

Adherence to osteoporosis guideline: survey among Czech general practitioners

Research Article

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Abstract: Rationale and objectives. General practitioners (GPs) play an important role in management of patients at risk of osteoporosis (OP). The objectives were to assess (1) knowledge about OP and use of OP clinical guideline in comparison with other information sources and (2) association between the use of individual information sources and knowledge and self-reported quality of care among GPs. Methods. Survey among random sample of Czech GPs was performed to find out their attitudes and role in OP management. The return rate of the postal questionnaire was 38% (525 respondents). Quality of care was assessed using three indicators: suspicion on OP, referral to the specialist and initial check-up. Results. Respondents (median age 52 years, 59% women) had a very good knowledge of several risk factors, while others, namely low body mass index, history of hip fracture in mother and smoking were perceived as risk factors by only 40%, 45% and 55% of respondents, respectively. 10% of GPs stated the correct answer regarding daily calcium intake recommended for postmenopausal women. The OP guideline was considered accessible by 83% of respondents and used repeatedly by 54%. Use of the guideline correlated positively with knowledge score ($P < 0.001$), while use of each individual other source of information did not. Use of the guideline correlated with all three indicators of quality of care. Use of each other information source correlated only with a maximum of two indicators. Conclusion. We identified areas of insufficient knowledge that should be targeted in educational activities for GPs. It is recommended to further motivate GPs to use their clinical guidelines regularly.

Keywords: *Information sources • General practitioners • Clinical guideline • Knowledge • Osteoporosis*

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1. Introduction

Osteoporosis (OP) is a systemic metabolic skeletal disease characterized by reduced bone mass and changes

in bone tissue quality. These disorders increase the risk of fracture and consequently have a considerable impact on public health. Osteoporosis affects primarily postmenopausal women, but it has recently become a great concern in men as well. Prevalence of OP has

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been significantly increasing together with aging of the population [1].

The age-standardized hip fracture rates (/100,000/year) in the Czech Republic (CZ) in 2010 was 374 for women and 211 for men [2]. The average year-to-year increase in the number of hip fractures is 5.9% in the CZ [3]; the incidence of hospitalizations for hip fracture more than doubled in the CZ from 1981 to 2009. The remaining lifetime probability of hip fracture at the ages of 50 years in men and women was estimated to 6.9% and 14.8%, respectively [2]. The projected change in the Czech male and female population 75+ years between 2010 and 2025 amounts to 57% and 37% which translates into increase in fractures by 22 470 (30%) [4].

While in 15 of the 27 European Union member states the principal provider of the medical care of OP is primary care, in the CZ, OP and metabolic bone disease is a recognized medical specialty, and the health care is provided by both general practitioners and specialists in rheumatology, endocrinology, orthopaedics, clinical osteology, internal medicine, and gynaecology.

Despite advances in diagnostics and pharmacotherapy, most patients with OP are not adequately treated in common clinical practice [5,6]. In the CZ, pilot analyses based on data of the General Health Insurance Company of the Czech Republic have shown that insufficient treatment of OP may present a considerable problem [7].

General practitioners for adults (GPs) play the key role in both identification and treatment of patients at high risk of fracture. Multifaceted interventions targeting high-risk patients and their primary care providers may improve the management of OP [8]. Evidence-based clinical guidelines can be effective in improving the process and structure of care [9]. GPs in the CZ perceive importance of their role in management of OP [10]. However, they face several self-reported barriers, particularly prescribing limitations and – similarly to GPs in Germany [11] – financial limits set down by health insurance companies [10]. In the CZ, great emphasis has been placed on formulation and dissemination of evidence-based clinical diagnostic and treatment guidelines for GPs. Therefore assessment of the actual knowledge about OP, real-life use of the guidelines and other information sources in relation to quality of care in primary care setting is needed.

The objectives of the analysis were to assess (1) knowledge about OP and the rate of use of OP clinical guideline in comparison with other information sources and (2) how is the use of individual information sources associated with knowledge about OP and self-reported quality of care among GPs in the CZ.

2. Methods

A cross-sectional survey among GPs was performed to analyse their attitudes, opinions and knowledge about OP, activities in management of OP and potential barriers. In 2007, an anonymous 2-round postal 24-item questionnaire was distributed to 1393 GPs randomly selected from a database of the Institute of Health Information and Statistics of the Czech Republic. The return rate of the survey was 38% (525 respondents). Differences between respondents and non-respondents in gender and region were not statistically significant. Details concerning the survey have been previously published in our previous report [10].

Outcome measures of the present analysis were (1) use of the OP guideline and other information sources, (2) knowledge about OP and (3) self-reported quality of care among patients at risk of osteoporosis-related fracture.

