INTRODUCTION

Osteoporosis is a progressive bone disease that is characterized by a decrease in bone mass and density which eventually leads to an increased risk of fracture [1]. The low bone mass and skeletal fragility lead to an increased vulnerability to low-trauma fractures, which is referred to as major osteoporotic fractures (including especially those affecting the vertebrae, proximal femur/hip, distal forearm, and proximal humerus) [2,3]. Furthermore, osteoporosis is a recognized complication in several specific diseases and medical disorders. A fairly recent report documented that there is a twofold increase in the risk of death within one year after a hip fracture and a fourfold increase in debility which requires long-term care [4].

It should be noted that there are international variations in osteoporotic fracture rates with temporal trends differing between population [2,5]. Hence, data from the Rochester Epidemiology Project (Olmsted County, Minnesota, USA) were used to compare the fracture rates in 2009-2011 with those in 1989-1991 [2,5]. Findings from this analysis suggested that, in women, hip fractures decreased by 25%, with a 26% reduction in distal forearm fractures [5]. Nevertheless, the overall age-adjusted fracture rate increased by 11%, a finding which was largely attributed to incidentally diagnosed vertebral fractures [2,5]. It must be said that the reasons behind the decrease of hip and non-hip fracture rates in industrialized countries remain unknown [2]. In any case, the change observed in fracture epidemiology has implications for risk assessment of fractures using tools calibrated to estimate absolute fracture risk [2]. Risk factors for the fractures resulting from osteoporosis are categorized into non-modifiable and (potentially) modifiable risk factors [2]. Medication use is theoretically modifiable, although in many cases, the use of medication that increases osteoporosis risk may be unavoidable.

Elbasan region lies in Central Albania and constitutes one of the largest regions of the country. The city of Elbasan in particular has been described as a very polluted area due to its iron-steel industry which is associated with high levels of air pollution [6,7]. The information about the magnitude and determinants of osteoporosis in population-based studies from Albania including Elbasan region is scarce. As a matter of fact, to date, there are no scientific reports on this matter informing about the size and distribution of osteoporosis in the adult population of Elbasan region. In this framework, the aim of this study was to assess the prevalence and correlates of osteoporosis in this study population.

METHODS

A cross-sectional study was conducted in Elbasan prefecture in 2013. Based on calculations of the sample size, a minimum of 780 individuals was required for inclusion in this survey. We decided to target 1000 individuals in order to increase the power of the study. One thousand consecutive primary health users in Elbasan aged 50 years and over of both sexes were invited to participate in this study. Of the eligible individuals, 983 agreed to participate (57% females, 43% males; overall response rate: 98%).

Bone densitometry was used to establish the presence of osteoporosis among study participants. Binary logistic regression was employed to assess the association of osteoporosis with covariates.

RESULTS: Overall, the prevalence of osteoporosis in this sample was 59% (N=579). There was evidence of a positive association of osteoporosis with female gender (OR=1.28, 95%CI=1.04-1.57), older age (OR=2.0, 95%CI=1.5-2.6), heredity (OR=1.7, 95%CI=1.3-2.3), a low-calcium dietary pattern (OR=1.7, 95%CI=1.3-2.2), physical inactivity (OR=1.8, 95%CI=1.3-2.4) and a lower body mass (OR=1.8, 95%CI=1.2-2.7).

CONCLUSION: Our study provides useful evidence about the prevalence and correlates of osteoporosis in Elbasan region. Female sex, older age, a positive family history of osteoporosis, a dietary pattern low in calcium, physical inactivity and a lower body mass were all positively and significantly associated with osteoporosis in this study population.

Keywords: Albania, bone densitometry, Elbasan, fractures, osteoporosis.
measure BMD [10]. Thus, all individuals who agreed to participate in this study underwent DXA assessment.

In addition, demographic data (age and sex), information on heredity and lifestyle/behavioral factors (a dietary pattern low in calcium and physical activity) were collected. Furthermore, all participants were measured height and weight based on which body mass index was calculated.

Binary logistic regression was used to assess the association of osteoporosis (outcome variable) with demographic characteristics, lifestyle factors, heredity and body mass (independent correlates). Crude (unadjusted) odds ratios (ORs) and their respective 95% confidence intervals (95% CIs) were calculated. In all cases, a p-value of ≤0.05 was considered as statistically significant. Statistical package for Social Sciences (SPSS, version 15.0) was used for all the statistical analyses.

