

ABSTRACT

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Title of Doctoral Thesis **Osteoporosis management in primary care in the Czech Republic**

Introduction: Osteoporosis (OP) is a systemic disease of the skeleton characterized by decreased bone mass and a disturbed microarchitecture of the bone tissue associated with increased risk of bone fragility and fracture. OP and its consequences are a major health, social, and economic concern, growing with aging of the population. Currently, most OP patients are not properly diagnosed and treated. In the Czech Republic, primary care that is provided by general practitioners (GPs), gynecologists and pharmacists should play a key role in identifying patients with OP.

Generally available guidelines recognize GPs as fully qualified for OP management. GPs are expected to be proactive in OP risk assessment and OP prevention and treatment. In the Czech Republic, due to prescribing limitations, GPs are only authorized to prescribe anti-OP drugs via delegated prescribing. Given the primary care structure in this country, it can be expected that gynecologists will be involved in OP management in women. Unlike GPs, they are authorized to prescribe anti-OP drugs and thus are not limited in OP management. Pharmacists could contribute to OP prevention, help identifying patients at high risk of OP, and improve patient adherence to therapy. The issue of OP can be addressed by the pharmacist while providing advice to the patient and making him/her aware of the risk of iatrogenic OP as a result of drug therapy.

Objectives: The study objective was to provide a short overview of OP prevention and treatment from the physician's and pharmacist's perspective. The objectives of the practical part were both qualitative and quantitative analysis of GPs' involvement in OP management and obtaining background information in order to adopt more effective strategies for OP management in adults at the GP level.

Methods: All relevant articles were identified by searching the literature using the PubMed database. The practical part was a cross-sectional observational study based on a questionnaire survey conducted in two rounds in a randomly selected sample of 1500 GPs. The questionnaire included 24 questions on demographic data, self-perception of the GP's role in OP management, methods for the identification of high-risk patients, OP knowledge, information sources, and barriers to OP management.

Results: A cornerstone in OP prevention and treatment is lifestyle modification. In both OP prevention and treatment, the purpose of lifestyle modification is the same – fracture risk reduction. Adequate and appropriate physical activity to stimulate bone mass and to strengthen skeletal muscles plays a major role. Another important factor is a balanced diet rich in calcium and vitamin D or supplemented with these substances when necessary. Fall prevention including home safety measures, better movement coordination, and improved muscular activity should be part of a comprehensive OP management. Other helpful steps are reviewing and reconsidering the patient's medication needs, adjusting the medication accordingly, treating the causal disease, if any, and reducing modifiable risk factors.

The currently available therapeutic options are anti-resorptive drugs (bisphosphonates, selective estrogen receptor modulators, denosumab), bone formation enhancers (teriparatide, parathormone), or dual action bone agents (strontium ranelate). After re-evaluation of the risk benefit ratio, the previously used calcitonin is no longer indicated for use in OP. Prolonged dosing intervals and parenteral dosage forms should improve compliance and adherence.

In the practical part, the questionnaire response rate was 38% (525 respondents). Respondents (mean age of 52 years, 61.5% of females) did not significantly differ from non-respondents. Most GPs (92%) self-perceive his/her role in OP management as at least moderately significant. The most frequent reasons for suspecting OP and for referral to a specialist are subjective patient complaints. When primary examination of

the skeleton is performed on the GP's initiative, the most commonly used method is X-ray (76%) or osteodensitometry (61%). Fracture as a result of OP is considered by 91% of respondents. OP etiology is suspected because of age and seemingly insignificant accident which caused the fracture. OP risk factors other than age are indicated by 70% of respondents. The most frequent post-fracture steps are referral to a specialist (82%), lifestyle modification recommendations (64%), and prescription of calcium/vitamin D supplements. The median quarterly referral rate was five patients per GP. The more significant the self-perception of the GP's role in OP management, the more proactive the GP was in screening patients for OP and in post-fracture management and the more frequently he/she suspected OP as the cause of fracture regardless of circumstances. Similarly to the self-perception of the GP's role, GPs' knowledge correlates with proactive OP management. The most important barriers to OP management appeared to be health insurance coverage limits and prescribing limitations, as GPs are not authorized to prescribe anti-OP drugs (71% each).

To improve OP management in the Czech Republic at the GP level, we suggest implementing OP knowledge boosting programs and activities to raise awareness of the GP's role in OP management. Furthermore, we recommend reconsidering the GP's prescribing limitations for anti-OP drugs and health insurance coverage limits for OP.

The most successful interventions done in other countries to improve OP management are comprehensive programs including patient education and counseling, notification of the patient's condition to GP, and training of GPs and, at the pharmacist level, training programs focused on medication reassessment and proactive search of databases for high-risk patients.

Conclusion: GPs participate in OP management, but there is a need to find mechanisms to boost their knowledge and engagement in this area and to focus more on the prevention of OP fractures. A systemic change to be considered is to make GPs authorized to prescribe anti-OP drugs.