WHO-EM/NCD/044/E

Report on the

# Consultation on establishing regional guidelines on osteoporosis

Beirut, Lebanon
6–8 May 2004

World Health Organization
Regional Office for the Eastern Mediterranean

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CONTENTS

## 1. INTRODUCTION

The World Health Organization's Regional Office for the Eastern Mediterranean (WHO EMRO) convened a consultation on establishing regional guidelines on osteoporosis in Beirut, Lebanon, 6–8 May 2004. The objectives of the consultation were to review national and regional plans for osteoporosis primary prevention and care and to establish regional guidelines. The meeting was attended by 12 temporary advisers from countries of the Eastern Mediterranean Region and WHO staff from the field, Regional Office and headquarters.

Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean, inaugurated the consultation. In his address, Dr Gezairy said that osteoporosis was a global health problem and was predicted to become the commonest metabolic bone disease in the Eastern Mediterranean Region. It was becoming progressively more common, partly because it was a disease that increased in frequency in people over 60 years of age, a segment of the population that was growing rapidly in all countries of the Region. Men as well as women suffered from osteoporosis but it was frequently considered a disorder of postmenopausal women because of oestrogen deficiency that occurred at the time of menopause and that led to increased bone destruction.

In view of the high rates of osteoporosis, he said, a population-based non-pharmacological approach to the treatment and prevention of fracture had many attractions. The major reason for the increasing importance of a public health approach to osteoporosis was the increasing longevity of both women and men. The primary aim was to prevent fractures, thus fall prevention and hip protection were particularly important. This required risk assessment, with elimination, of risk factors when possible and, fracture assessment and therapeutic intervention when warranted. Most fractures were clinically obvious.

Dr Gezairy stressed the importance of good nutrition, and regular exercise and the harm caused by smoking to meet these challenges. He emphasized that adequate calories, a balanced diet and appropriate nutrients were the foundation for development of normal bone growth. Aggressive nutritional supplementation dramatically improved hip fracture outcome, and could lead to better protection of bone mass. In the Eastern Mediterranean Region, under-nutrition was a problem and there was still a lack of population-based surveys on nutrition in many Eastern Mediterranean countries.

Dr Gezairy concluded by saying that osteoporosis was now recognized by the World Health Organization as a major public health problem. Osteoporosis was a silent risk factor for fracture. The use of visionary and long-term prevention strategies would be critical to improving women's health. Only by preparing young girls for a lifetime of healthy behaviour would this goal be achieved. With sustained and directed national and international efforts towards the prevention of osteoporosis, both women's and men's health might be improved worldwide.

The Chairperson was Professor Ghada El-Hajj Fuleihar (Lebanon) and the Rapporteur was Professor Ibrahim S. Salti (Lebanon). The agenda, programme and list of participants can be found in annexes 1, 2 and 3, respectively.

## 2. TECHNICAL PRESENTATIONS

### 2.1 Regional overview on osteoporosis

*Dr O Khatib*

The term osteoporosis was mentioned over 170 years ago, by a French scientist, to describe porous bones. Osteoporosis is currently known as a systemic skeletal disorder that affects bone density and quality, leading to bone fragility and increased risk of fractures. It is defined as having a T-score of less than −2.5. The T-score is the number of standard deviations separating an individual bone mineral density from the peak bone mineral density of young adults. Osteopenia is defined as a T-score between −1 and −2.5 inclusive. Bone mineral density is considered normal if it is above −1. The main problem with the use of T-score is that it was developed originally for epidemiological purposes and not for clinical and management objectives. In addition, the definition of osteoporosis was originally used only in the population of Caucasian postmenopausal women.

Osteoporosis, although common in older individuals, is not revealed until a fracture or bony deformity occurs. It is associated with significant morbidity and mortality. Most women over the age of 50 who sustain a hip fracture will die within one year of their fracture, and close to half of the survivors require long-term care.

