Knowledge on Osteoporosis of Prescriber According to Level of Medical Institute

Byung-Ho Yoon, Ji-Hoon Baek, Young-Kyun Lee, Yong-Chan Ha, and Kyung-Hoi Koo

1Department of Orthopaedic Surgery, Seoul National University Bundang Hospital, Seongnam; 2Department of Orthopaedic Surgery, Chung-Ang University College of Medicine, Seoul, Korea.

Purpose: There are gaps between the treatment guideline and clinical practice of osteoporosis showing low compliance. Although attitude and knowledge of prescriber have been known to be associated with the low compliance in real clinical practice, no study has assessed the knowledge of prescriber regarding osteoporosis in accordance to the level of medical institution. We compared the knowledge on osteoporosis of general practitioners with that of practitioners in a tertiary referral hospital.

Materials and Methods: In May 2012, 40 general practitioners and 40 practitioners in a tertiary referral hospital were evaluated using a modified Facts on Osteoporosis Quiz.

Results: The level of knowledge of general practitioners was similar with that of practitioners in a tertiary referral hospital (p=0.386). And, both groups were lack of knowledge of effect of physical exercise.

Conclusion: The level of knowledge on osteoporosis was not associated with the level of medical institute, and the effect of physical exercise should be stressed in an educational program on osteoporosis for practitioners.

Key Words: Osteoporosis, knowledge, level of medical institute

INTRODUCTION

Osteoporosis is a common and serious problem in the elderly population, and osteoporotic fractures are associated with decreased quality of life and excess mortality. Osteoporotic fractures could be prevented via osteoporosis treatment, which is recommended for elderly patients by evidence-based guidelines. However, there are gaps between the treatment guideline and clinical practice showing low compliance, especially in asymptomatic, chronic conditions like osteoporosis.

Several factors, such as lack of awareness in physician or patients, adverse drug reactions (gastroesophageal reflux and post-infusion syndrome), and subspecialty of prescriber have been known to be associated with low compliance. Among them, attitude and knowledge of the prescriber is associated with the low compliance in real clinical practice. Knowledge and awareness of the prescriber could be improved by educational programs. We hypothesized that knowledge on osteoporosis of the prescriber could be different according to the level of medical institution. However, little information is available concerning the knowledge of...
the prescriber for osteoporosis in accordance to the level of medical institution.

Recently, Facts on Osteoporosis Quiz (FOOQ) questionnaire is presented to assess knowledge of osteoporosis and it has been used in several studies because of a proven validity and reliability.\textsuperscript{20-22} The purpose of this study is to compare the knowledge on osteoporosis of general practitioners with that of practitioners in a tertiary referral hospital using FOOQ questionnaire.

### MATERIALS AND METHODS

The design and protocol of this study were approved by the Institutional Review Board. Sample size analysis was carried out to determine the minimum number of required patients by using the PS program (http://biostat.mc.vanderbilt.edu/wiki/Main/PowerSampleSize).\textsuperscript{23} The null hypothesis is that the level of knowledge would be similar between the general practitioners and practitioners in a tertiary referral hospital. Regarding the difference of 2 points or more in the mean score as significance, 36 subjects per group would be needed to achieve an alpha error of 0.05, at a power of 0.8, two-sided tails, and equal numbers in both groups. Assuming a 10% non-responder rate, we finally enrolled 40 subjects per group.

In May 2012, we recruited participants from Osteoporosis Symposium for the members of the Korean Hip Society held in Seoul. General practitioners were defined as physicians in clinic with 30 beds or less, and practitioners in a tertiary referral hospital were defined as physicians from tertiary hospitals with 300 beds or more. All participants were orthopedic surgeons. To evaluate the knowledge of osteoporosis, 40 general practitioners and 40 practitioners in a tertiary referral hospital were asked to answer a self-administered questionnaire, modified FOOQ\textsuperscript{24} before symposium.

FOOQ was based on the osteoporosis consensus conference of the National Institutes of Health in 2000\textsuperscript{24} and consisted of 20 true and false questions. It has been reported to have a satisfactory validity and reliability.\textsuperscript{24} And it has been used to assess knowledge of osteoporosis.\textsuperscript{20-22} We modified 2 (item 10 and 15) among the 20 items, according to current epidemiologic information in Korean and recommendation of Korean Society for Bone and Mineral Research.\textsuperscript{1} In modified item 10, the residual lifetime risk of osteoporotic fractures was about 60% in Korean women older than 50 years.\textsuperscript{1} In modified item 15, the recommendation of daily calcium intake was 1200 mg/day for the Korean population.\textsuperscript{1,25}

We compared the score of this modified FOOQ between the general practitioners and practitioners in a tertiary referral hospital.

Mann-Whitney U test was used to analyze the continuous variables, and Fisher’s exact test to analyze the categorical values. Statistically significance was accepted for $p$-value of $<$0.05, and statistical analysis was performed using SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

### RESULTS

Thirty-eight of the 40 general practitioners and 38 of the 40 practitioners in a tertiary referral hospital completed the questionnaires (Table 1). Four practitioners, who did not reply all the questionnaires, were excluded.

