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Economic Consequences and Potentially Preventable Costs Related to Osteoporosis in the Netherlands

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ABSTRACT

Background: Osteoporosis often does not involve symptoms, and so the actual number of patients with osteoporosis is higher than the number of diagnosed individuals. This underdiagnosis results in a treatment gap. **Objectives:** To estimate the total health care resource use and costs related to osteoporosis in the Netherlands, explicitly including fractures, and to estimate the proportion of fracture costs that are linked to the treatment gap and might therefore be potentially preventable; to also formulate, on the basis of these findings, strategies to optimize osteoporosis care and treatment and reduce its related costs. **Methods:** In this retrospective study, data of the Achmea Health Database representing 4.2 million Dutch inhabitants were used to investigate the economic consequence of osteoporosis in the Netherlands in 2010. Specific cohorts were created to identify osteoporosis-related fractures and their costs. Besides, costs of pharmaceutical treatment regarding osteoporosis were included. Using data from the literature, the treatment gap was estimated. Sensitivity analysis was performed on the base-case results. **Results:** A total of 108,013 individuals with a history of fractures were included in this study. In this population, 59,193 patients were using anti-osteoporotic medication and 86,776 patients were using preventive supplements. A total number of 3,039 osteoporosis-related fractures occurred. The estimated total costs were €465 million. On the basis of data presented in the literature, the treatment gap in our study population was estimated to vary from 60% to 72%. **Conclusions:** The estimated total costs corrected for treatment gap were €1.15 to €1.64 billion. These results indicate room for improvement in the health care policy against osteoporosis.

Keywords: costs analysis, the Netherlands, osteoporosis, osteoporotic fractures.

Introduction

Prevalence and Physical Health Burden

Osteoporosis is a skeletal disorder characterized by a decreased density of the bone mineral and alteration of the bone architecture [1,2]. The disease mostly occurs in postmenopausal women and elderly men. The total number of individuals older than 50 years diagnosed with osteoporosis in 2010 in the Netherlands was estimated at 148,200. This includes mostly female patients (133,000 female vs. 15,200 male patients) [1,3,4]. The most important consequence of osteoporosis is the increased risk of a bone fracture. Hip and spine fractures are the most critical fractures, often involving impairment, pain, or even death [1,2]. The number of osteoporosis-related fractures among people older than 50 years was estimated at 38,600 from a total estimated number of 120,000 fractures in 2010 [5]. Because of aging of the population, the prevalence of osteoporosis and its related consequences are expected to increase by 30% to 50% within 10 to 15 years on the basis of different scenarios [1,5].

Economic Burden

In addition to the physical health burden, the economic burden of osteoporosis is considerable. Although the costs of anti-osteoporotic medications are relatively low, the costs of osteoporosis-related complications are high. Osteoporosis-related fractures are the most important driver of costs for complications because these fractures are related to high resource use of inpatient care (hospitalizations) and often involve

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revalidation and long-term care and a considerable burden of indirect costs caused by, inter alia, sick leave [1].

Multiple estimates of the economic burden of osteoporosis are available in the literature. These estimates, however, vary widely [1,4,5]. In 2010, the total costs of osteoporosis in the Netherlands, with only medication, fractures, and long-term care taken into account, were estimated at €824 million [1]. The costs in the first year and the subsequent year amounted to €360 million and €434 million, respectively. Notably, the annual costs of pharmacological treatment of osteoporosis in the Netherlands were estimated at €29 million (3.5%) in 2010 [1]. Separately, health care costs for inpatient and outpatient hospital care related to osteoporosis were estimated at €190 million in the same year [5].

Treatment Gap

Osteoporosis itself does not usually involve any symptoms and therefore often remains unnoticed. Most hospitals in the Netherlands offer fracture liaison services (FLS) that involve postfracture screening in patients older than 50 years who had previously suffered from a fracture. Despite these services being offered, postfracture screening, let alone prefracture screening, for osteoporosis in the Netherlands is known to be suboptimal [6–10].

In the Netherlands, the actual number of patients with osteoporosis is estimated to be 2 to 5.5 times the number of diagnosed individuals [1,4]. The difference in these numbers indicates the existence of a treatment gap of 50% to 82% as a result of underdiagnosis. Nevertheless, estimates of the economic burden related to the treatment gap with regard to osteoporosis have not yet been published.

