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Interest in Osteoporosis among Nurses and Physicians before Introduction of a Fracture Liaison Service: A Questionnaire-Based Study

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Background: Osteoporosis-related fragility fractures such as proximal femoral and vertebral fractures are associated with decreased activities of daily living and a shorter life span. Many persons with osteoporosis do not receive testing or treatment. Introducing fracture liaison services (FLSs) to hospitals is an effective approach for reducing this treatment gap. Understanding interest in osteoporosis among nurses and physicians, their knowledge of osteoporosis, and their thoughts on team medicine for treatment of osteoporosis might be helpful when implementing FLSs.

Methods: An FLS had not been introduced at our hospital. We conducted a questionnaire survey of nurses and physicians at our hospital regarding their interest in osteoporosis, their knowledge of osteoporosis, and their thoughts on team medicine for osteoporosis.

Results: About half of the nurses and physicians were interested in osteoporosis. About 70% of nurses and physicians believed that team medicine was necessary for treating osteoporosis, and 50-60% believed that it should be introduced in the hospital. Only 5% of nurses and 18% of physicians had knowledge of FLSs.

Conclusion: Staff perceptions of team care for osteoporosis were generally supportive in our hospital. However, the introduction of an FLS to the hospital required educational activities for staff. The results of this survey will be helpful to other hospitals introducing FLSs. (J Nippon Med Sch 2025; 92: 29–36)

Key words: osteoporosis, team medicine, fracture liaison service, osteoporosis liaison service

Introduction

In Japan, 9.8 million women, 3 million men, and about half of women in their 80s have osteoporosis[1,2]. Osteoporosis is defined by the World Health Organization as "low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk," and the diagnostic criteria were "a value for bone mineral density (BMD) 2.5 standard deviations (SD) or more below the young adult mean (YAM)"[3]. In Japan, pre-existing fracture is an important risk factor for fragility fractures, and the diagnostic criteria are "patients with fragility fractures of the vertebral body or proximal femur, patients with fragility fractures elsewhere and BMD less than 80% of YAM, and patients with BMD equal to or below either 70% or −2.5 SD of YAM without fragility fractures"[4].

The number of proximal femoral fractures in Japan increased from 92,400 in 1997 to 193,400 in 2017[5]. Fracture/fall is the third most common reason (13.9%) for requiring nursing care[6]. In addition, fragility fractures and subsequent fractures are associated with increased mortality risk[7,8].

Recent advances in drug treatment for osteoporosis have increased the importance of osteoporosis treatment. Anabolic agents for osteoporosis such as teriparatide, abaloparatide, and romosozumab can increase BMD by

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Q1 Please check the number that applies to your age and sex.
Age: 1. 20s 2. 30s 3. 40s 4. 50s 5. 60s
Sex: 1. Woman 2. Man

Q2 Please check the number that applies to your years of clinical experience as a nurse (physician).
1. 4 years or less 2. 5-9 years 3. 10 years or more

Q3 Have you cared for (treated) a patient with osteoporosis in the past year? Please check the applicable number.
1. Yes 2. No

Q4 Are you interested in osteoporosis? Please check the appropriate number.
1. Very interested 2. Interested 3. Neither 4. Not interested 5. Not interested at all

Q5 Do you think it is necessary to treat osteoporosis through team medicine? Please check the appropriate number.
1. Definitely necessary 2. Necessary 3. Neither 4. Unnecessary 5. Not necessary at all

Q6 Do you think it is necessary to introduce team medicine for osteoporosis to our hospital? Please check the appropriate number.
1. Definitely necessary 2. Necessary 3. Neither 4. Unnecessary 5. Not necessary at all

Q7 If our hospital introduced team medicine for osteoporosis, would you participate? Please check the appropriate number.
1. Will definitely participate 2. Will participate 3. Neither 4. Won't participate 5. Not participate at all

Q8 Do you know about the fracture liaison service? Please check the appropriate number.
1. Know very well 2. Know 3. Neither 4. Don't know 5. Don't know at all

Q9 Would you recommend a patient suspected of having osteoporosis to see an orthopedist? Please check the appropriate number.
1. Recommend often 2. Recommend 3. Neither 4. Not recommend 5. Not recommend at all

Q10 If you have any questions or requests regarding this survey, we would appreciate it if you could fill them out.