Osteoporosis represents a global health problem and its prevalence is perceived to be rapidly increasing in the Eastern Mediterranean Region due to the progressive ageing of the population. In a Lebanese study, 37%–66% of women over the age of 50 had osteopenia at the lumbar spine, and 47%–54% at the femoral neck, 28%–33% of women in that group had osteoporosis of the spine, and 6%–18% using hip measurements. Fractures occurred in 11%–17% of women over the age of 50, and in 20%–22% over the age of 60. In addition, another study found a lifetime fracture risk of 16.7% in Lebanese women and 9.3% in Lebanese men. In Saudi Arabia, osteoporosis was reported in 24% and osteopenia in 34% of postmenopausal women aged between 52 and 62 years. On average bone mineral density was felt to be lower in Saudi Arabian women than in their American counterparts, possibly due to a higher prevalence of vitamin D deficiency and multiple pregnancies associated with prolonged periods of lactation. Bone mineral density appears to be lower on average in the Eastern Mediterranean Region compared to in industrialized countries with T-scores being lower by 0.3 to 0.6. It is not clear whether the relation between bone mineral density and fracture risk in women from countries of the Region is similar to that one found in Caucasian women. In addition, multiple risk factors for osteoporosis and fractures have been identified, including malnutrition, inadequate intake of dietary calcium and vitamin D, lack of exercise, and smoking. Therefore, surveillance programmes are needed in order to accumulate Region-specific data, and establish national prevention programmes.

Sixty per cent of global deaths are due to noncommunicable diseases. Osteoporosis is but one of many noncommunicable diseases that affect developing countries; however, it is treatable and potentially preventable. For this reason, regional guidelines are needed for prevention and management of osteoporosis.

## 2.2 National and regional diabetes guidelines

*Professor I Salti*

The process of developing management guidelines for osteoporosis may be helped by previous experience in other areas of chronic disease management. One may be able to use the extensive amount of work invested in developing management guidelines for diabetes as an example in order to draw some parallels between it and osteoporosis. For instance, national guidelines for management of diabetes mellitus were published in Lebanon not too long ago, targeting both primary care providers and specialists. The specialist category not only included endocrinologists or diabetologists, but also specialists involved in the management of diabetes-related complications, such as ophthalmologists, cardiologists, nephrologists and vascular surgeons, among others. Other health professionals were also targeted, including dietitians, nurse educators, social workers and psychologists. Hence, it is felt that the endorsement of these guidelines by the various medical and professional societies that represent the diverse specialties involved in the management of the disease in question is of paramount importance. Guidelines should address complications and disorders related to the disease in question, in addition to dealing with issues related to diagnostic criteria, screening, management and prevention. The importance of patient education, empowerment, and self care should also be stressed. The necessity that management of osteoporosis is approached with the help of a multidisciplinary team should be emphasized. Finally, in view of the perceived high prevalence of osteoporosis regionally, and the scarcity of osteoporosis specialists, it is felt that the initial evaluation of the majority of patients at risk will be done by primary care physicians, with difficult or problematic cases being referred to specialists.

## 2.3 Data on bone densitometry and fracture in Saudi Arabia

*Professor M Desouki*

Osteoporosis is the most common metabolic bone disease, affecting more women than men, especially in the postmenopausal stage. The sequelae of osteoporosis constitute a heavy public health burden, with physical, societal and economic implications.

It is currently estimated that osteoporosis is a public health threat for 24 million Americans, 80% of whom are women. It is estimated that close to 20% of postmenopausal women in the United States of America have osteoporosis, and another 52% have osteopenia. The cost of caring for osteoporosis-related fractures was US$ 17 billion in 2001.

Osteoporosis refers to a disorder that affects both bone mass and bony architecture. As no non-invasive technique is available to determine bone architecture, bone mass or bone mineral density is measured. Dual energy X-ray absorptiometry (DXA) is the current gold standard for measuring bone mineral density, and therefore estimating fracture risk.

WHO diagnostic criteria for women are:

- Normal: bone mineral density is within 1 standard deviation of the “young adult” mean (T-score above −1).

- Low bone mass (osteopenia): bone mineral density is between 1 and 2.5 standard deviations below the "young adult" mean (T-score is between −1 and −2.5)

- Osteoporosis: bone mineral density is 2.5 standard deviations or more below the "young adult" mean (T-score at or below −2.5). Women in this group who have already experienced one or more fractures are deemed to have severe or "established" osteoporosis.

An individual's bone mineral density after reaching adulthood is determined by the achieved peak bone mass and the amount of bone that is subsequently lost. Peak bone mass is heavily determined by genetic background and is somewhat influenced by nutrition, physical activity and lifestyle habits. There are some limited preliminary data that suggest that peak bone mass in Saudi Arabians may be 1.3% compared to values in developed populations. Normative bone mineral density data have been published by a Lebanese centre and erroneously referred to as Middle Eastern normative data. This reference may be erroneous since that specific database seems to conflict with other sources of Lebanese data and does not necessarily represent bone mineral density status in other Middle Eastern countries. The variability among countries of the Eastern Mediterranean Region is highlighted by published reports suggesting a lower incidence of hip fractures in Saudi Arabia compared to Kuwait, where the incidence of hip fractures seems to be similar to industrialized countries.

