

## Medical Students' Knowledge of Osteoporosis in Ege University Faculty of Medicine

Ege Üniversitesi Tıp Fakültesi Öğrencilerinin Osteoporoz Hakkındaki Bilgi Düzeyi

Sibel Eyiğör, Hale Karapolat, Berrin Durmaz

Ege University Faculty of Medicine, Physical Medicine and Rehabilitation Department, İzmir, Turkey

### Abstract

**Objective:** Osteoporosis is a major public health problem in many countries. Educating healthcare providers about osteoporosis may play a pivotal role in improving osteoporosis management. However, there are very few studies at the physicians' level of knowledge on this matter. Our aim was to determine as future physicians, Turkish medical students' knowledge and attitudes to the management and prevention of osteoporosis.

**Materials and Methods:** A total of 375 medical students from each grade were asked to fill in a questionnaire about osteoporosis.

**Results:** 98.9% of the students surveyed thought they were somewhat familiar with osteoporosis. Only 0.3% of the medical students who completed the questionnaire answered all the questions on the risk factors for osteoporosis correctly. The fact that supplementary medications in addition to calcium are needed for the management of osteoporosis was known by 45.9% of the medical students. With 10.7%, very few students knew that osteoporosis is directly responsible of hip fractures. On the other hand, 18.9% of the students knew that the disease could result in fatality.

**Conclusion:** The results of the present study show that medical students know the definition of osteoporosis but their knowledge on complications and preventive measures were insufficient in all classes. During their medical education, medical students should be furnished with necessary information on risk factors for osteoporosis and preventive measures that are applicable to the community and this knowledge should allow them to plan effective ways of using information. (*Rheumatism 2008; 23: 77-81*)

**Key words:** Knowledge of osteoporosis, medical students

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### Özet

**Amaç:** Osteoporoz çoğu ülkede toplumun ana sağlık problemlerinden birisi olarak karşımıza çıkmaktadır. Osteoporoz tedavisinin iyileştirilmesinde, sağlık ekibinin eğitimi esas rolü oynamaktadır. Ancak, doktorların bu konu hakkındaki bilgi düzeyi ile ilgili çok az sayıda çalışma bulunmaktadır. Bizim amacımız, geleceğin doktorları olacak olan tıp öğrencilerinin, osteoporoz tedavisi ve korunma konusundaki bilgi düzeylerini ve görüşlerini ortaya koymaktır.

**Yöntem ve Gereçler:** Farklı sınıflardan 375 tıp öğrencisi, osteoporoz ile ilgili sorgulama formlarını doldurdu.

**Bulgular:** Öğrencilerin %98.9'unun osteoporozun ne anlama geldiği hakkında bilgileri vardı. Tıp öğrencilerinin sadece %0,3'ü osteoporoz risk faktörleri ile ilgili soruların tümünü doğru olarak cevaplamışlardı. Osteoporoz tedavisine destek için ayrıca kalsiyum alınması gerektiği gerçeği, öğrencilerin %45,9'u tarafından bilinmekteydi. %10,7 gibi çok düşük bir oranda öğrenci, osteoporozun direkt kalça kırığından sorumlu olabileceğini biliyordu. Diğer taraftan, %18,9 oranında öğrenci bu hastalığın ölümlü sonuçlanabileceğini biliyordu.

**Sonuç:** Bu çalışmanın sonuçlarına göre, tıp öğrencileri osteoporoz tanımını bilmelerine rağmen, tüm sınıflarda komplikasyonlar ve korunma konusundaki bilgileri yetersizdi. Tıp öğrencileri tıp eğitimi sırasında, osteoporoz risk faktörleri ve koruyucu yaklaşımlar ile ilgili yeterli ve topluma uyarlanabilir bilgi almalıdırlar, bu bilgi onlara bildiklerini etkin şekilde kullanmak için plan yapma izni verir. (*Romatizma 2008; 23: 77-81*)

**Anahtar sözcükler:** Tıp öğrencileri, osteoporoz bilgi düzeyi

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### Introduction

Advances in medicine resulted in an increase in life expectancy and consequent increase in the proportion of

elderly people in the population. In response to the increase in mean life span, chronic diseases associated with advanced age have gained importance (1). Chronic diseases, with possible fatal complications and costly

management and follow-up, are those that adversely affect the quality of life and require specialist treatment. Nowadays, considering the funds allocated for healthcare, determination of risk factors for chronic diseases and implementation of preventive measures to eliminate them have become critical (2, 3).

