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Original Article

Intensive and Prolonged Health Promotion Strategy May Increase Awareness of Osteoporosis among Postmenopausal Women

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Abstract. The aim of the study was to measure the results of a 15-year health promotion strategy towards osteoporosis, in an urban community of subjects over 45 years old, in terms of osteoporosis awareness and handling. To this end an ancillary study to a large survey of the Belgian population's self-perceived health status was carried out. A rectangular sample of 4800 individuals over 45 years old was randomly selected in two Belgian cities, among the affiliates of the two main health insurance providers. One of the cities (Liège) had been, since the early 1980s, the target of a constant health promotion strategy, directed to both the medical community and the general population, aimed at increasing osteoporosis awareness in women after the menopause. During the same period, no particular steps were taken in the other city (Aalst) to increase osteoporosis awareness in the community. In our study, the participants were asked to spontaneously report any chronic, serious and/or severe disorders that they had been suffering from, for at least 6 months, during the previous 12 months. They also provided a list of drugs they were taking at the time of the survey. Osteoporosis was reported to be a disease affecting 1.5% of men in Aalst and 1.3% of men in Liège ($p = 0.61$). For women, osteoporosis was reported to be present in 4.8% in Aalst and 10.8% in Liège ($p<0.001$). Self-reporting of osteoporosis prevalence in Liège was statistically significantly higher in women aged 45–64 years, 65–74 years or over 75 years ($p<0.001$). Obesity, alcohol consumption or physical activity were equally distributed between women from Liège and Aalst. Prescription drugs used for osteoporosis had been delivered to a similar proportion of men in Aalst and Liège. In women, a statistically significant difference in these prescription drugs was observed between Liège and Aalst, both for the overall population ($p<0.001$) and in each of the age classes ($p<0.001$ for 45–64 years and 65–74 years; $p<0.009$ for over 75 years). A continuous long-term health promotion strategy, directed toward both physicians and the general population, thus appears to increase awareness about osteoporosis in women over 45 years and/or in the medical community. This is reflected by an increase in self-reported prevalence of osteoporosis and in the prescription of drugs aimed at prevention and treatment of this disorder. Whether these observations reflect an appropriate diagnosis and a proper handling of the disease remains to be evaluated by objective diagnostic tools such as bone densitometry and by an evaluation of the effectiveness of prescription practices in postmenopausal women.

Keywords: Awareness; Health promotion; Osteoporosis; Prevalence; Treatment

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Introduction

It is now widely accepted that osteoporosis constitutes an ever-increasing medical, social and economic burden in many parts of the world [1–3]. Since the population continues to age, the prevalence of osteoporosis and, consequently, the incidence of related fractures will sharply increase in most developed and developing

countries [4,5]. Therefore, there is a large consensus that setting up effective and efficient anti-osteoporosis strategies is an urgent need. In order to help the practitioner's decision process regarding 'when, how and to whom', screening, prevention and treatment of osteoporosis should be undertaken. Several scientists as well as national and/or supranational organizations have published guidelines or recommendations for the management of osteoporosis; in many cases, particular attention was paid to cost-effectiveness of the recommended strategies [6–10].

Despite this, however, a large majority of at-risk patients do not receive osteoporosis-specific interventions [11]. Of even greater concern is the fact that patients who have already sustained an osteoporosis-related fracture remain largely untreated [12]. Several non-profit organizations, throughout all continents, are putting a great deal of effort into increasing the awareness of osteoporosis both in the medical community and in the general population. Whether these costly and time-consuming efforts have an impact on post-menopausal women's perception of osteoporosis or on their chances of being properly diagnosed and treated for osteoporosis has not often been evaluated. The purpose of this study was to measure the results of a 15-year health promotion strategy towards osteoporosis, in an urban community of subjects over 45 years old, in terms of osteoporosis awareness and handling.

Materials and Methods

The present evaluation was conducted, between 1995 and 1997, as an ancillary study to a large survey of the Belgian population's self-perceived health status, requested by the National Social Security Institute (INAMI-RIZIV). A rectangular sample of 4800 individuals over 45 years old was randomly selected from the two major health insurance providers (Christian and Socialist mutualities). An equal number of subjects (200) of each gender and in each of three predetermined age classes (45–64 years, 65–74 years, over 75 years) were identified in two cities – one Flemish (Aalst; Dutch speaking) and one Walloon (Liège; French speaking) – similar in terms of medical demography and urbanization. Liège, however, has been, since 1982, the target of constant communication efforts directed both to the medical community and to the general population, aimed at increasing osteoporosis awareness in women after the menopause. These efforts involved city authorities, local television and broadcasting systems, newspapers, health insurance providers, general practitioners' associations and senior citizens organizations. During the same period, no particular move was taken to increase osteoporosis awareness in the community in Aalst. Since the language used in the two cities is different, it can reasonably be assumed that very little of the health promotion material developed in Liège was available and used in Aalst.