### 2.3 Lifestyle factors and osteoporotic fractures in Lebanon

*Dr R. Baddourah*

Bone strength can be affected by lifestyle factors in childhood, adulthood and old age. A study in Lebanon showed that fewer than 5% of children were taking calcium or vitamin D supplements. Only 16% were taking a minimum of 200 IU vitamin D daily.

Vitamin D levels were low in a majority of children, especially during the winter months and among girls and lower socioeconomic classes. There was a weak but significant relationship between vitamin D level and bone mineral density. In addition, girls tended to exercise much less than boys (100 minutes/week compared to 300 minutes per/week, respectively).

Even in adults, a survey of rural, young to middle-aged women showed that 65% had very low 25 OH-vitamin D levels (<10 ng/ml). Parathyroid hormone level was inversely related to vitamin D levels in these women. Veiling may be a factor contributing to low vitamin D level by limiting sun exposure of the skin.

Finally, in a study of elderly Lebanese subjects, more than half of the women and a third of the men had very low levels of 25 OH-vitamin D (<10 ng/ml), and only 5%–6% had adequate levels (>20 ng/ml). Bone mineral density was inversely related to vitamin D level.

Lifestyle factors such as smoking, low level of activity, low intake of calcium and vitamin D, and inadequate sun exposure all contribute to low peak bone mass and therefore increase the risk of fractures in adulthood and old age.

### 2.4 Osteoporosis in men

*Dr Ali Al-Zahrani*

Even though osteoporosis has been thought of as a disorder of women, it does affect a substantial number of men. In the United States of America, 20% of people with osteoporosis are men, and close to 30% of hip fractures occur in males. Mortality associated with hip fracture is three times higher in men than in women (30% versus 9%). Hypogonadism is a well-known risk factor for osteoporosis in men in addition to other risk factors that are common to both sexes. The loss of bone mineral density with ageing appeared to be related to decreasing levels of testosterone with age. Levels of estradiol also appear to be important, with lower bone mineral density and higher rates of fractures occurring in men with lower levels of estradiol. In addition, individuals with aromatase deficiency or estrogen receptor mutation also suffer from low bone mineral density. With regard to treatment, while supplementation of patients with moderate to severe hypogonadism with testosterone improves bone mass, treatment of elderly patients with borderline low testosterone shows no consistent benefit. For male patients with idiopathic osteoporosis, alendronate therapy has been studied and leads to significant improvement in bone mineral density and fracture risk.

### 2.5 Prevention of osteoporotic fractures

*Dr M. Mufti*

The risk of fractures is influenced by both skeletal and non-skeletal factors. Skeletal factors are related to bone quality, the achieved peak bone mass, and to the subsequent rate of bone loss, while non-skeletal factors include items such as propensity to fall, tallness and thin body habitus. In the United States of America, 50% of women and 30% of men will suffer an osteoporotic fracture during their lifetime, most commonly in the spine, hip or wrist areas, causing significant morbidity and mortality. Even though patients who experience a fracture are at increased risk of having a recurrent one, very few of them receive an adequate evaluation or education for low bone mineral density before discharge. In addition, very few patients are treated despite the availability of efficacious agents that lower the risk of fractures, such as bisphosphonates and selective estrogen receptor modulators. Whenever any patient is hospitalized with a hip fracture, it is the orthopaedic surgeon's responsibility to inform the patient that he/she needs an osteoporosis evaluation, which the surgeon can perform himself or arrange through referral. Treating and educating patients about osteoporosis require a team effort, with involvement of surgeons, osteoporosis specialists, nutritionists, and physical therapists among others.

### 2.6 Lifestyle factors and osteoporotic fractures in Saudi Arabia

*Professor R Sulimani*

Osteoporosis is a common disorder in Saudi Arabia. The prevalence may be decreased if measures aiming at improving peak bone mass are implemented, including adequate intake of calcium and vitamin D, sun exposure, exercise, and avoidance of smoking. However recent reports suggest that low 25-oral hypoglycaemic vitamin D (5–10 ng/ml) occur in 20%–22% of Saudis. Urban females show the lowest vitamin D concentrations, and there was negative correlation between the total duration of lactation and bone mineral density values. The low

levels of vitamin D, despite the abundance of sun in the country, may be due to people staying mostly indoors, and clothing style that minimizes sun exposure. Rickets has therefore been described in children in Saudi Arabia, and osteomalacia in the elderly population. Therefore particular attention should be devoted to optimizing calcium intake and vitamin D supplementation, in addition to enhancing the activity level of the population. Increased awareness about osteoporosis (with or without osteomalacia) will hopefully lead to measures that address this public health problem.