2.1. Knowledge

Knowledge about OP comprised general information, fractures, risk factors and recommended calcium intake. Knowledge score was defined as a sum of correct responses (possible score range 0-21) [10].

2.2. Information sources

Use of information sources was assessed by the following question. Rate the following sources of information on osteoporosis in terms of usability for you: never / sometimes / repeatedly. The sources of interest were: guideline for GPs, professional literature (journals, monographs), workshops and conferences, drug manufacturer's information, e-learning and guideline for specialists.

2.3. Self-reported quality of care

Potential for providing good-quality care was assessed using 3 pre-specified indicators.

2.3.1. Suspicion on OP

Suspicion on OP was assessed by the following questioning:

"You suspect osteoporosis in a patient based on (multiple choice): (1) your targeted questions, (2) patient's family history, (3) report of a specialist the patient was referred to, (4) report of a specialist who has examined/treated the patient, (5) patient's complaints and (6) diagnosis made by a specialist. If you consider a

single option more relevant than the others, please also underline that option.”

First three response alternatives were considered as “active” choices and were included into calculation of a *suspicion on OP-score*. Each “active” alternative scored 1 point, the most relevant option, if among “active” alternatives, scored 2 points (possible score range 0-4).

2.3.2. Referral to the specialist

Referral to the specialist was assessed by the following questioning:

“Specify the reasons for referral of the patient to the specialist (multiple choice): (1) patient’s age, (2) other risk factors, (3) patient’s own or her/his family initiative, (4) patient’s subjective complaints, (5) specialist’s suspicion, (6) suspected osteoporosis fracture and (7) fracture diagnosed by a physician. If you consider a single option more relevant than the others, please also underline that option.”

First two response alternatives were considered as “active” choices and were included into calculation of *reasons for referral-score*. Each “active” alternative scored 1 point, the most relevant option, if among “active” alternatives, scored 2 points (possible score range 0-3).

2.3.3. Initial check-up

Initial check-up was assessed by the following questioning:

“When the initial check-up is conducted on your initiative, your choice is (multiple choice):

(1) osteodensitometry, (2) height measurement, (3) laboratory analysis and (4) X-ray. If you consider a single option more relevant than the others, please also underline that option.”

First three response alternatives were considered as “preventive” choices and were included into calculation of an *initial check-up-score*: each “preventive” alternative scored 1 point, the most relevant option, if among “preventive” alternatives, scored 2 points (possible score range 0-4).

2.4. Statistical analysis

To evaluate the associations between variables, the following tests were used: Kendall correlations for 2 continuous (ordinal) variables and Mann-Whitney test for dichotomous and continuous (ordinal) variables. Use of OP guideline was treated as an ordinal variable (never, sometimes and repeatedly). Quality of care indicators were treated as scores (scales). Knowledge was mostly treated as a knowledge score (scale). All statistical analyses were calculated using PASW 18.0 software

(version 18.0, IBM Corporation, Armonk, NY, U. S., 2009). $P < 0.05$ was considered statistically significant.

3. Results

The median age of respondents was 52 years (range 30-83). As much as 59% of them were women. Two thirds of respondents considered continuing lifelong education as adequate concerning information on OP.

3.1. Knowledge

The mean knowledge score was 12.2 ± 3.3 of 21 possible points. The knowledge score correlated negatively with age ($P < 0.001$) and was not associated with gender. Knowledge of risk factors is summarised in Table 1. Considering calcium intake, 88% of respondents believed that sufficiency of calcium and vitamin D is necessary for treatment success. As much as 57% “knew” total daily calcium intake recommended for postmenopausal women, but 66% of them underestimated the dose. Correct answer (within 1200-1500 mg/day) was explicitly stated by only 10% of all respondents.

3.2. Information sources

The OP guideline for GPs was considered accessible by 83% of respondents. Use of guideline in comparison with other information sources about OP is shown in Figure 1. Use of information sources was associated with age (Table 2) but not with gender. Use of the guideline for GPs correlated positively with knowledge score ($P = 0.002$; when controlled for age $P < 0.001$). Use of each individual other source of information did not correlate with the knowledge score.