Considered as a chronic illness, osteoporosis is a disease of bone metabolism that can cause bone fractures. Therefore it is a health issue that gains prominence and needs to be emphasized not only worldwide but also in Turkey (3). In the USA, there are 1.5 million fracture cases due to osteoporosis, costing some 13.8 billion dollars for treatment. Hence, for community health purposes and increased cost of management, research has focused on prevention of osteoporosis rather than its treatment (4). Determining the risk factors for osteoporosis before they cause bone loss in the elderly, educating the individuals under risk with regard to the complications of osteoporosis and administering the necessary treatment modalities will not only decrease osteoporosis-related mortality and morbidity but also help cut the cost of treatment (5, 6). There are concerns on the financial losses and psychological aspects of osteoporosis and, this major task of implementing the preventive measures falls on the healthcare professionals. The 2000 National Institutes of Health Consensus Conference on osteoporosis identified as one of its priorities "the need to study the most effective method of educating the public and healthcare professionals about the diagnosis and management of osteoporosis" (Consensus Development Panel, 2000) (7). Educating healthcare providers about osteoporosis may play a pivotal role in improving osteoporosis management. However, there are very few studies on the physicians' level of knowledge on this matter (8-12). A high proportion of general practitioners reported that they did not have sufficient knowledge on osteoporosis during their undergraduate education (10). This has resulted in doubts regarding the osteoporosis knowledge of students trained to be medical doctors but no studies have been found on this matter. Results of such studies are important for planning undergraduate and postgraduate educational programs on major health issues such as osteoporosis for physicians.

This study is constructed to establish whether or not medical students who will become general practitioners acquired the necessary knowledge during their education and to assess their readiness to assume the role of educator related to this disease.

## Materials and Methods

This descriptive study used a survey method to gather data on medical students' knowledge of osteoporosis, health beliefs of osteoporosis, risk factors, osteoporosis preventing behaviors, and management strategies. The study was carried out in Ege University Medical Faculty, Izmir between September to November 2006. Total duration of medical education in Turkey is six years. Fifteen volunteers selected among 3rd year medical students were trained by a physiatrist on how to fill in the questionnaire for a project called "special training mod-

ule" that has a role in the education of medical students. A preliminary questionnaire was filled in by fifteen graduate students to identify and eliminate bias in the questionnaire design. Each participant was informed about the study and written consents were obtained. The questionnaire was distributed before lectures and during a student-faculty member dinner. None of the students received any sort of help while filling in the questionnaire. Initials of the respondents were written on the forms only and confidentiality was assured. Responses were evaluated by two experienced physiatrist.

A questionnaire comprising 43 questions was used. Since it was not specific to healthcare professionals, the questionnaire was modified from validated questionnaire for Turkish female subjects with osteoporosis and the Osteoporosis Knowledge Questionnaire (13). Osteoporosis risk factors in the questionnaire were adapted from the MEDOS study by Kanis et al. (14). Age, sex and attributes of the classes of the students were recorded. In the questionnaire, 28 questions were on risk factors of osteoporosis, 5 on fracture and mortality, 4 on general knowledge of osteoporosis (obtaining information, management), 4 on diagnosis and awareness of the disease, 1 on symptoms and 1 on preventive factors of osteoporosis. Twenty eight questions were answered by indicating the degree of agreement using a 5-point Likert scale (strongly agree  $\pm$  strongly disagree). Nine questions were answered Yes or No. Five questions were multiple choice questions while 1 question was answered Correct or Incorrect. In addition to scoring, the responses to Likert-type questions were further evaluated by grouping them as correct or incorrect. These responses were specifically selected for certain areas (risk factors, symptoms, etc). The levels of knowledge of the participants in certain areas were calculated by summing the number of correct answers.