Fig. 1 Questionnaire. Questions for both nurses and physicians.

more than 10% in 1-2 years[9]. However, one study reported that the drug treatment rate after proximal femoral fracture was only 31.6% in Japan[10]. This osteoporosis treatment gap is a global phenomenon, and fewer than 20% of patients with a first osteoporotic fracture were appropriately treated for osteoporosis, even in countries that treat osteoporosis at an early stage, such as those in Europe and North America[11].

The fracture liaison service (FLS) was started in the UK in 1999 to manage osteoporosis in patients with fragility fractures[12–14]. The FLS is an effort to prevent secondary fractures by collaborating with multiple professions to increase the osteoporosis treatment initiation rate and treatment continuation rate for patients with fragility fractures, and to practice fall prevention[12,13]. FLSs are cost-effective and are associated with reduced re-fracture risk and mortality and better BMD, treatment initiation, and adherence to treatment[15–17].

The Japan Osteoporosis Society has developed an educational program for medical professionals involved in osteoporosis treatment, with the aim of disseminating liaison services, and has held an osteoporosis liaison service (OLS) coordinator lecture course every year since 2012[17]. In 2020, the Japan Osteoporosis Society and Fragility Fracture Network Japan created evidence-based standards based on the experience of individual medical institutions in providing FLSs for patients with fragility fractures, and on reports and clinical guidelines from overseas[18]. In addition, the medical fees revision in 2022 by the Ministry of Health, Labour and Welfare, Health established a new assessment for preventing secondary fractures after surgery for patients with proximal femur fractures, thus allowing hospitals to include medical fee claims[19]. This has given medical professionals an additional incentive to treat osteoporosis.

Because we planned to introduce an FLS at our hospital, we analyzed staff interest in osteoporosis, their knowledge of osteoporosis, and their thoughts on team medical care for osteoporosis. We believe that the present results will be useful for medical institutions considering the introduction of an FLS.

Materials and Methods

This questionnaire-based study was approved by the relevant Institutional Review Board (No. F-2023-083) and was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent for publication of the questionnaire data was obtained from participants by an opt-out procedure.

A questionnaire survey on osteoporosis and FLS was distributed to all nurses (n=429) and to all physicians (n=111) except orthopedists. Our hospital is a university hospital in Tokyo with 405 beds and 24 clinical departments and no FLS at the time of the study. The questionnaire was distributed anonymously in July 2023 and assessed interest in osteoporosis, knowledge of osteoporosis, and understanding of team medicine for osteoporosis (**Fig. 1, 2**). The questionnaire items were decided after discussion with nurses and orthopedic surgeons in the group preparing to launch an FLS, and after considering past re-

For nurses
Q11 Do you know about osteoporosis treatment? Please check the appropriate number.
1. Know very well 2. Know 3. Neither 4. Don't know 5. Don't know at all

Q12 Do you know about preventing bone fractures caused by osteoporosis? Please check the appropriate number.
1. Know very well 2. Know 3. Neither 4. Don't know 5. Don't know at all

Q13 If a patient under your care is suspected of having osteoporosis, do you give explanations about osteoporosis and precautions in daily life? Please check the appropriate number.
1. Yes, often 2. Yes 3. Neither 4. Not usually 5. Never

For physicians
Q14 Is osteoporosis associated to diseases in your clinical field? Please check the appropriate number.
1. Strongly associated 2. Associated 3. Neither 4. Not associated 5. Not associated at all

