

(RESEARCH ARTICLE)

Levels of knowledge and



## Levels of knowledge and beliefs among Moroccan women living in Casablanca: Preliminary results of a survey among Moroccan women living in Casablanca

Jihad MOULAY BERKCHI <sup>1,2,\*</sup>, Dounia TAHRI JI HASSANI <sup>1</sup>, Kawtar FEJRY <sup>1</sup>, Samia BELKHADIR <sup>1</sup> and Lahsen ACHEMLAL <sup>1</sup>

<sup>1</sup> Rheumatology Department, Cheikh Khalifa International University Hospital, Faculty of Medicine, Mohammed VI University of Health Sciences (UM6SS), Casablanca, Morocco.

<sup>2</sup> Laboratory of neurosciences and Oncogenetics, Mohammed VI center for research and innovation, Casablanca, Morocco.

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### Abstract

**Objectives:** To get closer to the beliefs and knowledge of Moroccan women over 18 years old living in Casablanca.

**Methods and patients:** The survey was conducted among a population aged 18 and over. An in-depth questionnaire was carried out with the aim of distinguishing gaps in knowledge but also popular beliefs limiting good understanding.

**Results:** 322 participants were included, aged from 19 to 86 years. 96% of participants were familiar with the term osteoporosis without any correlation with age, level of education or place of residence. The primary source of information was family and neighborhood in 59%. 57% considered the therapeutic arsenal expensive and was no way correlated with monthly income. 90% mentioned the preponderant role of calcium and vitamin intake in preserving bone health. Vitamin D deficiency, rheumatic and endocrine history represented the popular beliefs most implicated in the occurrence of osteoporosis in 90%, 86%, 78% respectively. The major impact of osteoporosis represented by the risk of fracture and the disability caused were part of the achievements in 97% and 95% respectively.

**Conclusion:** The general knowledge of the Casablanca female population was high compared to numerous studies carried out in the same context.

**Keywords:** Osteoporosis; Survey; Knowledge; Beliefs; Moroccan female population

### 1. Introduction

Osteoporosis is defined by the World Health Organization (WHO) as a systemic skeletal disorder, characterized by a decrease in bone mass and micro-architectural deterioration, predisposing to the loss of bone strength and increase the risk of fractures [1].

It is a silent and threatening pathology affecting 44.6% of postmenopausal women and continues to be prevalent in Morocco [2]. However, it remains underdiagnosed, undertreated and underestimated by patients [2].

With the increase of life expectancy, osteoporosis is becoming a major global health problem with considerable clinical, economic, and social impacts [3].

\* Corresponding author: J MOULAY BERKCHI

Osteoporotic fractures are the most serious consequence of osteoporosis, which can harm the patient's quality of life [4]. According to a recent statistic from the International Osteoporosis Foundation, osteoporotic fractures affect a third of women aged over 50 worldwide. Each fracture is a sign of another imminent with a high risk of mortality in the year following the fracture, particularly for fractures of the upper end of the femur [5].

In Morocco, osteoporosis occurs 10 years earlier than the global average estimated by the World Health Organization; the prevalence is estimated at 35% among women over 50 and 60% among those over 60 years old. This worrying situation led to fear an explosion in the number of osteoporotic fractures in less than 20 years [2].

Given the high cost associated with fragility fractures, early detection of patients at risk for osteoporosis is essential. Prevention must start from a young age. Indeed, perceptions of personal susceptibility and belief in the severity of a disease are important elements in influencing behavior change in disease prevention programs. [6-7]. However, their insufficiency has been reported in numerous studies [8], many people are not aware of their risk of developing osteoporosis and do not regularly have an osteoprotective behaviors [9].

In Morocco, a study conducted by Allali. F et al on the association between education level and the prevalence of osteoporosis and peripheral fractures in postmenopausal women showed that lower education level was associated with higher osteoporosis prevalence [10].

To identify population groups of Moroccan women with the lowest levels of knowledge about osteoporosis, risk factors and preventive measures, which should be targeted in future awareness campaigns and educational programs, we conducted a study which aims to evaluate knowledge, beliefs and practices concerning osteoporosis among Moroccan women over 18 years old in Casablanca.

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## 2. Material and methods

### 2.1. Study design

Participants were recruited from a cross-sectional survey carried out among female volunteers over the age of 18 years old. Recruitment of subjects is still ongoing.

