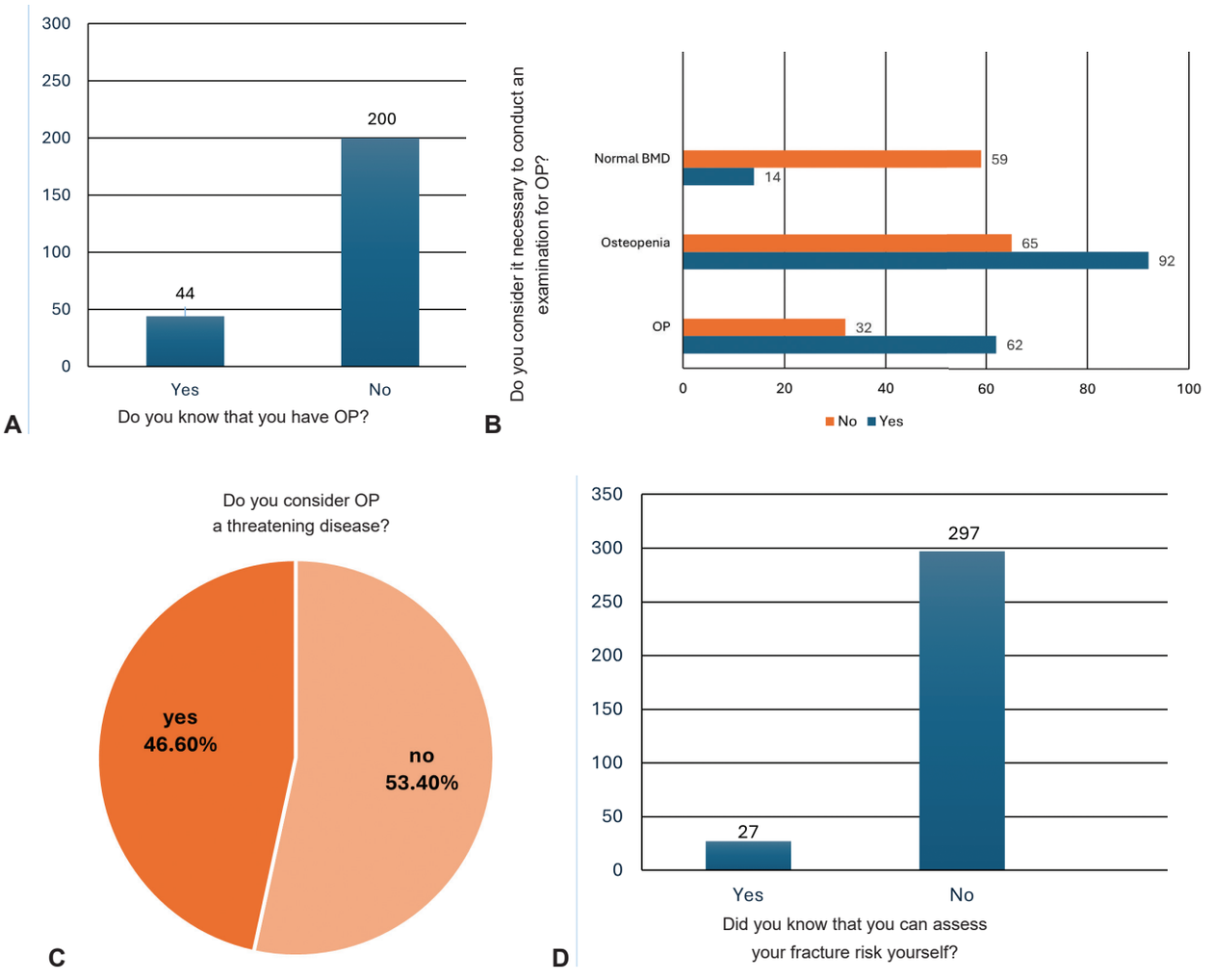

Fig. 1. 1A. Distribution of women according to their answers to the question: "Do you know that you have OP?"; 1B. Distribution of women according to the answers to the question: "Do you consider it necessary to conduct an examination for OP?" and the established diagnosis after osteodensitometry with REMS; 1C. Distribution of women according to the answers to the question: "Do you consider OP a threatening disease?"; 1D. Distribution of women according to the answers to the question: "Did you know that you can assess your fracture risk yourself?"