### 2.7 Osteoporosis management: practical considerations

*D.I. El-Kebbi*

Osteoporosis by itself does not cause any medical problems unless fractures occur. Fractures lead to signs and symptoms, including pain, deformity, neurological deficit, disability, or in some cases, death. Therefore, the ultimate aim of osteoporosis screening and management is to prevent fractures. Hip fractures are associated with significant morbidity and mortality. They often result from a fall in a person with fragile bones. While measures aiming at improving bone strength have been repeatedly underscored, factors that increase the risk of falling need also to be addressed. These include improving the balance and coordination of people at risk, increasing their muscle strength, and improving their state of mind, which in many cases means avoiding medications that alter consciousness or cause over-sedation. In addition, other measures that may decrease the risk of fractures include correcting visual or hearing deficit in the elderly, the use of hip padding, and restructuring the living environment in order to make it safer, such as covering slippery floors, and removing obstacles and loose rugs.

Another approach to reducing fractures would be by enhancing bone strength, as mentioned above. Bone strength depends on bone density and bone architecture. While no non-invasive technique exists for studying or measuring bony architecture, bone density can be easily measured, and interventions to improve it have been developed. A major contributor to bone density is the achieved peak bone mass. Peak bone mass is usually reached by the end of the third decade, and is influenced by a person's genetic background, nutritional status, calcium intake, vitamin D stores (from endogenous synthesis and exogenous intake), weight-bearing physical activity, lifestyle factors such as smoking and alcohol abuse, and gonadal steroid secretion status. Two important nutritional elements that appear to be deficient in the Eastern Mediterranean Region are calcium and vitamin D, according to preliminary studies. Serious consideration should be given to supplementing specific food products with these factors, such as adding calcium to bread, cereal or fruit juices, and vitamin D to milk or yogurt.

Finally, another risk factor for fracture that is frequently overlooked is glucocorticoid therapy. Studies show that even low doses of glucocorticoids (the equivalent of 2.5–5 mg of prednisone) may lead to bone mass loss over time. Fortunately, clinical studies have shown a benefit from bisphosphonate administration both in the prevention and treatment of glucocorticoid-induced osteoporosis. It is hoped that consensus guidelines will be developed to define the criteria for screening glucocorticoid-treated patients for osteoporosis, and for treating them. It is also hoped for that consensus guidelines will be drafted addressing other

categories of people who may be at risk of fractures, namely men and premenopausal women with risk factors for osteoporosis.

### 2.8 International guidelines

*Professor G El-Hajj Fuleihan*

Osteoporosis represents a major public health problem, associated with significant morbidity, mortality and cost. The ageing of the population is contributing to an increase of the disease, since the elderly are at particularly high risk. Unfortunately, studies in the United States show that fewer than one-third of individuals with osteoporosis are diagnosed and fewer than one-seventh are treated, even though the annual incidence of fractures in women is close to three times higher than that of myocardial infarction and close to seven times higher than that of breast cancer. Studies show that fractures can be predicted by bone mineral density measurement. Treatment strategies that improved bone mineral density have been shown in many cases to decrease the risk of fracture (exceptions do occur). Older age, estrogen/androgen deficiency, glucocorticoid therapy, maternal history of fractures and a prior history of fractures are major risk factors for fractures. Other risk factors include low body mass index, radiographic evidence of osteopenia, loss of height, and conditions associated with osteoporosis, such as anorexia, malabsorption, malnutrition, hyperparathyroidism, rheumatoid arthritis, chronic renal or liver disease, hyperthyroidism, and therapy with certain drugs such as anti-seizure medications and heparin. The rationale for screening patients at risk by measuring bone mineral density is based on the fact that the presence of low bone mineral density predicts the occurrence of fractures, and pharmacological intervention in this population has been shown to prevent fractures. Most international guidelines agree on the need for screening or testing postmenopausal women over 65, and those under 65 if they have risk factors. They also agree on treating post menopausal women if their T-score is less than −2.5, or if they have low bone mass in the presence of pre-existent fragility fractures. Some international guidelines would treat individuals with low bone mass and major risk factors.