Each of the selected individuals initially received a letter of introduction to the survey, including an information folder describing the objectives and procedures, asking for personal descriptive characteristics and for their permission to conduct an oral interview. In case of refusal or non-response, a substitute matched individual was drawn from the insurance provider's database. The participants of the trial were then visited by a team of experienced and appropriately trained interviewers.

Subjects were asked to spontaneously report any chronic, serious and/or severe disorders they have been suffering from, for at least 6 months, during the previous 12 months. After this spontaneous report, a list of chronic illnesses was presented to the subjects to exclude any forgotten disorder. The self-reported morbidity was then coded following the International Classification Primary Health Care (ICPC) [13].

From the personal details report obtained when subjects were first contacted, we were able to compare obesity (defined as body mass index $\geqslant 30$ kg/m^2), alcohol consumption (more than six drinks, at least once a week) and physical activity (regular exercise practice, yes/no) in the population.

Concomitantly, each participant provided a list of medications he or she was taking at the time of the survey.

In the present study we discuss only the results of the analysis performed for the report of osteoporosis, and, in the case of the female population, of two chronic disorders chosen for the purpose of comparison, i.e., hypertension and breast cancer. The prescription drugs' class referred to as ''osteoporosis drugs'' includes estrogen and/or progestogen replacement therapy (HRT), bisphosphonates, calcitonin, fluoride, calcium and vitamin D – the drugs most frequently used for prevention and treatment of osteoporosis in Belgium.

Results were analyzed by means of Pearson chi-square and the Fisher's exact test, which provided the two-sided significance of the difference.

The study received prior approval from the Ethics Committee (IRB) of Ghent University Hospital and had been, following Belgian regulations, notified to the Commission for the Respect of Private Life.

Results

To obtain a sample of 4800 responders, a total of 7461 individuals were to be contacted, corresponding to a 36% (2661/7461) rate of non-responders. Information was then appropriately gathered on 4796 subjects (99.9%).

Osteoporosis was reported to be a disease affecting 1.5% of men in Aalst and 1.3% of men in Liège ($p = 0.61$). In men, no significant difference was observed for reporting of osteoporosis prevalence between Liège and Aalst, either in the whole population sample or in any of the three age classes.

For women, osteoporosis was reported to be present in 4.8% in Aalst in 10.8% in Liège. This difference was significant ($p<0.001$). The self-reporting of osteoporosis prevalence was also statistically significantly different ($p<0.001$) in all age classes between Liège and Aalst (Fig. 1). The two disorders chosen for comparison were reported to be equally present in women from Aalst and Liège: hypertension was reported in 21.8% of women in Liège and 21.6% in Aalst ($p = 0.92$) while breast cancer affected 1.3% and 1.5% of women in Liège and Aalst, respectively ($p = 0.87$). Obesity (12.8% in Liège vs 13.3% in Aalst; $p = 0.35$), alcohol consumption (6% in Liège vs 6.5% in Aalst; $p = 0.36$) and physical activity (25.8% in Liège vs 23.8% in Aalst; $p = 0.13$) were equally distributed between women from Liège and Aalst.

Prescription drugs used for osteoporosis had been delivered to a similar proportion of men in Aalst (0.4%) and Liège (0.7%). In women, a statistically significant difference was observed between Liège and Aalst for the overall population ($p<0.001$) and in each of the age classes ($p<0.001$ for 45–64 years and 65–74 years, $p<0.009$ for over 75 years) (Fig. 2).