Table 1. Knowledge of risk factors for osteoporosis or osteoporosis-related fracture among 525 general practitioners in CZ

Risk factor	Knowledgeable respondents (%)	Incorrect answer (%)	Not stated* (%)
Age	97.9	0.6	1.5
Glucocorticoid therapy	92.8	0.8	6.4
Immobilisation, lack of physical activity	93.0	1.0	6.0
Preterm menopause	92.4	1.7	5.9
Decreased height	72.8	5.1	22.1
Anorexia nervosa	56.0	8.6	35.4
Smoking	54.9	14.5	30.6
History of hip fracture in the mother	44.6	15.8	39.6
Low body mass index	39.6	20.8	39.6

3.3. Self-reported quality of care

Indicators of quality of care in OP management were not associated with age and gender. Relations between use of information sources and indicators of quality of care are listed in Table 3.

4. Discussion

To our knowledge this study is the first evaluating use of various information sources with respect to knowledge and self-reported quality of care in management of OP among GPs.

Our respondents had a very good knowledge of some risk factors for OP – age, glucocorticoid therapy, immobilisation (lack of physical activity) and preterm menopause. Glucocorticoid therapy was considered as a risk factor for OP by 93% of respondents. This is in accordance with Duyvendak's survey among GPs and specialists in the Netherlands which focused on corticosteroid-induced OP. The Duyvendak's survey showed that 92% of respondents consider OP as an

important side effect of corticosteroids [12]. However, we found out risk factors which most GPs did not take into account – namely history of hip fracture in the mother and low body mass index. Also knowledge of optimal calcium intake was seriously insufficient; specifically total daily calcium intake recommended for postmenopausal women was underestimated in most respondents. Werner referred to relatively good levels of knowledge about OP among health care professionals in general, but poor knowledge regarding dietary information about calcium. Our results support the findings of this review [13]. Correlating knowledge with age revealed that younger GPs were more knowledgeable about OP concerning general information, fractures, risk factors and calcium intake. This finding is in accordance with other studies that evaluated knowledge about OP regarding risk factors, diagnosis, treatment and follow-up of the disease [14] and knowledge about low back pain regarding diagnosis, treatment and follow-up [15].

According to the addressed GPs' self-report, majority of them were familiar with the diagnostic and treatment guideline on OP for GPs. This guideline was the most common source of information followed by professional literature. Other common sources of information included workshops/conferences and manufacturer's information repeatedly used by about one third of respondents. However, repeated use of OP guideline for GPs was relatively low despite its easy accessibility and high rate of dissemination. Authors of the guideline represent both the Society for Metabolic Skeletal Diseases, Czech Medical Association of J. E. Purkyne (JEP) and Society of General Practice, Czech Medical Association JEP; the guidelines are published on behalf of the

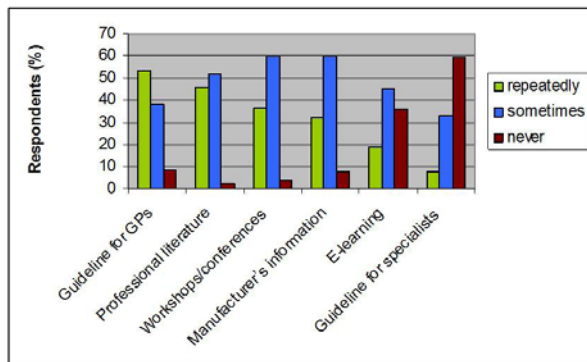


Figure 1. Use of information sources about osteoporosis among 525 general practitioners in CZ.

Table 2. Correlations between use of information sources and age among 525 general practitioners in CZ (N values represent numbers of respondents with the two non-missing responses used in the calculation).

Source of information (N)	Correlation with age Kendall's tau (P value)
guideline for GPs (461)	0.101 (0.007)**
professional literature–journals, monographs (463)	0.079 (0.038)*
workshops and conferences (479)	0.137 (<0.001)***
manufacturer's information (447)	0.163 (<0.001)***
e-learning (420)	-0.131 (0.001)**
guideline for specialists (339)	0.117 (0.004)**

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 3. Correlations between use of information sources and indicators of self-reported quality of care in osteoporosis (OP) management. All calculations are controlled for age.

Source of information	Correlations with quality of care indicators Kendall's tau (P value)		
	Suspicion on OP	Referral to a specialist	Initial check-up
guideline for GPs	0.184 (<0.001)***	0.128 (0.020)*	1.192 (<0.001)***
professional literature (journals, monographs)	NS	NS	0.113 (0.032)*
workshops / conferences	NS	NS	0.116 (0.028)*
manufacturer's information	NS	NS	NS
e-learning	0.120 (0.023)*	0.178 (0.001)**	NS
guideline for specialists	0.132 (0.012)*	NS	NS

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; NS – non-significant

Society of General Practice that represents the unifying scientific body for Czech GPs. Although membership in the society is not obligatory for GPs, printed version of the guideline (ten-page booklet) is sent by post to all registered GPs (both members and non-members) immediately after publication. The document is also freely available on the internet website of the society. In a German study, about half of respondents reported to be familiar with the national OP guideline [11]. Our results are in accordance with the findings of that national survey which included 892 GPs with response rate of 41%, similar to our survey. In contrast to the German study, we did not find any association between use of guideline and female gender.