Of the 324 patients studied, only 2 women (0.6%) ever had their 10-year fracture risk assessed using the "FRAX" model, Fig. 2A. When comparing the answer to the question "Do you consider OP a threatening disease?" in the different age groups, we found that the older the women were, the less often they considered OP as a threatening disease, Fig. 2B. After comparing the history of previous fracture between the groups according to the answer to the question: "Do you consider it necessary to conduct an exam for OP?" no statistically significant difference was found (p = 0.065). Women who considered it necessary to conduct a screening for OP had a more frequent history of fractures (62 women) than those who did not consider investigation for OP necessary (45 women), but the difference between groups was not significant, Fig. 2C.

After conducting a comparison of the history of previous fractures between the groups according to the answer to the question: "Do you consider OP a threatening disease?" also no statistically significant difference was found (p = 0.123). Women who considered OP as a threatening disease had a more frequent history of fractures (60 women with fractures) compared to those who did not consider OP as a threatening disease (47 women with fractures), but the difference between the groups was not significant, Fig. 2D.

After comparing the fracture risk for a major osteoporotic fracture (FRAX MOF) between the groups

according to the answer to the question: “Do you consider it necessary to conduct an examination for OP?” no statistically significant difference was found (p = 0.436). Women who consider it necessary to conduct an examination for OP have a higher fracture risk (17.2%) compared to those who do not consider it necessary (16.4%), but this difference is not significant, Fig. 2E.

After comparing the fracture risk for FRAX MOF between the groups according to the answer to the question: “Do you consider OP a threatening disease?” also no statistically significant difference was found (p = 0.158). Women who consider OP a threatening disease have a higher fracture risk (17.8%) compared to those who do not consider it threatening (17.5%), but this difference is not significant, Fig. 2F.