The inclusion criteria comprise all patient over 18 years old without a diagnosis of osteoporosis. Any patient followed for osteoporosis, under the age of 18, with physical or mental limitations that could affect their ability to provide informed consent or answer questions was excluded. Eligible subjects were invited to a face-to-face interview session.

This study analyzed the results of 322 women, aged between 19 and 86 years old, living in the greater Casablanca region and without any formal health training. They agreed to participate in the survey after presentation of an oral and written information letter about the purpose of the study and written consent.

The questions were asked by the same investigator in the same way to avoid any misunderstanding and they were naturally the same questions for all participants.

### 2.2. The questionnaire

Many questionnaires assessing the level of knowledge and health beliefs associated with osteoporosis have been used in previous studies. Our questions were formulated based on 2 validated questionnaires: Modified Osteoporosis Prevention and Awareness Tool (OPAAT) and Osteoporosis Health Belief Scale (OHBS) (Kim et al. 2013) while adapting the questions to the Moroccan context.

We conducted a pilot study with 10 women to ensure the clarity of the questionnaire.

The final validated version of our questionnaire included 2 main parts:

- The first part included information on the socio-demographic characteristics: age, gender, income, education, residence, level of education, monthly income, sports and professional activities. We were also interested in the general risk factors of osteoporosis, including smoking history, current alcohol consumption, parental history of fracture as well as personal history of fracture and Current use of nutritional supplements (calcium, vitamin D).
- The second part assessed the level of knowledge using a questionnaire composed of 33 dichotomous (yes/no)

or multiple-choice questions and divided into 3 areas which are:

- General knowledge (definition, diagnosis, and treatment) about osteoporosis
  - Knowledge about osteoporosis prevention
  - Susceptibility and severity regarding osteoporosis

### 2.3. Statistical Analysis

Statistical analysis was performed using Statistical Package for Social Science Version 21. Statistical significance was set as  $p < 0.05$ . The qualitative variables were presented as frequencies while the Quantitative variables were expressed as means with standard deviation. We use a bivariate analysis to compare groups using the Chi2 test for categorical variables.

## 3. Results

### 3.1. Sociodemographic and overall characteristics

In total, we include 322 participants until now, aged between 19 and 86 years old, the mean age was 39.39 (19 - 86) years old. 30% of participants were postmenopausal. The educational level of the study group was mainly university (54%), and the majority (86%) came from an urban area. 69% of participants had a profession with a significant number of sedentary jobs (26%). The monthly income status was between 3,000 and 10,000 dhs in 54% of participants.

Concerning the main comorbidities sought which could induce secondary osteoporosis, we found diabetes and hyperthyroidism in 11 and 10 cases respectively, two common endocrinopathies to be systematically sought in the presence of osteoporosis. A family history of osteoporosis was present in 22% of cases.

Glucocorticoids were the frequent (14%) drugs involved in iatrogenic osteoporosis in our population. In terms of vitamin-calcium intake, 25% took calcium supplementation and 54% received vitamin D supplementation. Physical activity is far from being at the top of our members' concerns, only 28% exercised for more than 30 minutes. Concerning the toxic habits, 7.5% and 5% respectively consumed tobacco and alcoholic beverages.

The sociodemographic and overall characteristics of the study population are summarized in Table 1.

**Table 1** Sociodemographic and overall characteristics of the population studied

Variables	(%)
Age (mean)	39.39 (19 - 86)
Menopause	
Yes / No	30/70
Age at menopause (mean)	50 (42 - 55)
Place of residence	
Urban/Rural	86 / 14
Educational level	
Illiterate	15
Primary	9
Secondary	22
University	54
Professional Activity	
Housewife with household activities	
> 30 mins/day	20
<30 mins/day	11

Active employment	43
Sedentary employment	26
Monthly income (Moroccan dirhams)	
(-) 3000	33
3000 and 10000	54
(+) 10000	13
Comorbidities	
Chronic inflammatory rheumatic diseases	6
Diabetes	11
Hyperthyroidism	10
Diabetes and chronic inflammatory rheumatic diseases	3
Without	70
Familial ATCD of osteoporosis	
Yes / No	22 / 78
Medicinal Intake	
Glucocorticoids	14
Thyroid hormones	11
Others (PPIs*, antidepressants, antiepileptics)	20 (10, 6, 4)
No	55
Calcium supplementation	
Yes/ No	25/75
Vit D supplementation	
Yes/ No	54/ 46
Smoking	
Yes/ No	7.5/92.5
Alcoholism	
Yes No	5/95
Sports physical activity	
- 30 mins/day	27
+ 30 mins/day	28
3h/week	9
Sedentary	34

\* PPIs: Proton Pump inhibitors

### 3.2. Knowledge and beliefs about osteoporosis

The second part of the questionnaire concerning the knowledge and beliefs of Moroccan women on osteoporosis is represented in Table 2.