Q15 Do you think that osteoporosis treatment can be effective? Please check the appropriate number.
1. Very effective 2. Effective 3. Neither 4. Not very effective 5. Not effective at all

Q16 Do you diagnose osteoporosis in your patients yourself? Please check the appropriate number.
1. Diagnose often 2. Diagnose 3. Neither 4. Not diagnose 5. Not diagnose at all

Q17 Do you treat osteoporosis in your patients yourself? Please check the appropriate number.
1. Treat often 2. Treat 3. Neither 4. Not treat 5. Not treat at all

Fig. 2 Questionnaire. Specific questions for nurses and physicians.

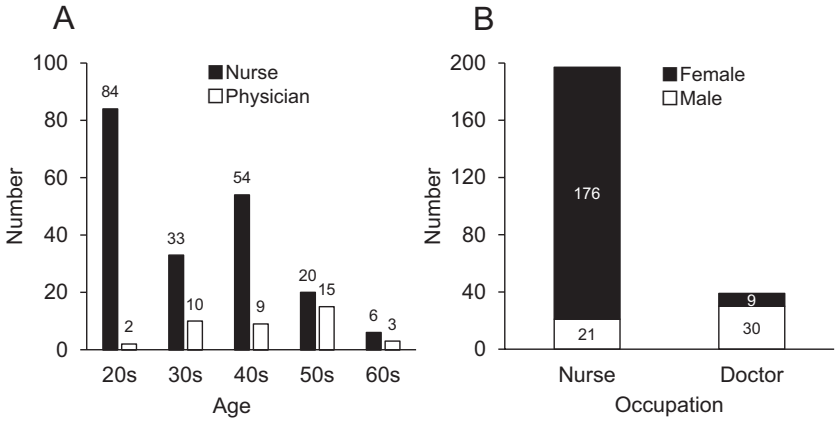

Fig. 3 Age, sex, and occupation (Q1)

ports and opinions from interviews with a small number of nurses and physicians in other departments. A self-administered Google form was used for the questionnaire. The answer method for items other than Q10 was closed ended, with a maximum of one answer, and answers were required.

The results for each question were tallied and examined individually. In the statistical analysis of Q4-Q17, except Q10, options 1 and 2 were considered positive and the others were considered negative. In addition, we examined the association of age/sex with each result for the above 13 questions. For age, we performed a simple correlation analysis using Pearson's correlation coefficients and conducted a comparative analysis between individuals under 50 years and those over 50 years using the chi-square test. For sex, we used the chi-square test.

Results

Responses were received from 197 nurses and 39 physicians who were enrolled in the study. There were no missing data. The responses for each question were as follows:

Q1. Nurses were mostly in their 20s to 40s, and 90.3% were female. Physicians were mostly in their 30s to 50s, and 76.9% were male (**Fig. 3**).

Q2. Regarding clinical experience, most nurses had less than 5 years or more than 9 years of experience, and most physicians had more than 9 years of experience (**Fig. 4A**).

Q3. In the most recent 1-year period, 83 nurses had experience caring for one or more patients with osteoporosis, and 114 had no experience. Among physicians, 29 had experience treating one or more patients with osteoporosis, and 10 had no experience (**Fig. 4B**).

Q4. About 50% of nurses and 50% of physicians were interested in osteoporosis (**Fig. 5**).

Q5. About 70% of nurses and physicians thought that team medicine was necessary for osteoporosis (**Fig. 5**).