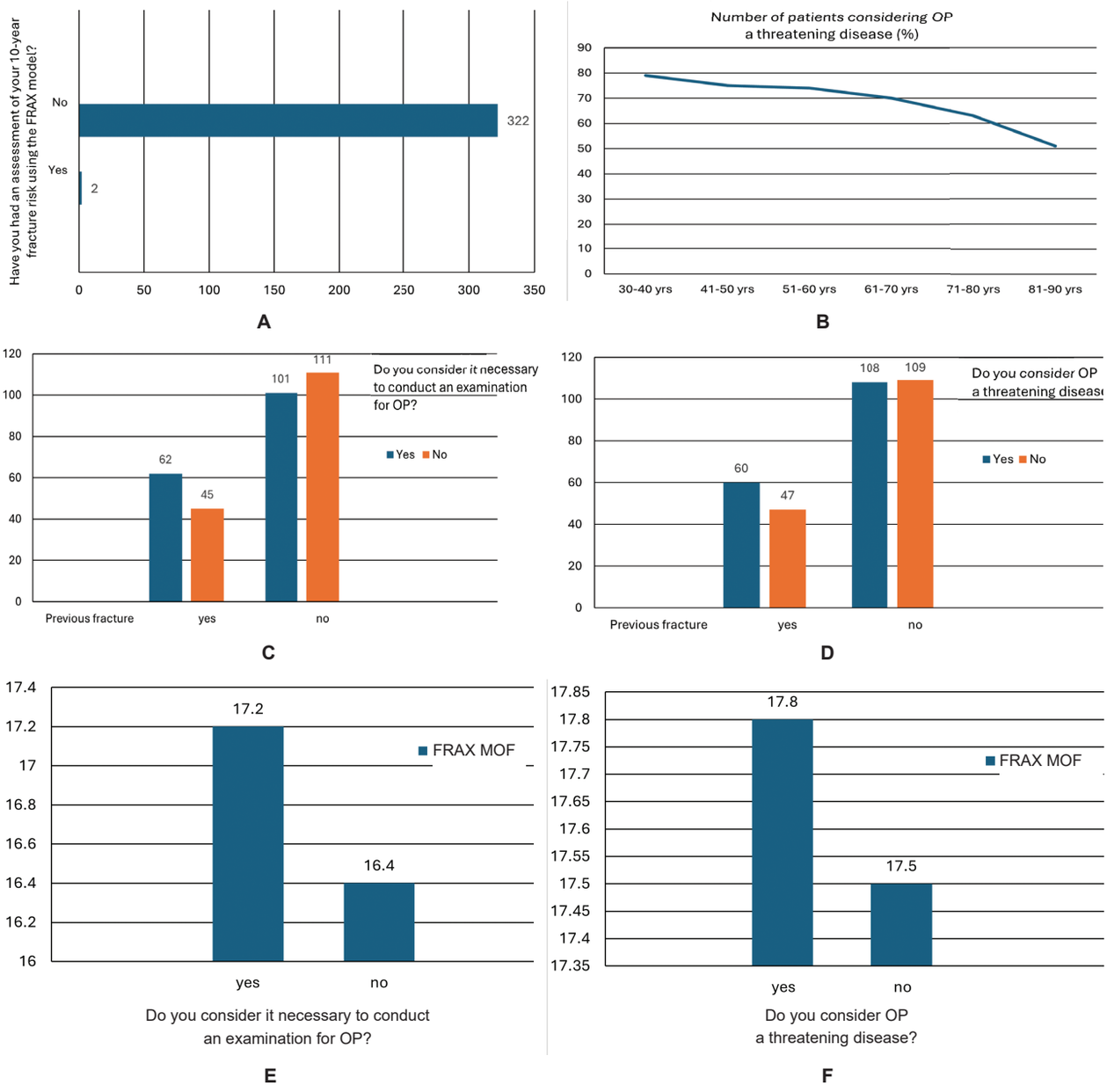

Fig. 2. 2A. Distribution of women according to answers to the question: “Have you had an assessment of your 10-year fracture risk using the FRAX model?”; 2B. Comparison of the answers to the question: “Do you consider OP a threatening disease” between different age groups; 2C. Comparison of the history of previous fracture between the groups according to the answer to the question: “Do you consider it necessary to conduct an examination for OP?”; 2D. Comparison of the history of previous fracture between the groups according to the answers to the question: “Do you consider OP a threatening disease?”; 2E. “Do you consider it necessary to conduct an examination for OP?”; 2F. Comparison of fracture risk for large FRAX MOF between groups according to the answers to the question: “Do you consider OP a threatening disease?”

Discussion

In the present study, it is striking that the majority of patients (59.6%) define their general health status as relatively good with values between “0” and “5”. However, after performing the osteodensitometry, we found that the number of women with actual problem in the bone health is significantly higher – 251/324 (77.5%) compared to the above cited 59.6%. Almost 13.6% of women in our study had already known at the time of osteodensitometry that they had OP. After conducting the research, we found that they make up a relatively small percentage of women with established OP – 46.8% (44/94). This result agrees with previous studies, which also found that the number of women informed and aware of the diagnosis of OP is low [13, 14]. Published studies to date show that patients are significantly better informed about dyslipidemia or high blood pressure than about OP [15] and are significantly more interested in malignant, neurological and cardiac diseases than in their bone health. Previous studies have found that better informed people have higher BMD values due to prevention compared to uninformed people [16]. For this reason, special programs should be developed to disseminate information about OP with the possibility of self-assessment of bone health and fracture risk through globally recognized models in order to better prevent the disease [17]. According to the obtained results, the number of women who consider it necessary to perform the OP examination and those who do not consider it necessary are almost equally distributed (51.9% versus 48.1%). After conducting a study with REMS, we found that 91.7% of women who consider it necessary to be tested for OP actually had a BMD problem, and 62.2% of women who did not consider it necessary also had a lower than normal BMD. In other scientific works, it can also be seen that a large number of patients (55-62%) refuse to perform bone density measurement [18, 19, 20]. The reasons why patients in our study did not consider OP testing necessary were not recorded separately. Possible reasons for the low willingness may be the lack of reimbursement for the examination by the public health fund and the heterogeneous information regarding the predictive nature of osteodensitometry for fractures [21]. A large proportion of women believe that OP is normal bone wear and tear associated with old age and describe its progression as slow. Even women who experience a pathologic fracture are uncertain about its relationship to OP and consider it an incidental event independent of OP. Thus, seeing the progression of OP as slow and inevitable, patients do not feel the urgency to diagnose and treat themselves as strongly as in other diseases [22]. When asked whether patients consider OP a threatening disease, only 46.6% of women answered yes, and the remaining 53.4% – no.