**RESULTS**

Table 1 presents the distribution of demographic characteristics, behavioral factors, heredity and body mass among study participants according to their osteoporosis status. Overall, the prevalence of osteoporosis in this representative sample of individuals in Elbasan region was 59% (N=579). Of these, 463 (80%) were females and 116 (20%) were males. Conversely, in the subsample of individuals without osteoporosis, there were only 23.8% women. The proportion of older individuals (≥60 years) was considerably higher among participants with osteoporosis compared with those without osteoporosis (72.2% vs. 56.4%, respectively). Individuals with osteoporosis had a higher prevalence of heredity compared with those without osteoporosis (33.5% vs. 22.5%, respectively). Furthermore, participants with osteoporosis had a higher level of a low-calcium diet (36.8% vs. 25.7% among those without osteoporosis), a lower level of physical activity (23.1% vs. 34.9%, respectively) and a higher level of low body mass (15.7% vs. 9.4%, respectively).

Table 2 presents the association of osteoporosis with independent correlates. There was evidence of a very strong association of osteoporosis with female gender (OR=12.8, 95%CI=9.4-17.4). Furthermore, older participants had a significantly higher “risk” of osteoporosis compared with their younger counterparts (OR=2.0, 95%CI=1.5-2.6). Furthermore, there was a positive association of osteoporosis with heredity (OR=1.7, 95%CI=1.3-2.3), a low-calcium dietary pattern (OR=1.7, 95%CI=1.3-2.2), physical inactivity (OR=1.8, 95%CI=1.3-2.4) and a lower body mass (OR=1.8, 95%CI=1.2-2.7).

**DISCUSSION**

Our study provides novel evidence about the magnitude and selected correlates of osteoporosis in Elbasan prefecture, which constitutes one of the largest regions in Albania. Overall, the prevalence of osteoporosis in this representative sample of primary health users in Elbasan region was almost 60%. Female sex, older age, a positive family history of osteoporosis, a dietary pattern low in calcium, physical inactivity and a lower body mass were all positively and significantly associated with osteoporosis in this study population. Our findings related to the main determinants of osteoporosis are generally in line with previous reports from the international literature [2].
The World Health Organization has identified risk factors for any osteoporotic fracture and for hip fracture from 12 prospectively studied population-based cohorts in many geographic areas worldwide [11]. The cohorts in this analysis included the European Vertebral Osteoporosis Study (Pan-European), the Dubbo Osteoporosis study (Australia), the Canadian Multicentre Osteoporosis study (Canada), Rochester (USA), Sheffield (UK), Rotterdam (Netherlands), Kuopio (Finland), Hiroshima (Japan), the OFELY (L’os des femmes de Lyon) cohort from Lyon and the multicentre EPIDOS (Epidémiologie de l’ostéoporose) cohort from France, and two cohorts from Gothenburg (Sweden) [11]. Study participants had a baseline assessment documenting clinical risk factors for fracture. Approximately 75% also had BMD measured at the hip. The follow-up was approximately 250,000 patient-years in 60,000 men and women, during which more than 5000 fractures were recorded [11].

In our study, we obtained evidence of a particularly strong relationship of osteoporosis with age. Future analysis should measure the risk of fracture related to osteoporosis status in this population. As shown elsewhere, osteoporotic fractures have long-term consequences with excess mortality up to 10 years and increased economic costs up to 5 years [2].

Our study may have several limitations. Our analysis included a large and representative sample of primary health users. Yet, primary health care users may not represent the overall adult population of Elbasan region. From this point of view, the population-based prevalence of osteoporosis may differ from the estimate in our sample of primary health users in Elbasan region. On the other hand, at best, our findings are generalizable (representative) to the region of Elbasan and not to the overall Albanian population. In addition, we used a standardized internationally valid instrument for assessment of osteoporosis in our study sample. However, the information obtained through the interview may suffer from information bias. In any case, there is no reason to assume differential reporting of heredity, a low-calcium dietary pattern, or physical activity among study participants distinguished by the presence of osteoporosis.

In conclusion, our study provides useful evidence about the prevalence and correlates of osteoporosis in Elbasan region. Female sex, older age, a positive family history of osteoporosis, a dietary pattern low in calcium, physical inactivity and a lower body mass were all strong and significant determinants of osteoporosis in this study population. Future nationwide population-based studies should be conducted in order to assess the prevalence and the main determinants of osteoporosis in Albania, a Mediterranean country in Southeast Europe which is undergoing a rapid process of political and socioeconomic transition.

Conflicts of interest: None declared.

References