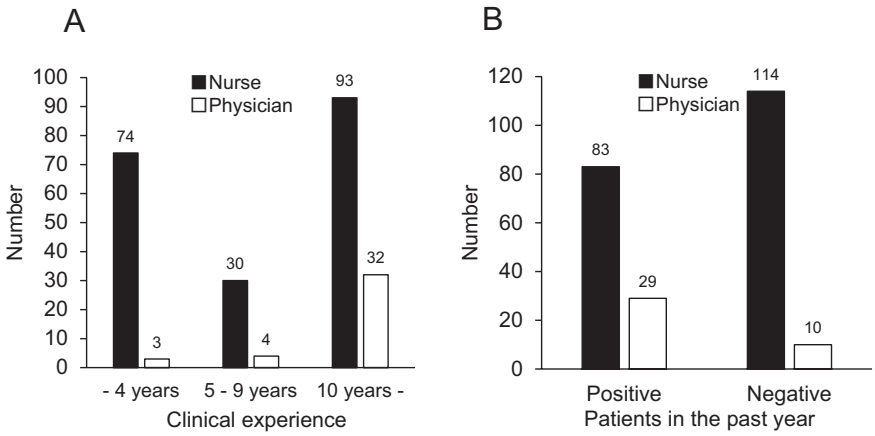

Fig. 4 Clinical experience and patients in the year (Q2, 3)

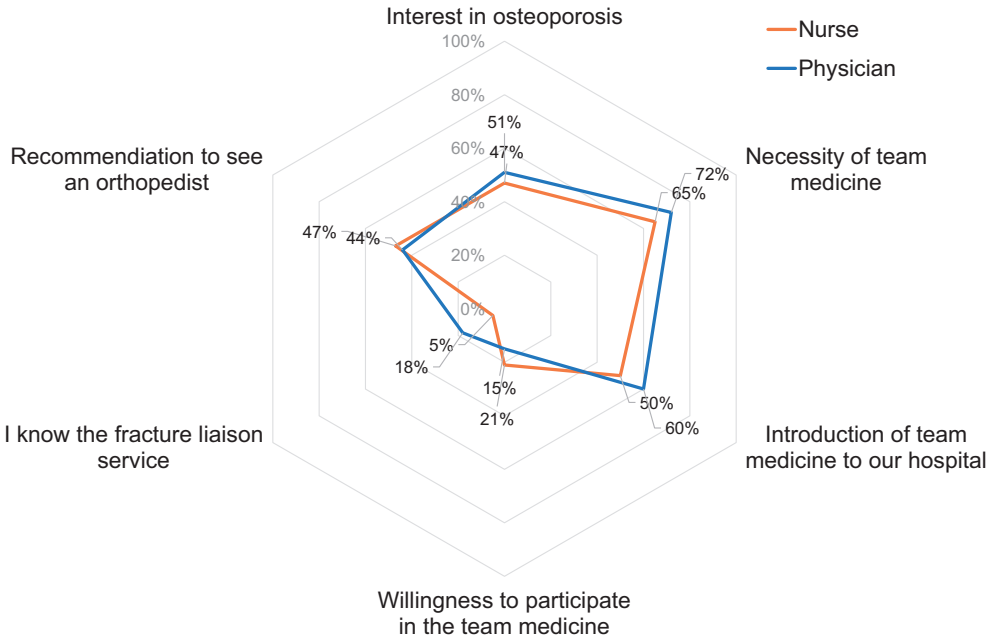

Fig. 5 Responses to common questions for nurses and physicians (Q4-9)

Q6. Fifty percent of nurses and 60% of physicians thought that it is necessary to introduce team medicine for osteoporosis at our hospital (**Fig. 5**).

Q7. Twenty-one percent of nurses and 15% of physicians stated that they were willing to participate in team medicine for osteoporosis when the hospital introduces it (**Fig. 5**).

Q8. Only 5% of nurses and 18% of physicians had knowledge of FLSs (**Fig. 5**).

Q9. For patients with suspected osteoporosis, 47% of nurses and 44% of physicians would recommend that the patient visit an orthopedist (**Fig. 5**).

Q10. Opinions included "I would like to have a study session on how to identify patients with osteoporosis and how to give precautions in daily life to osteoporosis patients" (a nurse) and "I would like to receive a lecture because I want to know more about osteoporosis pathophysiology and treatment" (a physician).