Although the proportion of accurate answer to item 18 of practitioners in a tertiary referral hospital was higher than that of the general practitioners (92% vs. 71%, \( p = 0.018 \)), there was no significant difference in the total mean score between the two groups (\( p = 0.386 \)) (Table 2, Fig. 1).

The correct statement that “High-impact exercise improves bone health” (item 2) and the false statement that “Walking has a great impact on bone health” (item 14) was incorrectly identified by most of responders, regardless of the affiliation of the level of medical institution (Table 2).

### DISCUSSION

Our finding presented that general practitioners have similar

| Table 1. Characteristics of Responders |
|--------------------------------------|
| General practitioners (n=38) | Practitioners in a tertiary referral hospital (n=38) | \( p \) value |
| Age | 47.87±8.56 | 42.92±8.39 | 0.013 |
| Duration of practice (yr) | 15.50±8.42 | 10.39±7.78 | 0.008 |
| Gender | | | 0.012 |
| Men | 31 | 38 | |
| Women | 7 | 0 | |
knowledge and understanding about osteoporosis, in comparison with the practitioners in a tertiary referral hospital. However, more practitioners in a tertiary referral hospital answered correctly in question about the effect of hormone replacement for osteoporosis. Although hormone replacement therapy was usually performed by obstetric and gynecologist in Korea, this study showed that orthopedic surgeons in a tertiary referral hospital had much knowledge about the hormone replacement therapy.

Most responders did not correctly answer the two items as previously specified (items 2 and 14), which were statements about the effect of physical exercise on osteoporosis, regardless of the affiliated medical institution (Fig. 1). By the 2000 NIH osteoporosis consensus conference, some evidence indicates that especially resistance and high-impact activities contribute to development of high peak bone mass. This could mean that almost orthopedic surgeons did not know the efficacy of exercise for osteoporosis, or that they underestimated the efficacy of exercise for osteoporosis in their practice. This exercise field of osteoporosis was revealed to be promoted at an educational program for clinical doctors.

Original FOOQ was developed in order to evaluate the knowledge of osteoporosis in patients or the general population and it consisted of 25 items. Based on the 2000 NIH osteoporosis consensus conference, modified FOOQ consisted of 20 true and false questions. Previous FOOQ studies on the general population reported that men have less knowledge about osteoporosis compared to women, who are prone to postmenopausal osteoporosis and osteoporotic fractures. Further, it has been reported that the mean score

### Table 2. Proportions (%) of Correct Responses to the Modified FOOQ

| Questions                                                                 | General practitioners (n=38) | Practitioners in a tertiary referral hospital (n=38) | p value |
|---------------------------------------------------------------------------|------------------------------|------------------------------------------------------|---------|
| 1. Physical activity increases the risk of osteoporosis                   | 97                           | 97                                                   | 1.000   |
| 2. High-impact exercise improves bone health                               | 45                           | 32                                                   | 0.238   |
| 3. Most people gain bone mass after 30 yrs of age                         | 95                           | 95                                                   | 1.000   |
| 4. Lower weight women have osteoporosis more than heavy women             | 82                           | 82                                                   | 1.000   |
| 5. Alcoholism is not linked to the occurrence of osteoporosis             | 95                           | 92                                                   | 1.000   |
| 6. The most important time to build bone strength is between 9 and 17 yrs of age | 92                           | 95                                                   | 1.000   |
| 7. Normally, bone loss speeds up after menopause                          | 82                           | 89                                                   | 0.328   |
| 8. High caffeine combined with low calcium intake increases the risk of osteoporosis | 100                          | 97                                                   | 1.000   |
| 9. There are many ways to prevent osteoporosis                            | 87                           | 97                                                   | 0.200   |
| 10. 60% of women older than 50 yrs will have a fracture due to osteoporosis in their lifetime | 79                           | 71                                                   | 0.427   |
| 11. There are treatments for osteoporosis after it develops                | 87                           | 89                                                   | 1.000   |
| 12. A lifetime of low intake of calcium and vitamin D does not increase the risk of osteoporosis | 97                           | 95                                                   | 1.000   |
| 13. Smoking does not increase the risk of osteoporosis                    | 92                           | 100                                                  | 0.240   |
| 14. Walking has a great effect on bone health                             | 5                            | 5                                                    | 1.000   |
| 15. After menopause, women need about 1200 mg of calcium daily           | 92                           | 89                                                   | 1.000   |
| 16. Osteoporosis affects men and women                                     | 100                          | 100                                                  | 1.000   |
| 17. Early menopause is not a risk factor for osteoporosis                 | 97                           | 100                                                  | 1.000   |
| 18. Replacing hormones after menopause cannot slow down bone loss         | 71                           | 92                                                   | 0.018   |
| 19. Children 9 to 17 yrs of age get enough calcium from one glass of milk each day to prevent osteoporosis | 58                           | 66                                                   | 0.479   |
| 20. Family history of osteoporosis is not a risk factor for osteoporosis  | 87                           | 87                                                   | 1.000   |

FOOQ, Facts on Osteoporosis Quiz.