**Table 2** Beliefs and knowledge of the female population over 18 years old about osteoporosis

QUESTIONS	CORRECT ANSWERS	Answer	Answer	Answer
		YES	NO	I don't know
<b>DEFINITION AND DIAGNOSIS OF OSTEOPOROSIS</b>				
Osteoporosis is a decrease in bone mineral density	YES	81%	16%	3%
Is osteoporosis painful?	NO	70%	22%	8%
Osteoporosis is seen exclusively in women.	NO	32.5%	67.5%	0%
Can osteoporosis also affect young women?	YES	71%	12%	17%
There is a relationship between menopause and osteoporosis	YES	70%	17%	13%
Is osteoporosis hereditary?	NO	48%	40%	12%
The treatment of osteoporosis costs on average 200dh/month, do you think it is expensive?		57%	23%	20%
<b>SUSCEPTIBILITY AND SEVERITY</b>				
A simple x-ray confirms the diagnosis of osteoporosis	NO	22%	66%	12%
Is there specific imaging for the diagnosis of osteoporosis?	YES	76%	8%	16%
Does a blood test allow the diagnosis of osteoporosis:	NO	41%	40%	19%
Can osteoporosis be cured:	YES	37%	43%	20%
Do you think you are at risk of osteoporosis if you are overweight?	NO	77%	14%	9%
Do you think you are at risk of osteoporosis if you are low weight (Body Mass Index < 19 kg/m <sup>2</sup> )?	YES	38%	45%	17%
You think you will be at risk for osteoporosis if you have a family history of osteoporosis	YES	47%	42%	11%
You think you will be at risk of osteoporosis if you had early menopause before age 40	YES	78%	14%	8%
You think you will be at risk of osteoporosis if you smoke	YES	60%	31%	9%
You think you will be at risk of osteoporosis if you drink alcohol	YES	58%	25%	17%
You think you will be at risk of osteoporosis if you have a vitamin D deficiency	YES	90%	1%	9%
You think you will be at risk of osteoporosis if you have a calcium deficiency	YES	90%	5%	5%
You think you will be at risk for osteoporosis if you have an endocrine or rheumatic disease, such as RA	YES	86%	8%	6%
For you, is osteoporosis as alarming as heart disease, cancer or diabetes?	YES	67%	29%	4%
Is osteoporosis a fatal disease:	YES	20%	66%	14%
Osteoporosis can make daily activities more difficult	YES	95%	1%	4%
Can osteoporosis cause fractures?	YES	97%	3%	0%
Osteoporosis can cause psychological problems:	YES	67%	22%	11%
<b>KNOWLEDGE ABOUT PREVENTION</b>				
Calcium is only found in dairy products	NO	10%	87%	3%

A sufficient daily calcium intake can be obtained with 2 glasses of milk	NO	38%	46%	16%
The main source of vitamin D is food	NO	30%	67%	3%
Sun rays prevent vitamin D deficiency.	YES	89%	9%	2%
Can Excessive Diet Cause Osteoporosis?	NO	54%	30%	16%
Physical activity is beneficial for osteoporosis.	YES	74%	12%	14%

The overwhelming majority of women (96%) were familiar with the term osteoporosis without any correlation with age, level of education or residence (p-value 0.976, 0.447, 0.423 respectively) (Table 3). In 59% of cases, the primary source of information was family and the neighborhood.

The reduction in bone mineral density stood out as the definition of osteoporosis in 81% of participants, however several also associated it with a vitamin-calcium deficiency in 47% of cases without any association with age, education level or residence (p-value at 0.152, 0.679, 0.188 respectively) (Table 3).

Osteoporosis was considered non-exclusive to the female sex, painful, hereditary and incurable in 67.5%, 70%, 48% and 40% respectively.