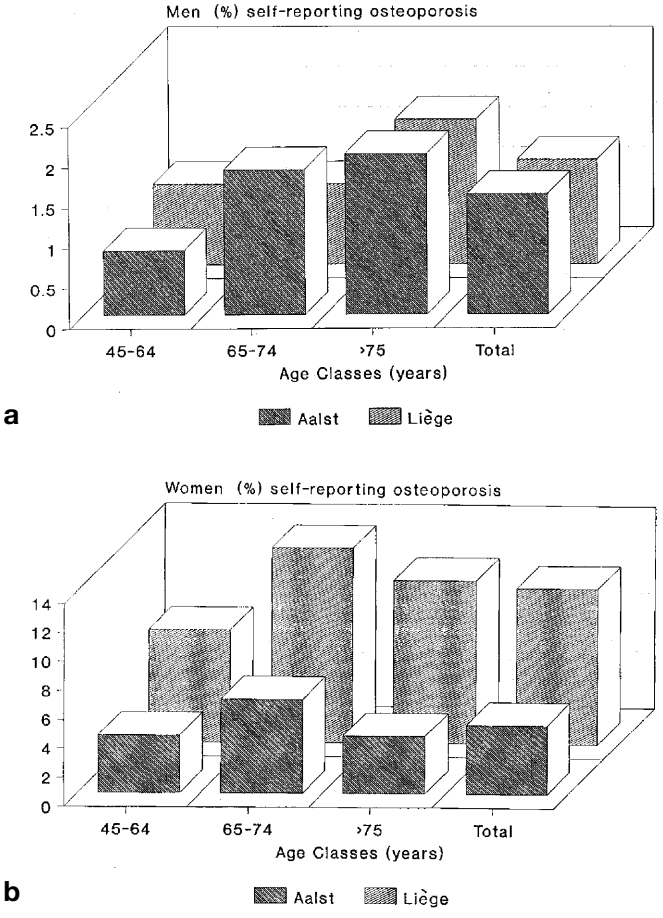

Fig. 1. a Frequency (%) of self-report of osteoporosis in men, in Liège and Aalst, in the whole sample and in the three age classes. **b** Frequency (%) of self-report of osteoporosis in women, in Liège and Aalst, in the whole sample and in the three age classes.

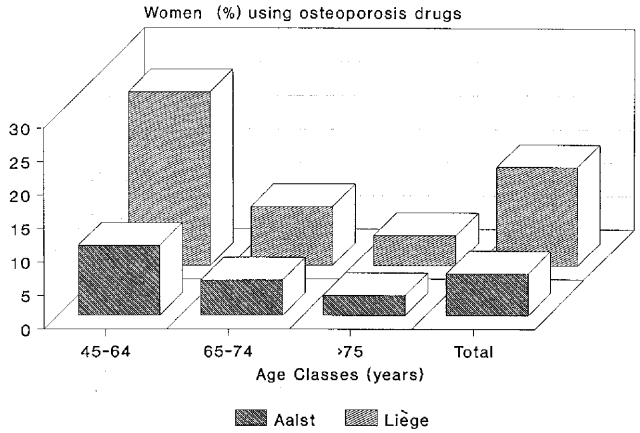

Fig. 2. Proportion of women in Liège and Aalst using a prescription drug from the 'osteoporosis class' at the time of the survey.

Discussion

The objective of the present study was to take advantage of a large health survey to evaluate whether an intensive and prolonged health promotion strategy, focusing on postmenopausal osteoporosis, might have an impact on the way this disorder was handled in an urban community of individuals over 45 years. The data set generated by the study relates only to the self-perceived health of the subjects. The diagnoses reported are spontaneously mentioned and were not confirmed by any objective methodology. They are likely to include diagnosis set up by a general practitioner without any measurement, by a specialist on the basis of the bone mineral density measurement, or by the individual him- or herself, sometimes by mistake. Consequently, our purpose is not to produce epidemiologic figures regarding the prevalence of postmenopausal osteoporosis in Belgium. However, the main feature of our study is that, in Liège, where the health promotion strategy had been implemented for more than 15 years, women but not men spontaneously reported a much higher prevalence of osteoporosis than in Aalst, were nothing was specifically done to prioritize osteoporosis among other health problems.

To the best of our knowledge, the self-reported prevalence of osteoporosis in men and women as part of a household interview has not frequently been published and analyzed in peer-reviewed journals. In a Norwegian survey of a random sample of 1514 women and men aged 16–79 years, 34.6% of women and 18.9% of men when asked whether they knew someone with osteoporosis or had it themselves, answered in the affirmative [14]. In an Australian study [15], osteoporosis was reported to be present in 4.8% of women and 1.4% of men. These figures are rather similar to those reported here for Aalst, considered as our non-intervention group. However, comparisons are rather difficult to perform due to the ethnic, cultural and

nutritional differences between Australian and Belgian populations as well as because of the structure of the respective health systems. Additionally, the population investigated in the Australian study included up to 60% of individuals below the age of 45 years, the lower limit of our own population.