## 3. RECOMMENDATIONS

1. A regional panel of experts should be established to work closely with WHO/EMRO on osteoporosis issues. It should serve as a regional steering committee for development of regional osteoporosis guidelines.

2. Regional osteoporosis guidelines should be formulated on whom to test, what measures to use and when to treat.

3. The draft regional osteoporosis guidelines should be finalized by the committee by September 2004.

4. The regional guidelines should replace other national guidelines, to prevent duplication.

5. An annual meeting should be held, on a rotating basis, for bone densitometry accreditation.

6. Countries should plan for the following activities, with support from WHO.

- educational activities to raise community awareness, and development of patient-oriented brochures
- surveillance studies on hip fracture incidence
- development of a fracture registry
- studies on osteoporosis fracture risk

## Annex 1

## AGENDA

1. Opening session
2. Adoption of agenda
3. Regional overview on osteoporosis
4. Epidemiology of osteoporosis in Lebanon: bone mineral density and fracture
5. Lebanese data on lifestyle factors and osteoporosis
6. Saudi Arabia data on lifestyle factors and osteoporosis
7. Saudi Arabia data on bone densitometry and fracture
8. Methodology to develop osteoporosis guidelines
9. Osteoporosis: summary review of international guidelines
10. National and regional diabetes guidelines: how to learn from them
11. Osteoporosis: summary review of Lebanese guidelines
12. Guidelines framework: from national to regional
13. Country presentations: osteoporosis at public health level
14. Osteoporosis management: practical considerations
15. Osteoporosis – fracture prevention
16. Panel discussion on regional guidelines: how they can be developed and implemented
17. Osteoporosis: future regional agenda, plans and time-frame
18. Conclusions and recommendations
19. Closing session

**Annex 2**

**PROGRAMME**

**Thursday, 6 May 2004**

| | |
|---|---|
| 08:30 – 09:00 | Registration |
| 09:00 – 10:00 | Opening ceremony<br>Address of Dr Hussein A. Gezairy, Regional Director, WHO/EMRO<br>Speech of H.E. the Minister of Public Health, Lebanon<br>Election of Chairman, Co-chairman and Rapporteur<br>Adoption of agenda |
| 10:00 – 11:00 | Regional overview on osteoporosis, Dr O. Khatib |
| 11:00 – 11:30 | Epidemiology of osteoporosis in Lebanon bone mineral density and fracture, Dr Hassane Awada |
| 11:30 – 12:00 | Lebanese data on lifestyle factors and osteoporosis, Dr Hassane Awada |
| 12:00 – 12:30 | Saudi data on lifestyle factors and osteoporosis, Professor Riad Sulimani and Professor Mahmoud I. El-Desouki |
| 12:30 – 14:00 | Saudi data on bone densitometry and fracture, Professor Mahmoud I. El-Desouki |
| 14:00 – 14:30 | Methodology to develop osteoporosis guideline, Dr Rafik Baddoura |
| 14:30 – 15:30 | Osteoporosis: summary review of international guidelines, Professor Ghada El-Hajj Fuleihan and Professor Mahmoud I. El-Desouki |
| 15:30 –16:00 | National and regional diabetes guidelines: how to learn from them, Professor Ibrahim S. Salti |
| 16:00 – 16:30 | Osteoporosis: summary review of Lebanese guidelines, Professor Ghada El-Hajj Fuleihan |
| 16:30 – 17:00 | Guidelines framework: from national to regional, Dr Oussama Khatib |
| 17:00 –18:00 | Discussion |

**Friday, 7 May 2004**

| | |
|---|---|
| 09:00 – 11:00 | Country presentations: Osteoporosis at public health level, Professor Bagher Larijani, Professor Kamal Al-Shoumer and Dr Rafik Baddoura |

11:00 – 11:30 Country presentations: osteoporosis at public health level, Professor Mahmoud I. El-Desouki

11:30 – 12:00 Discussion

12:00 – 12:30 Osteoporosis management: practical considerations, Dr Imad M. El-Kebbi and Dr Ali Al-Zahrani

12:30 – 14:00 Osteoporosis – fracture prevention, Dr Mohammed H. Mufti

14:00 – 15:30 Panel discussion on regional guidelines: How can they be developed and implemented?

15:30 – 16:30 Osteoporosis: future regional agenda, plans and time-frame

16:30 – 17:00 Discussion

**Saturday, 8 May 2004**

09:00 – 10:30 Discussion

10:30 – 12:00 Conclusions and recommendations

## Annex 3

## LIST OF PARTICIPANTS

### Temporary Advisers

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