

Original Article

Prevalence of Osteoporosis in Women in Buenos Aires Based on Bone Mineral Density at the Lumbar Spine and Femur

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Abstract

The aim of the study was to report values for osteoporosis (OP) prevalence in Buenos Aires. Bone mineral density (BMD) at different skeletal sites was measured from November 2012 to July 2014. Participants were recruited through a newspaper advertisement inviting women at least 50 yr of age to receive free BMD measurement. After signing an informed consent form, 5448 women living in Buenos Aires and surrounding districts were studied. Lumbar spine (L1–L4), femur neck, and total hip BMDs were measured (Lunar Prodigy, software version 12.3 GE, Madison, WI, USA). OP was defined as a *T*-score ≤ -2.5 at the lumbar spine or the femoral neck. Results showed that 1021 out of 5448 studied subjects (18.7%) had OP at the lumbar spine or the femoral neck. Comparison of age of the population sample with reference data for the general population showed a moderate (+0.6%) increase in prevalence. Prevalence of OP was low, up to the age of 70 yr when based on femoral neck BMD only. Conversely, the prevalence of OP at the lumbar spine, which was reportedly high in women up to the age of 70 yr, tended to level off over that age. The results of the total femur only added a slight (+0.7%) nonsignificant increase to the OP prevalence. A total 346,500 out of 1,853,000 women aged 50+ yr in Buenos Aires had OP at the lumbar spine or femoral neck, whereas only 163,500 had OP at the upper femur, reducing the number by 53%. The present study assessed OP prevalence in the most densely populated urban area in Argentina. The results are similar to those reported for Caucasian populations in the United States and Canada. As measurement of only the BMD of femoral neck overlooks the diagnosis in half of the women, future studies should include measurement of the lumbar spine in combination with the femoral neck for a more accurate estimation of OP prevalence.

Key Words: Femoral neck; lumbar spine; osteoporosis prevalence; total hip.

Introduction

Although densitometric estimation of bone mineral density (BMD) has long been used to detect osteoporosis (OP), a number of recent studies on the prevalence of OP in different countries (1–4) have contributed new data to

the already existing body of knowledge (5–10). In this regard, there is some controversy as to which BMD measurements should be used to determine prevalence of OP (11–13).

The aim of the present study was to report values for OP prevalence in a densely populated area in Argentina with no previous available data. In addition, OP prevalence based on the BMD of each of the measured skeletal sites and the prevalence based on the combination of two is reported. The discordance in the diagnosis on the basis of BMD at different skeletal sites is discussed.

Received 08/4/15; Revised 12/22/15; Accepted 01/6/16.

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Materials and Methods

Recruitment

From November 2012 to July 2014, our institution implemented a campaign to detect OP by means of a newspaper advertisement inviting ambulatory women at least 50 yr of age to receive free BMD measurement. Subjects with a body weight over 110 kg were excluded. A total 7086 women were given an appointment over the telephone and 5511 came for the study. On presentation for assessment, the volunteers signed an informed consent form and filled in a brief questionnaire inquiring about their medical record and history of previous bone fractures. Results corresponding to approximately 1% ($n = 63$) of studied women were disregarded and excluded from the final analysis for different reasons: inability or refusal to fill in the questionnaire, presence of a prosthesis or vertebroplasties that did not allow performance of the complete assessment, or history/presence of severe systemic disease secondarily affecting bone mineralization. Subjects with Parkinson's disease, rheumatoid arthritis, celiac disease, and severe renal insufficiency were excluded. The results of 5448 women were included in the final analysis.

The vast majority of women were of Caucasian and European descent. The study was approved by the ethics committee of the institution.

Population

All the women lived in the city of Buenos Aires or in the surrounding districts. According to the 2010 National Census, the total population of women over the age of 50 in the area was 1,852,000.

Measurements

BMDs of lumbar spine (L1–L4), femoral neck, and total hip were measured using standard techniques. As previously reported, the peak bone mass of young women in Buenos Aires does not differ from that observed in a US Caucasian population (14,15).

The determinations were made using GE Lunar Prodigy equipment with software version 12.3 GE, Madison, WI, USA. Internal quality control was performed daily and external control every 4 mo. As shown in a previous study conducted at our laboratory, precision was 1.5% at lumbar spine and 1.5% at the femoral neck (16).

Diagnostic Criteria

OP was defined as a T -score of ≤ -2.5 at any of the studied sites. The National Health and Nutrition Examination Survey (NHANES) III database was used as reference standard for hip T -score and the manufacturer's database was used for the spine T -score. The cutoff values for diagnosis of OP were as follows: lumbar spine (L1–L4) = 0.880 g/cm², femur neck = 0.690 g/cm², and total hip = 0.693 g/cm².

Age Distribution

The age distribution of the population of the present study compared to the total population of women over 50 yr of age in Buenos Aires (Census 2010) disclosed some underrepresentation in the 50–59 and 80–89 age bands (see below).

Data were processed using the Postgre SQL (version 9.3).

Results

Overall OP Prevalence

Of the 5448 studied women (18.7%), 1021 had a T -score of ≤ -2.5 at the lumbar spine or the femoral neck, at least. A slight nonsignificant increase was observed when adding total hip values to the remaining 2 studied areas (+0.7%).

The prevalence of OP in the present group (18.7%) was adjusted considering an age distribution identical to that of the general population. A moderate +0.6% increase was observed.

The prevalence of OP according to decade of life and measured site, and the according to the combination of both variables, is shown in Table 1. The high prevalence of OP at the lumbar spine in the 5th and the 6th decade of life tended to level off after that age. Conversely, the low prevalence at the femoral neck and total hip in the first studied decades increased sharply after the 7th decade. Thus, prevalence was found to vary widely among the different age bands (Fig. 1).

The average age and T -score considering OP prevalence at the different sites are shown in Table 2. A posterior analysis of lumbar spine determinations ruled out 4.5% of measurements on account of the presence of artifacts (average age of this subset: 74.6 yr). The results corresponding to these subjects were not considered when calculating the average values shown in Table 2.

Magnitude of OP

Out of a population of 1,853,000 women over 50 yr of age living in the area of Buenos Aires, and considering BMD

Table 1

Osteoporosis Prevalence by 10-yr Age Band and 50–80+ yr at the LS, FN, TH, and at the LS or FN

Age (yr)	LS	FN	TH	LS or FN
50–59	6.8	1.1	2.6	7.0
60–69	17.0	5.5	4.4	18.6
70–79	22.7	11.5	10.2	27.4
80+	21.4	28.6	14.3	44.7
50–80+	16.0	6.7	5.8	18.7
50–80+ adjusted	14.9	8.0	6.2	19.3

Note: Lower line: 50–80+ adjusted for an age distribution identical to that of the general populations.

Abbr: FN, femoral neck; LS, lumbar spine; TH, total hip.

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