Use of the guideline for GPs, but not other information sources, correlated with knowledge about OP. Older GPs reported more frequent use of all sources of information, with the exception of e-learning. However it was not associated with better knowledge. It is also possible that social desirability bias (generally understood as tendency on the part of individuals to present themselves in a favourable light, regardless of their true feelings about an issue or topic) is generally more noticeable in elderly, especially in post-communist countries.

Use of the guideline for GPs correlated also with all three indicators of quality of care – suspicion on OP, referral to a specialist and initial check-up. Association between use of other individual information sources and quality of care was less noticeable. Use of e-learning correlated with two indicators (suspicion on OP, referral to a specialist). Use of professional literature, workshops/conferences and guideline for specialists correlated with only one indicator; the associations were also weaker than in case of the guideline for GPs. Use of manufacturer's information did not correlate with any of the indicators.

When compared to questionnaire surveys from other fields targeting GPs, our findings are in accordance with studies conducted in Israel [15] and in Germany [16]. GPs reporting familiarity with guideline for low back pain were found to have better knowledge about diagnosis, treatment, and follow-up [15]. Concerning secondary prevention of coronary heart disease, guideline knowledge led to improved cardiovascular risk factor treatment [16]. On the other hand, family doctors' knowledge and self-reported behaviour concerning treatment of type 2 diabetes mellitus was not related to the reported availability or usage of the guideline in Estonia [17]. However the survey was relatively small and the authors admitted that the concerned type of health care (use of laboratory tests) might also depend on financial resources. In our survey, two out of three chosen indicators of quality of

care (suspicion on OP and referral to a specialist) do not depend on budget at all.

4.1. Strengths

Quality of care indicators were designed with respect to the specific role of GP in management of OP in CZ. In 2007, GPs were not authorized to independently prescribe neither antiresorptive drugs (bisphosphonates, raloxifene, calcitonin and strontium-ranelate) nor osteoanabolics. They could prescribe only preparations containing calcium and plain vitamin D. The prescription (initial indication) of antiresorptives and osteoanabolics was restricted to physicians specialized in orthopaedics, gynaecology, endocrinology, rheumatology and internal medicine. Currently, oral antiresorptives can be prescribed by GPs with commissioning (authorization) from a specialist who has previously indicated a specific drug for the patient. Our indicators of quality of care are mostly independent of budget restrictions set by health insurance companies.

4.2. Limitations

As in other questionnaire surveys, it is expected higher participation of GPs who are more interested in the topic. Therefore the assessed knowledge about OP and quality of care is most likely higher than it would be expected in the overall population of Czech GPs. Quality of care relied on self-report. The quality of care indicators can reflect knowledge of *lege artis* evidence-based procedures rather than real performance in his/her practice due to well-known social desirability bias. Linder et al analysed antibiotic prescribing based on administrative data and self-reported familiarity with acute respiratory infection guideline. The authors have concluded that self-reported familiarity with guideline should not be assumed to be associated with consistent guideline adherence or higher quality of care [18]. Compliance with guideline for the treatment of cardiovascular diseases evaluated by analysing patient data was studied by Karbach et al [19]. The authors concluded that physicians' knowledge of the guideline did not itself lead to better guideline implementation. As mentioned above, the impact of financial restrictions and budget factors on compliance with guideline and quality of care should also be carefully taken into account.

The present analysis is among the first steps [10] to follow longitudinal trends in OP management in primary care in CZ.

In conclusion, we found a number of areas of insufficient knowledge about OP that should be targeted in educational activities for GPs. The knowledge of risk

factors is equivocal. Only one out of ten respondents indicated correctly the total daily calcium intake recommended for postmenopausal women. The vast majority of respondents considered OP guideline for GPs accessible and more than half of them used the guideline repeatedly. In contrast to use of other sources of information, use of the guideline was associated with better knowledge. Compared to other sources of information, use of the guideline correlated best with quality of care.

In order to increase knowledge about OP among GPs and to steer primary care to be more effective, it is important to motivate GPs to use their clinical guidelines. Easily accessible evidence-based diagnostic and treatment guidelines presented as a brief document seem to be the most appropriate source of information for general practitioners in the CZ. E-learning should be a

good way for life-long education of younger GPs; these methods should be further encouraged and developed.

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Conflict of interest statement

Authors state no conflict of interest.

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