The claim that osteoporosis is exclusive to women was correlated with age (p-value less than 0.005). In fact, the population aged 40 to 80 tended to have this belief (55.6%) versus young people aged 18 to 40 who are aware of non-exclusivity (80.3%).

The question relating to the occurrence of osteoporosis in young women was correlated with the level of education (p-value 0.012) (Table 3); patients with a university level were the best informed. The relationship between menopause and osteoporosis was known in 70% of responses.

In terms of positive diagnosis, 76% declared specificity of imaging, however 41% judged the interest and necessity of the blood test. The specific imaging represented by bone densitometry as a diagnostic tool for osteoporosis was correlated with the place of residence (p-value at 0.005) (Table 3). The group from the urban area was better informed.

Vitamin D deficiency, rheumatic and endocrine history represented the popular beliefs most implicated in the occurrence of osteoporosis in 90%, 86% respectively.

For the risk factors, some associations were statistically significant, the low body mass index was correlated with age (p-value less than 0.023) (Table 3), those under 40 were the most aware of it.

83% of participants expressed anxiety about osteoporosis while 29% and 66% respectively minimized its severity and the risk of mortality following the occurrence of complications.

From a therapeutic point of view, 57% considered the treatment expensive, and was in no way correlated with monthly income (p-value at 0.421).

The major impact of osteoporosis represented by the risk of fracture and disability were part of the achievements with spectacular rates of 97% and 95% respectively. Indeed, most participants were well informed of this risk if osteoporosis was not prevented and well managed. These two significant consequences were correlated with place of residence. Mortality (p-value < 0.002) concept acquired more among people from a rural area, and fractures (p-value < 0.001) concept acquired among women from urban areas (Table 3).

For preventive measures, almost unanimously (90%) affirmed the preponderant role of calcium and vitamin intake in maintaining bone balance. 67% of participants were aware that the majority of vitamin D comes from sun exposure.

Indeed, the main source of vitamin D was well known by the youngest between 18 and 40 years old with a rate of 70.7% (p-value at 0.001) (Table 3). Likewise, only 10% believed that calcium was exclusively dependent on milk.

Regarding the effect of exercise on bone health, physical activity was correctly identified as being beneficial in preventing osteoporosis by 74% of participants.

**Table 3** Significant correlations between different questions and socio-demographic characteristics

Questions	Age P-Value	Level of education P-Value	Residence P-Value
Osteoporosis is seen exclusively in women.	0.004	0.393	0.314
Can osteoporosis also affect young women?	0.113	0.012	0.376
Osteoporosis DC requires specific imaging	0.330	0.516	0.005
Risk factors			
Do you think you are at risk of osteoporosis if you are low weight (Body Mass Index < 19 kg/m <sup>2</sup> )	0.034	0.326	0.365
Vitamin-calcium deficiencies			
The main source of vitamin D is food	0.001	0.062	0.169
Is osteoporosis a fatal disease?	0.254	0.675	0.002
Can osteoporosis cause fractures?	0.225	0.163	0.000
			p < 0.05

#### 4. Discussion

Osteoporosis is considered the most common skeletal disorder with high global prevalence. Fracture is the most serious consequence that can occur, significantly altering the patient's quality of life [11].

The prevention of osteoporosis depends greatly on the level of knowledge; the higher this level, the better the application of the concepts acquired in daily practice. Increasing the level of knowledge among the general population is one of the absolute priorities to ensure the promotion and success of osteoporosis prevention and control programs [11].

Regarding the level of knowledge, the greatest number (92%) of study participants had heard of osteoporosis. This is consistent with other studies such as the one carried out in Riyadh in the year 2013 during which 86% of the participants had heard of osteoporosis [12]. However, as results differ from country to country, this finding is inconsistent with a study conducted in Hyderabad, India, which found that 70% of respondents were unaware of the disease [13].

We have also demonstrated that residence influences people's awareness, this is the case for the population in urban areas and this could well be explained by the fact that ease of access to care is centered in this area. Education gives us access to health information and power to interpret it. In our study, the level of education of the participants was positively correlated with the level of awareness. This agrees with other studies carried out in Saudi Arabia [12, 14], Iran, Turkey and India [15,16, 17, 18]. Indeed, a study conducted by Urgan and Tumer [17] among Turkish women showed that the level of education can determine the extent to which a woman is aware of osteoporosis. This is also consistent with the work of Eslamian et al. [19] conducted in Iran stating that education had a significant impact on the osteoporotic knowledge of Iranian women in Tehran. Given that many studies report high levels of education among participants, it is possible that women with more years of education are more willing to participate.