Previous studies have also reported that patients are largely unaware of the seriousness of OP. Only 13% of women with OP and 2% of those without OP in Lewiecki’s study believed that their poor bone health could be the cause of their most recent fracture, and 43% of women with OP mentioned clumsiness as the main reason for the fracture, and not the poor bone health. Misconceptions about the causes of fractures as well as their consequences, combined with insufficient information on the problem, contribute to bad compliance with treatment [23]. Therefore, patients with OP may perceive the severity of this disease differently. Each patient in their own individual way forms their ideas and worries about the disease and prepares their own strategy for dealing with it. Thus, improved communication between physicians and patients regarding disease severity and future fracture risk may facilitate shared treatment decision making. It is the patients’ self-awareness that is a leading point in the diagnosis and treatment of OP [13]. In the present study, it was found that the risk of a MOF, calculated according to the FRAX model, did not differ significantly between the groups according to the answer to the questions: “Do you consider the examination for OP necessary” and “Do you consider OP a threatening disease”. This shows that patients with a high fracture risk do not feel threatened by OP and do not consider it necessary to carry out osteodensitometry to clarify the diagnosis. Despite the lack of a statistically significant difference between the groups, women who had already suffered an osteoporotic fracture in the past felt more at risk of OP, as well as the need to perform osteodensitometry. Therefore, it can be said that some of the patients, especially after multiple fractures, are already aware of the risk of OP [16]. In general, however, the discrepancy between the actual risk of osteoporotic fractures and that assessed by the patient is striking, which has also been reported in other studies [24]. This suggests a great lack of self-awareness on the aspect regarding the OP problem [25]. For example, a Danish study of over 20,000 patients examined how patients assessed their fracture risk related to OP. The results showed that women between 65 and 81 years of age generally underestimated their risk of fracture compared to the actual risk calculated according to the FRAX

model [11]. The GLOW cohort study of over 60,000 women similarly showed that only 29% of patients who had already suffered a fracture believed they had an increased risk of fracture [26]. According to the authors, the discrepancy between self-estimated and actually calculated fracture risk is due to the fact that patients have problems in perceiving themselves as a risk patient or attribute their current health status to other causes [27]. To improve self-assessment of fracture risk, patients' awareness of OP and its consequences should be increased [15]. When comparing the answer to the question "Do you consider OP a threatening disease?" in the different age groups, we found that the older women were, the less often they considered OP as a threatening disease. Similar results have been found in other studies. Although the prevalence of osteoporotic fractures increased with age [28], the number of patients who feel at risk for OP decreases with age. This may be because elderly patients do not well understand the relationship between fractures and the underlying disease [29] and underestimate the effects of OP in terms of secondary functional impairment and mortality, or simply feel too old and ill to consider the examination for OP as well as therapy useful.

Conclusion

This is the first study to assess patients' self-awareness of OP disease and the associated fracture risk in Bulgaria. Awareness of OP, like other chronic diseases, is currently defined as low, and raising awareness is the first step to ensure long-term compliance with therapy. The developed osteoporosis risk questionnaire could be used in scientific and clinical studies.

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Постъпила за печат: 23.08.2024 г.

Submitted: 23.08.2024

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