Mean total score (SD) 16.39±1.69 16.71±1.69 0.386
In conclusion, our study showed that general practitioners have similar knowledge regarding the osteoporosis, compared to practitioners in a tertiary referral hospital, and that the effect of physical exercise should be stressed in an educational program on osteoporosis for practitioners.

REFERENCES

1. Park C, Ha YC, Jang S, Jang S, Yoon HK, Lee YK. The incidence and residual lifetime risk of osteoporosis-related fractures in Korea. J Bone Miner Metab 2011;29:744-51.
2. Salaffi F, Cimmino MA, Malavolta N, Carotti M, Di Matteo L, Scendoni P, et al. The burden of prevalent fractures on health-related quality of life in postmenopausal women with osteoporosis: the IMOF study. J Rheumatol 2007;34:1551-60.
3. Yoon HK, Park C, Jang S, Jang S, Lee YK, Ha YC. Incidence and mortality following hip fracture in Korea. J Korean Med Sci 2011;26:1087-92.
4. Lee YK, Jang S, Jang S, Lee HJ, Park C, Ha YC, et al. Mortality after vertebral fracture in Korea: analysis of the National Claim Registry. Osteoporos Int 2012;23:1859-65.
5. Cranney A, Wells G, Willan A, Griffith L, Zytaruk N, Robinson V, et al. Meta-analyses of therapies for postmenopausal osteoporosis. II. Meta-analysis of alendronate for the treatment of postmenopausal women. Endocr Rev 2002;23:508-16.
6. Eastell R. Treatment of postmenopausal osteoporosis. N Engl J Med 1998;338:736-46.
7. McClung MR. Therapy for fracture prevention. JAMA 1999;282:687-9.
8. Watts NB, Bilezikian JP, Camacho PM, Greenspan SL, Harris ST, Hodgson SF, et al. American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the diagnosis and treatment of postmenopausal osteoporosis. Endocr Pract 2010;16 Suppl 3:1-37.
9. Qaseem A, Snow V, Shekelle P, Hopkins R Jr, Forciea MA, Owens DK, et al. Pharmacologic treatment of low bone density or osteoporosis to prevent fractures: a clinical practice guideline from the American College of Physicians. Ann Intern Med 2008;149:404-15.
10. Dawson-Hughes B; National Osteoporosis Foundation Guide Committee. A revised clinician’s guide to the prevention and treatment of osteoporosis. J Clin Endocrinol Metab 2008;93:2463-5.
11. Seeman E, Compston J, Adachi J, Brandi ML, Cooper C, Dawson-Hughes B, et al. Non-compliance: the Achilles’ heel of anti-fracture efficacy. Osteoporos Int 2007;18:711-9.
12. Compston JE, Seeman E. Compliance with osteoporosis therapy is the weakest link. Lancet 2006;368:973-4.
13. Gong HS, Oh WS, Chung MS, Oh HJ, Lee YH, Baek GH. Patients with wrist fractures are less likely to be evaluated and managed for osteoporosis. J Bone Joint Surg Am 2009;91:2376-80.
14. Choi HJ, Shin CS, Ha YC, Jang S, Jang S, Park C, et al. Burden of osteoporosis in adults in Korea: a national health insurance database study. J Bone Miner Metab 2012;30:54-8.
15. Kim SR, Ha YC, Park YG, Lee SR, Koo KH. Orthopedic surgeon’s awareness can improve osteoporosis treatment following hip fracture: a prospective cohort study. J Korean Med Sci 2011;
21. Wilson RK, Tomlinson G, Stas V, Ridout R, Mahomed N, Gross A, et al. Male and non-English-speaking patients with fracture have poorer knowledge of osteoporosis. J Bone Joint Surg Am 2011;93:766-74.
22. Baek JH, Lee YK, Hong SW, Ha YC, Koo KH. Knowledge on osteoporosis in guardians of hip fracture patients. J Bone Miner Metab 2013;31:481-4.
23. Dupont WD, Plummer WD Jr. Power and sample size calculations. A review and computer program. Control Clin Trials 1990;11:116-28.
24. Ailinger RL, Lasus H, Braun MA. Revision of the Facts on Osteoporosis Quiz. Nurs Res 2003;52:198-201.
25. Korea Women’s Health and Osteoporosis Foundation, Korean Society of Osteoporosis, Korean Society of Gynecologic Endocrinology. Calcium and Vitamin D Recommendation; 2010.
26. Edelstein OE. What Do Israeli Osteoporotic Men Know and Do about Their Disease? J Osteoporos 2011;2011:719862.