Nevertheless these authors draw conclusions which can be extrapolated to the present paper. When comparing self-reported prevalence of osteoporosis, in both studies, with the figures observed from former epidemiologic surveys [16,17], there are few doubts that osteoporosis remains largely underdiagnosed. In the NHANES III study evaluating the prevalence of low femoral bone density in US adults, low bone mineral density (*T*-score <–2.5), assessed by dual-energy X-ray absorptiometry, was present in 18% of non-Hispanic white women over 50 years of age [16]. In our study, the proportion of women self-reporting osteoporosis more than doubled in Liège. Whether this is linked to the awareness strategy, conducted both toward the general population and the medical community, cannot be unequivocally claimed. However, a certain number of observations support this hypothesis. This difference is only occurring in women, who were specifically targeted by all the health promotion interventions, while osteoporosis in men, similarly reported in the two cities, has never been the topic of any campaign in Liège. A difference in obesity, alcoholism and physical activity, well established to influence, positively or negatively, the risk of osteoporosis cannot be considered as a factor explaining the discrepancy in osteoporosis self-report between the cities. In fact, these parameters were equally distributed between Aalst and Liège.

Similarly, even if the cultural background may be different between the French- and Flemish-speaking parts of Belgium, no difference in ethnicity or dietary habits can explain the results observed in the survey. Belgium has one of the largest 'densities' of bone densitometers in Europe, but the equipment is evenly distributed throughout the country and a discrepancy in the availability of bone scanners between the two cities cannot explain the observed difference [18]. Furthermore, when considering two other disorders that are rather common in women over 45 years, hypertension and breast cancer, for which no difference in health promotion occurred between Liège and Aalst, the self-reported prevalence was similar in the two cities. Finally, there is no possibility of a spreading of the effect of awareness campaigns between Aalst and Liège, because of the language difference.

The figures reporting the use of drugs for osteoporosis are also supportive of a positive effect of awareness campaigns in Liège. We should, however, acknowledge the fact that drugs from this class might also be prescribed for other indications (e.g., HRT for menopausal symptoms or bisphosphonates and calcitonin for Paget's disease of bone), a fact that makes also rather difficult the exact evaluation of the overall volume of the prescriptions dedicated to osteoporosis prevention and treatment. However, since the situation is similar throughout the country and independent of the insurance providers, our results can reasonably be considered as reliable for the purpose of comparison between Aalst and Liège.

When considering the female population as a whole, the proportion of women who were prescribed a drug of the osteoporosis class is higher than those having reported suffering from this disorder both in Aalst (6.3% vs 4.8%) and in Liège (14.8% vs 10.8%). The highest proportion of women receiving a pharmacologic intervention is found in the 45–64 year class, both in Aalst (10.5%) and in Liège (26%). This observation is likely to be accounted for by the number of early postmenopausal women who were prescribed HRT for global prevention of all consequences of the menopause. In Belgium, prevention of osteoporosis has been reported to be one of the determinants of HRT prescription. However, climacteric symptoms or cardiovascular protection seem to be much more appealing benefits of HRT in the minds of HRT prescribers [19]. The fall in the proportion of women treated after the age of 65 years reflects the well-known poor long-term compliance of postmenopausal women with HRT, as documented in Belgium and in other European countries [20–22].

The rate of women treated with HRT in Aalst (10%) in the 45–64 years class is in accordance with the figures usually reported for HRT users at this age in Belgium [16]. The proportion of women treated with drugs from the osteoporosis class in Liège is significantly higher than in Aalst, for the three age classes, in accordance with the higher prevalence of self-reported osteoporosis. However, the figures for osteoporosis drug consumption in the 65–74 years and over-75 years age classes are much lower (12.3% and 6% respectively) than in the youngest class (26%). Hence, it can reasonably be assumed that the 26% figure for drug users in the 45–64 years age class in Liège, linked to a higher HRT prescription rate, reflects an increased perception of the importance of preventing postmenopausal bone loss, through an appropriate pharmacologic management, in accordance with the repetitive messages of the health promotion campaigns.

In conclusion, continuous, long-term health promotion strategies, directed toward both physicians and the general population, appear to increase awareness about osteoporosis in women over 45 years and/or in the medical community. This is reflected by an increase in self-reported prevalence of osteoporosis and in the prescription of drugs aimed at prevention and treatment of this disorder. Whether these observations reflect an appropriate diagnosis and a proper handling of the disease remains to be evaluated by objective diagnostic tools such as bone densitometry and by an evaluation of the effectiveness of prescription practices in postmenopausal women.

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