Q11. Only 31% of nurses knew about osteoporosis treatment (**Fig. 6**).

Q12. Only 33% of nurses knew about preventing osteoporosis fractures (**Fig. 6**).

Q13. Only 16% of nurses could explain osteoporosis and precautions in daily life when a patient is suspected of having osteoporosis (**Fig. 6**).

Q14. Two-thirds of physicians reported that osteoporosis is associated with diseases in their clinical field (**Fig. 7**).

Q15. Most physicians (80%) reported that osteoporosis treatment is effective (**Fig. 7**).

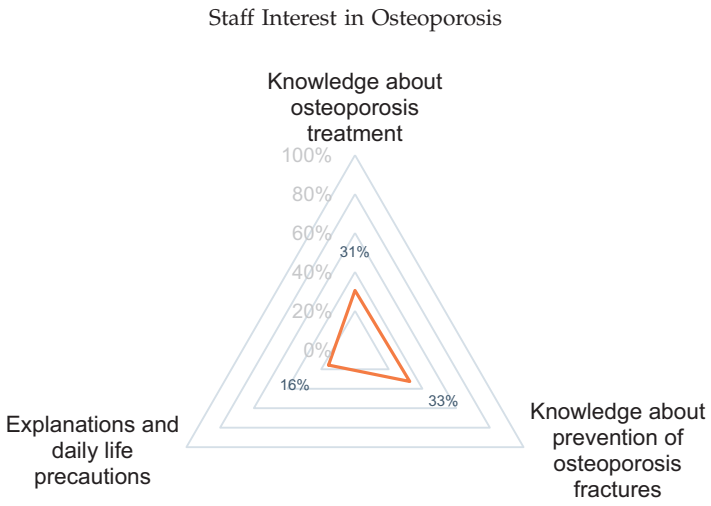

Fig. 6 Responses to questions for nurses (Q11-13)

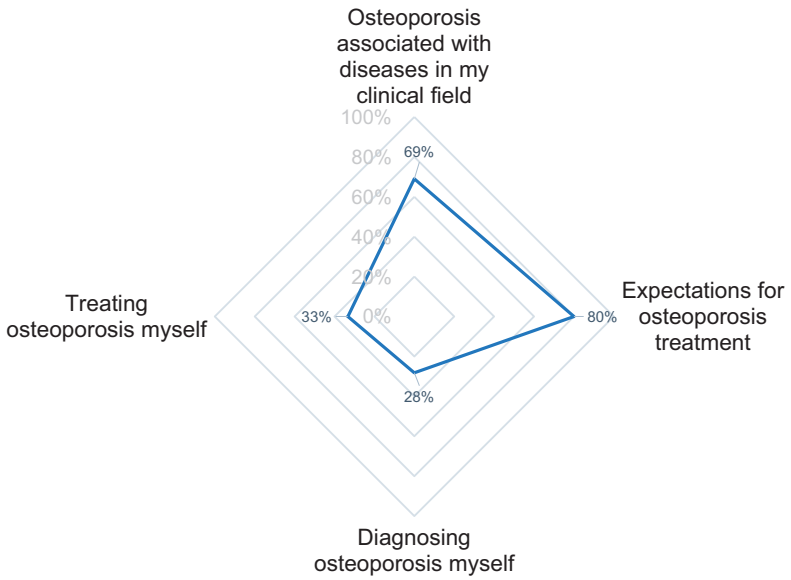

Fig. 7 Responses to questions for physicians (Q14-17)

Q16. A quarter of physicians had themselves diagnosed osteoporosis in patients (**Fig. 7**).

Q17. One-third of physicians had themselves treated osteoporosis in patients (**Fig. 7**).