Four hundred students of the Medical Faculty, from different years and whose faculty registration numbers were even were contacted and asked if they would like to participate in the study. Three hundred and eighty eight of them expressed an interest in participation. Thirteen of them were excluded from the study due to incomplete filling of the query forms. Students according to the medical class were divided into two groups as level of 1-3 and level of 4-6.

### Statistical Analyses

Data were analyzed by chi-square, Mann-Whitney U and Kruskal-Wallis tests using the Statistical Package for the Social Sciences (SPSS) for Windows 13.0. A p value less than 0.05 was considered significant.

## Results

Osteoporosis questionnaire was completed by 375 students. Characteristics of the students are presented in Table 1.

Of the respondents, 98.9% have heard of the term "osteoporosis" (98.4% of male students and 99.5% of females students, there were no differences between classes,  $p>0.05$ ) while 98.8% defined osteoporosis correctly as "softening of bones or reduction of bone

mineral density" (98.9% of males and 98.7% of females, there were no differences between classes,  $p>0.05$ ). The sources medical students learned osteoporosis were radio (9.3%), medical textbooks (60.8%), journals/magazines (23%), newspapers (32.9%), internet (19.2%), friends (23.3%) and other sources (2.2%).

Only 0.3% of the medical students who completed the questionnaire answered all the questions on the risk factors for osteoporosis correctly while 14.1% answered some of the questions (16 of the 28 questions) correctly. Among the risk factors for osteoporosis, nutritional factors and diseases resulting in osteoporosis were least likely to be known by the students. The ratio of those who knew the relation between nutritional factors and osteoporosis was 27.5% (all the questions on the nutritional factors for osteoporosis) while the ratios of those who knew the relations between osteoporosis and cancer, pulmonary diseases, hematologic diseases and neurological diseases were 41.3%, 21.9%, 48%, and 40.5%, respectively.

The ratio of students who correctly answered the questions related to the symptoms of osteoporosis was low (chronic back pain 46.9%, reduction in mobility 45.9%).

Only 18.1% of the students knew all the symptoms of osteoporosis while 58.4% knew 4 of the 5 symptoms of the disease. Meanwhile, 70.9% of the students knew the methods to establish the diagnosis of osteoporosis.

The fact that supplementary medications in addition to calcium are needed for the management of osteoporosis was known by 45.9% of the medical students. 27.5% of the students answered all questions on the prevention of osteoporosis correctly while 32.5% answered most of the questions correctly. The protective effect of estrogen on osteoporosis was known by 68% of the students.

With 10.7%, very few students knew that osteoporosis is directly responsible of hip fractures. On the other hand, 18.9% of the students knew that the disease could result in fatality.

The level of knowledge regarding the risk factors for osteoporosis increased with the classes of the students ( $p<0.05$ ) (Figure 1). However, there were no differences between classes with regard to making the osteoporosis diagnosis and knowing the symptoms or prevention of osteoporosis ( $p>0.05$ ).

When the students were compared according to the medical class (level of 1-3, level of 4-6), there were no statistically significant differences in heard of the term "osteoporosis", defined osteoporosis, making the osteoporosis diagnosis and prevention of osteoporosis ( $p>0.05$ ). There were statistically significant differences in knowing the symptoms, osteoporosis is responsible of hip fractures and the risk factors for osteoporosis (knowing ratio in level of 4-6  $>$ level of 1-3) ( $p<0.05$ ).

Only 33.6% of the students have ever talked to but 91.1% wanted to talk to a consultant physician about osteoporosis. 60.1% of the students wanted to attend educational seminars on osteoporosis.

We found that the possibility of talking to a physician about osteoporosis significantly increased with the year of medical school the students are in ( $p=0.00$ ) (Figure 2). Medical students in all classes expressed an interest in talking to a consultant and attend educational seminars on osteoporosis.