Aim

Because the health care reimbursement system in the Netherlands is fragmented into primary care (general practitioner), secondary care (hospital care), and tertiary care (long-term care) with strongly differing data availabilities, estimating the total burden of osteoporosis is complicated. The fact that the extent of the treatment gap is not yet clear further complicates such a task. In this study we present retrospective data regarding the burden of osteoporosis using the reimbursement data of one of the largest Dutch health care insurance companies. The aim of this study was to estimate the total health care resource use and costs related to osteoporosis, including fractures. In addition, we aim to estimate the proportion of fracture costs that are linked to the treatment gap and might therefore be potentially preventable. On the basis of these findings, we aim to formulate strategies to optimize osteoporosis care and treatment and reduce its related costs.

Methods

Study Design and Data Selection

The design of this cost evaluation study concerned a retrospective analysis. Claims data of the Achmea Health Database (AHD) were used to investigate the economic consequence of osteoporosis in the Netherlands in 2010 [11]. The AHD contains anonymized medical information of 4.2 million individuals of all ages in the Netherlands on reimbursed health care use and its costs. In particular, to estimate the costs of osteoporosis, claims data on inpatient care and pharmaceutical treatment were selected from the database. Selection criteria included 1) patients being older than 50 years and 2) who were receiving pharmaceutical treatment against osteoporosis in 2010 and/or were using vitamin D or calcium supplements in 2010 and/or had experienced one or more fractures in 2010.

The costs related to osteoporosis in the study population were calculated by adding the costs of claimed anti-osteoporotic medication, the costs of vitamin D and calcium supplements, and the costs of inpatient care for the treatment of osteoporosis-related fractures. Only those claims that were reimbursed between January 1, 2010, and December 31, 2010, were included in the analysis.

Costs

Anti-osteoporotic drugs

Claims data related to the use of anti-osteoporotic drugs were selected by using the Anatomical Therapeutic Chemical codes. These include bisphosphonates and strontiumranelate (M05B), selective estrogen receptor modulators (G03X), and parathyroid hormones and analogues (H05AA). Users of antineoplastic agents and medication against Paget disease (H05BA, M05BA05) were excluded from the analysis, because the fractures that were experienced by this group of users were likely not the result of osteoporosis but merely from these specified diseases.

Vitamin D and calcium supplements

Claims data on vitamin D and calcium supplements were also extracted from the database by using the Anatomical Therapeutic Chemical codes (A11, A12); these, however, are also available over the counter.

Osteoporosis-related fractures

To specifically link claims data on inpatient care to osteoporosis, a cohort method was designed for identifying the costs for the treatment of osteoporosis-related fractures. Notably, two cohorts were created in the selected claims database. An illustration of the created cohorts is shown in Figure 1.

Cohort 1 contained all patients having had at least one fracture in 2010. Fractures were classified according to Center et al. [12] as 1) hip fractures, 2) major fractures, and 3) minor fractures.

Hip fractures were defined as fractures of the proximal femur and acetabulum. Major fractures included fractures of the vertebra, pelvis, distal femur, proximal tibia, ribs, and proximal humerus. Minor fractures included all remaining fractures, fractures in fingers and toes excluded because their relation to osteoporosis is unlikely [12]. The estimated costs of fractures were based on the costs linked to Diagnose Behandel Combinatie (DBC) codes for specialist medical performances reimbursed by the insurance company.

Cohort 2 consisted of all patients older than 50 years who had received a prescription of an anti-osteoporotic medication, identified in the same way as described earlier.

Fractures were considered osteoporosis-related if the fracture occurred in a patient using anti-osteoporotic medication, therefore being part of both cohorts 1 and 2. Because Dutch patients with osteoporosis generally collect medications every 3 months, patients were considered to have experienced an osteoporosis-related fracture if medication was collected within 3 months before the fracture occurred (including the last 3 months of 2009). These selected fractures were labeled “assessed” osteoporosis-related fractures, which notably reflect an underestimation of the total osteoporosis-related fractures, given the aforementioned treatment gap.

Extrapolation

To estimate the total costs of osteoporosis in the Netherlands, total costs were extrapolated from the AHD population of 4.2 million individuals to the entire Dutch population of 16.6 million