Regarding the correlation between age and the 13 questions, a significant positive correlation was observed with "interest in osteoporosis" in nurses (**Table 1, 2**; **Fig. 8**). However, when age was classified as under 50 and others, it was significantly associated with responses to multiple questions, including introduction of team medicine, recommendation to see an orthopedist, and knowledge of osteoporosis, among nurses (**Table 1**). Regarding the association of sex with the responses to questions, the only significant difference was for Q17 (Do you treat osteoporosis in your patients?) (**Table 2**).

Discussion

An important finding of this study was that about half of nurses and physicians were interested in osteoporosis before the introduction of team medicine for osteoporosis. In addition, many women aged 40 or older had a strong interest in osteoporosis. This relatively high proportion of staff who were interested in osteoporosis suggests a favorable situation for introducing FLSs. However, it also suggests that nurses in their 20s and 30s require education on the importance of osteoporosis prevention and treatment.

Few studies have investigated interest in osteoporosis among hospital staff. In a 2016 questionnaire survey of staff at six Japanese group hospitals (a total of 1,126 staff including physicians, nurses, rehabilitation staff, pharmacy staff, and regional medical cooperation office staff),

Table 1 Relationships between each response and age

	Q4	Q5	Q6	Q7	Q8	Q9	Q11	Q12	Q13	Q14	Q15	Q16	Q17
Nurses													
Correlation	0.940*	0.509	0.696	0.096	0.847	0.783	0.863	0.728	0.683				
p	0.018	0.381	0.192	0.877	0.071	0.117	0.059	0.163	0.204				
< 50 y (n=171)	70*	107	81*	32	5*	73*	51*	46*	25				
50 y ≤ (n=26)	22*	20	18*	9	4*	19*	13*	14*	6				
p	< 0.001	0.0772	0.0189	0.0628	0.0023	0.0019	0.0204	0.0027	0.2699				
Physicians													
Correlation	0.0342	0.3842	0.6314	−0.1212	0.5601	−0.2399				0.7705	0.6154	0.7255	0.7631
p	0.9564	0.5231	0.2533	0.8461	0.3261	0.6975				0.1273	0.2691	0.1653	0.1334
< 50 y (n=21)	10	14	11	4	3	9				13	16	4	6
50 y ≤ (n=18)	10	14	12	2	4	8				14	15	7	7
p	0.6211	0.4421	0.3659	0.4935	0.5197	0.9206				0.5197	0.5818	0.1698	0.4956

*$p < 0.05$

Table 2 Relationships between each response and sex

	Q4	Q5	Q6	Q7	Q8	Q9	Q11	Q12	Q13	Q14	Q15	Q16	Q17
Nurses													
Female (n=176)	84	114	86	35	7	83	57	55	28	–	–	–	–
Male (n=21)	8	13	13	6	2	9	7	5	3	–	–	–	–
p	0.4030	0.7952	0.2586	0.3541	0.2499	0.7088	0.9302	0.4838	0.8469	–	–	–	–
Physicians													
Female (n=9)	4	7	6	1	2	6	–	–	–	6	6	1	0*
Male (n=30)	16	21	17	5	5	11	–	–	–	21	25	10	13*
p	0.6398	0.6493	0.5927	0.6854	0.7033	0.1114	–	–	–	0.8493	0.2775	0.1938	0.0156

*$p < 0.05$

60.6% of physicians and 39.6% of nurses reported that they "take osteoporosis into consideration in my daily medical care"[20]. That finding is consistent with ours, but the difference in positive response rates between nurses and physicians was larger than in the present study. Their study included 33 physicians, 10 of whom were orthopedic surgeons. Our study excluded orthopedic surgeons, which may have influenced the difference in results. In a questionnaire survey of 3,168 postmenopausal women in Japan, 71.8% reported that they "know in detail what kind of disease osteoporosis is," and 93.1% reported that "I'm worried about breaking a bone and being bedridden"[21]. Women in the osteoporotic age group have a strong interest in osteoporosis; thus, it is unsurprising that medical professionals in the same age group do as well.