**Table 1. Students characteristics**

n: 375	
Age (year)	21.11±2.04
Sex (M/F) (%)	50.7/49.3
Attribute of the class (%)	
Level 1	14.9
Level 2	21.6
Level 3	20.5
Level 4	16.3
Level 5	13.6
Level 6	13.1

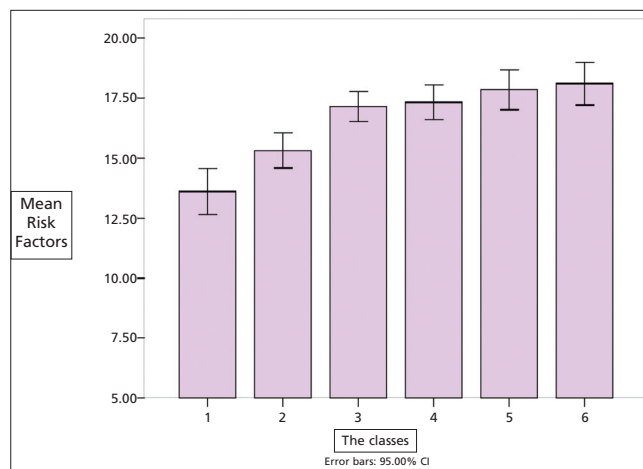


Figure 1. The level of knowledge regarding the risk factors for osteoporosis

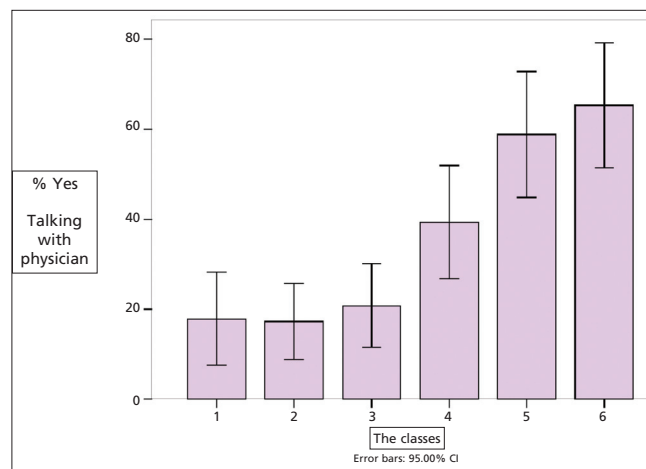


Figure 2. The possibility of talking to a physician about osteoporosis

## Discussion

The results of the present study show that medical students knew the definition of osteoporosis but their knowledge on complications and preventive measures were insufficient in all classes.

The aim of studies addressing the knowledge of osteoporosis among the general population and students is to obtain the results of raising the population's consciousness with regard to the risk factors and preventive measures. However, there are very few studies assessing the knowledge on osteoporosis of healthcare professionals, especially physicians, who are important for the management and prevention of osteoporosis (8-12). The results of a mail survey carried out in England involving 2,515 general practitioners revealed that they thought they did not get enough information on osteoporosis during their medical education (10). In two recent studies exploring the educational needs of physicians in the management of osteoporosis, the importance of a prior fracture as a risk factor for future fractures was not well recognized by many family physicians (11, 15). Family physicians expressed a wish to get more information on the risk factors and management (11). The current study revealed that there are gaps among healthcare providers. To improve the detection and treatment of osteoporosis, information targeting both physicians and the population at large is needed. It would be of interest to extend the present study further efforts to raise awareness among physicians. Implications of this study are especially important for physician education.

Education is found to be the strongest predictive factor of knowledge on osteoporosis according to many studies (2, 6, 13, 16 - 18). The need for better education throughout the training of doctors needs to be addressed. In the present study, we found that, there were no significant differences in defined osteoporosis, making the osteoporosis diagnosis and prevention of osteoporosis between the class groups. Even though bone physiology, diagnosis and treatment of osteoporosis are taught, medical students were incompetent regarding establishing the diagnosis, and prevention of osteoporosis. Medical students do not perceive themselves immune to osteoporosis due to their young ages and did not feel obliged to participate in activities to protect themselves from osteoporosis. This has been demonstrated in the study by Kasper et al. one hundred and twenty seven students with a mean age of 20 did not believe they were under the risk of developing osteoporosis and did not perceive any vulnerability (19). Since students could not relate what they learned about osteoporosis to their lives, they were not fully interested (10). Therefore, instead of giving lectures only, they should be encouraged to actively participate in practical clinical rotations related to osteoporosis and reinforce their knowledge by training the patients. Problem-based learning and community orientated teaching would be helpful in understanding the subject better (10).