It has been reported in the literature that knowledge and education regarding osteoporosis increases with age, a finding that is quite mixed and diverges between studies. Wahba et al (2010) [20] conducted a cross-sectional study assessing knowledge of osteoporosis among 494 young Egyptian women aged 16 to 24 years. The results indicated that 88.1% of this population had knowledge about osteoporosis. A study conducted in 2015 including 13 regions of Saudi Arabia including 1830 participants aged 18 and over demonstrated that the younger the person, the more informed they are [21].

These findings contrast with our results, the level of knowledge was not predominantly high among the youngest for certain questions relating to risk factors. Likewise, an Iranian study could not find an association between awareness level and age [15].

It is well known that bone density loss is accelerated in the years following menopause when hormonal changes occur [6-22]. In our study group 30% were postmenopausal, it is expected that older women will have better knowledge of the risk associated with menopause. For our participants, 69% affirmed the association between osteoporosis and menopause, another point that demonstrates a high level of knowledge regardless of age group.

Having a job facilitates access to sources of knowledge, in terms of employment status and knowledge, our results are not consistent with other studies in the other countries cited above or the majority of those who were aware of osteoporosis were employed, while the lowest rate of knowledge was among unemployed people. 69% of our participants were employed; however, the results demonstrated that those who were not employed were the closest to certain knowledge. Therefore, the position of civil servant or non-civil servant does not impact the quality of instruction in osteoporosis.

The study carried out in the United States (USA) [23] on 153 postmenopausal women aged at least 55 years and the study by Wahba et al [20] had approximately the same level of knowledge concerning the role of calcium in prevention of osteoporosis. This suggests that women do not necessarily acquire more knowledge as they age.

Still in the same study from the United States (USA), the results showed few obstacles to calcium intake compared to obstacles to physical activity. Ease of calcium intake was favored by its availability in tablets and foods. Physical activity was rather difficult to achieve since these women included in the study were all post-menopausal and certainly anxious about the idea of practicing physical activity that could represent a danger, hence the need to ensure that the areas exercise is safe and affordable. In our work, only 22% were on calcium supplementation and only 38% exercised regular physical activity. 76% testified to the benefit of physical activity for osteoporosis, and 91% to calcium deficiency in the risk of developing osteoporosis.

Our participants used calcium more than physical exercise for the prevention of osteoporosis but there were more difficulties with calcium intake than with physical exercise.

These preliminary data analyses should be interpreted within the context of its strength and limitations. Our survey has a number of limitations which included the inability to conduct the study in different medical center of Casablanca due to logistical reasons, but we think that our hospital may be representative of the Casablanca community given that we receive patients from different districts of Casablanca. The number currently recruited cannot be representative of the Casablanca population, but our recruitment's still in progress and these preliminary results already allow us to have an idea of the level of knowledge of our population and to distinguish the different categories of patients to target during awareness campaigns. Likewise, our study did not evaluate preventive behavior towards osteoporosis in more detail, which is an important element in guiding our awareness campaigns. Despite these limitations, this is the first study that attempted to determine the levels of knowledge and beliefs about osteoporosis among non-osteoporotic Casablanca women.

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## 5. Conclusion

Osteoporosis is a common and silent disease responsible for long-lasting disability with a heavy economic burden on the patient and society. These preliminary results of our survey demonstrated that the general knowledge of the Casablanca female population was high compared to numerous studies carried out in the same context.

However, the challenge is still major given the increase in the number of osteoporotic patients, hence the interest in the active participation of doctors in the patient education effort. In addition, the media and associations should redouble their efforts to plan health education strategies targeting all generations.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.



### *Statement of ethical approval*

Ethical approval was obtained from the ethics committees of Sheikh Khalifa International Hospital and Mohamed VI University of Health Sciences and our study was conducted in accordance with the Declaration of Helsinki. Patient agreed to participate in the study after presentation of an oral and written information letter about the purpose of the study and thus they gave their written consent.

### *Authors' contributions*

J.MB established the study protocol and carried out the questionnaire, K.F and S.B participated in patient recruitment, J.MB and D.TJH wrote the manuscript, L.A. revised the manuscript.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.”

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