Another important finding in the present study was that approximately 70% of nurses and physicians believed that team medicine was necessary to treat osteoporosis, and 50-60% thought it should be introduced in their hospitals. In addition, 21% of nurses and 15% of physicians reported that they would participate in team medicine. However, FLSs were little known among the nurses and physicians. These results suggest that appropriate educational activities on FLSs are necessary.

In a previous questionnaire survey conducted in 2016 among staff at six group hospitals, the percentage of those who reported that they knew about OLS was extremely low (1.5-3.6%) in the five hospitals that had not implemented in-hospital OLS awareness activities[22]. In contrast, the one hospital that had already started in-hospital educational activities for OLS had a moderate awareness rate of 24.4%[19]. These activities were conducted by an OLS coordinator (nurse) and a board-certified member of the Japan Osteoporosis Society (orthopedist) through study sessions and academic confer-

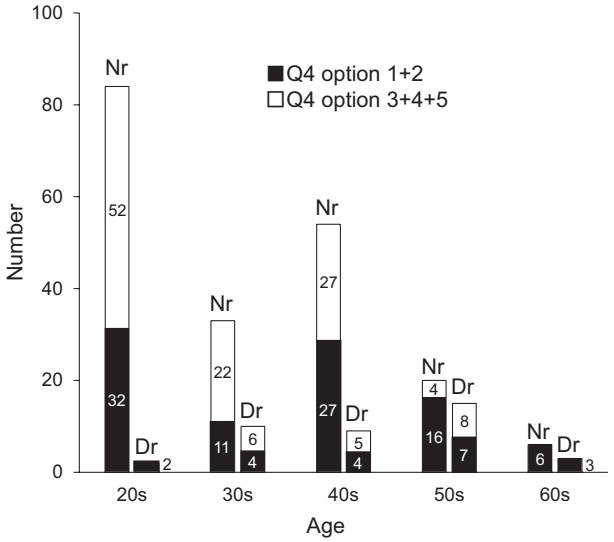

Fig. 8 Age and interest in osteoporosis

ence reports for medical staff in the hospital.

Other findings of the present study were that few nurses had knowledge of the treatment of osteoporosis or prevention of fragility fractures (31% and 33%, respectively), and few (13%) had explained osteoporosis to patients or advised them on daily life. Nurses have the closest contact with patients and are therefore essential to multidisciplinary collaboration in team medicine. Our results suggest that nurses require more training in osteoporosis.

In the present study, 69% of physicians reported that osteoporosis was associated with medical conditions in their clinical field, and 80% of physicians reported that osteoporosis treatment was effective. However, only 33% and 28% of physicians had themselves diagnosed and treated the disease, respectively, whereas 44% of physicians referred patients to the orthopedics department. These results highlight the need for a team medicine approach for osteoporosis. It has been reported that a wide variety of diseases cause bone metabolic abnormalities similar to primary osteoporosis, including endocrine, nutritional, drug-induced, mobility, congenital, and other disorders[23].

The present study has some limitations. First, it was a questionnaire survey, which might have introduced bias. Although the questions were decided through discussion among multiple experts, bias may have arisen because validity and reliability were not evaluated. Second, the relatively low response rate may have affected the statistical analyses. Possible reasons for the low response rate include a lack of public relations activities and the busy schedules of staff, but the lack of interest in osteoporosis cannot be denied. In other words, nonresponders may have been less interested in osteoporosis than were responders. Despite these limitations, the study has several strengths. To date, few studies have investigated staff interest in osteoporosis, their knowledge of osteoporosis, and their thoughts on team medicine for osteoporosis in hospitals where an FLS had not yet been introduced. Our findings will be useful for supporting the introduction of FLSs.

In conclusion, staff perceptions of team care for osteoporosis were generally supportive in the hospital; however, the introduction of an FLS to the hospital will require educational activities for staff. The present results will be helpful for other hospitals introducing FLSs.

Conflict of Interest: The authors declare no conflicts of interest.

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