Knowledge of osteoporosis risk factors is critical to identify high-risk individuals and take necessary

precautions. The widely accepted strategy associated with the prevention of osteoporosis is the calcium intake and weight-bearing exercise (6, 7). In the present study, we found that 94.4% and 72.7% of the medical students knew that exercise and dietary intake of calcium, respectively, protected against osteoporosis. An important part of curriculum development is helping students to change their behaviors by incorporating role modeling and vicarious experiences for increasing calcium intake and weight-bearing activities. However, 14.11% of the students could name the most prominent risk factors for osteoporosis only. But also, there were significant differences in knowing risk factors between groups with regard the grade. Among the risk factors, nutritional risk factors and diseases causing osteoporosis were least likely to be known by the subjects. This may be because the subject is underestimated in medical schools. The increase in the ratio of knowing the risk factors as the year of the medical school increased can be attributed to the higher chance of talking to a consultant or meeting with patients with osteoporosis. Prevention of osteoporosis-related morbidity and mortality requires the knowledge of risk factors for osteoporosis. Therefore medical students should be taught the risk factors as well during their medical education. Our study demonstrates the necessity of this. Physician educators have the potential to not only increase students' knowledge but also influence students through role modeling.

Osteoporotic fractures and disabilities caused by these fractures constitute a major health problem, especially among the elderly by requiring hospitalization, rehabilitation and intensive care units (8 - 10). Hence, general practitioners should be aware of the fact that osteoporotic fractures are an important source of morbidity and mortality, resulting in economical and functional losses. Laroche et al (20) reported that more than half the general practitioners started treatment of osteoporosis without fractures on the basis of standard spinal X-rays where the radiologist suggested bone mineral loss. The initial biological investigation was correctly carried out by only 6% of physicians. On the other hand, many of the medical students in the present study were unaware that osteoporosis could cause femur fractures (93%) and death (81.1%). This may be related to not disclosing the relation between osteoporosis and risk of mortality to the medical students during their education and the importance of it as a public health issue. Our results also showed that the ratio of knowing the femur fracture associated with osteoporosis was increased with the year of the medical school. These data are consistent with those from a study evaluating the effects of a continuing education program of osteoporosis for nurses (21). These findings have profound consequences, because most individuals view osteoporosis as a distant threat because it is asymptomatic until significant bone loss or fractures have occurred. Therefore, medical students need more education regarding osteoporosis complications.

Even though the majority of the students knew the benefits of calcium intake, less than half of them (45.9%) knew that calcium is required as part of the diet in osteo-

porosis. This result supports the findings of Kasper et al. (19) who reported that only 3.8% of the population took calcium at the recommended daily dose even though 86% was familiar with osteoporosis. It is difficult to comment on whether or not physicians know the recommended daily dose of calcium but considering the medical curriculum, it is plausible that they may have different views with regard to the optimal dosage unless it is within their personal field of interest. It is possible that students, during the medical education, just memorize the daily requirement of calcium but do not use this information in their daily lives.

The limitation of the present study was the lack of a validated osteoporosis questionnaire specific to healthcare professionals. Short period of time to fill in the questionnaires and no benefit for the participation (e.g. extra marks) may lead someone to believe that the responses may be perfunctory. Presence of an osteoporotic person nearby may affect the knowledge of the students. A question to establish the presence of such a person could have been included in the questionnaire. Another limitation of our study was the inclusion of students from only one medical school. The results of this study cannot be generalized to all medical students. Nevertheless, the present study can be used to shed light to future studies.

The most important approach for aging societies is the prevention of chronic diseases such as osteoporosis and consequent fractures in later stages of life. The need for better education of the physicians needs to be addressed. Changes in undergraduate medical curriculum, introduction of problem-based learning and community-oriented teaching should lead to greater awareness of the public health impact of osteoporosis (8, 10, 22). Knowing the risk factors and planning of the preventive measures against these risk factors are far more important than treating osteoporosis. It would be of interest to extend the present study after further efforts to raise awareness among physicians. During their medical education, medical students should be furnished with necessary information on risk factors for osteoporosis and preventive measures that are applicable to the community and this knowledge should allow them to plan effective ways of disseminating information.

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