Research paper

Osteoporosis guideline awareness among Iranian nurses: results of a knowledge and attitudes survey

HAMIDEH MAHDAVIAZAD[1], VAHID KESHTKAR[1], MOHAMMAD JAFAR EMAMI[2], ZEINAB KARGARSHOUROKI[2], AMIR REZA VOSOUGHI[2]
[1] Department of Community Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran;
[2] Bone and Joint Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Keywords

Beliefs • Knowledge • Screening • Osteoporosis • Prevention

Summary

Introduction. *Osteoporosis is a chronic and progressive disease associated with gradual bone loss and elevated risk of fracture. Role of health care professional especially nurses in lowering burden of osteoporosis via patients and public education is critical. Current study conducted to evaluate knowledge and attitude regarding osteoporosis among the nurses in orthopedic wards and their experience with national clinical osteoporosis guideline.*
Methods. *A cross-sectional study was conducted from August to December 2016 among all nurses in orthopedic ward of hospitals affiliated to Shiraz University of Medical Sciences. The 23- item self-administered scale consisted of knowledge and attitude questions were used. Moreover, data regarding participation in osteoporosis training courses and awareness of the national osteoporosis clinical guideline were collected as a measure of nurses' experience with guideline. The gathered data were analyzed using SPSS (V. 16), student t-test was used to compare total knowledge and attitude scores between categorical demographic and professional data. Pearson test was used to calculate the correlation between total knowledge and attitude scores and years of practice. A p-value < 0.05 was considered statistically significant.*
Results. *From total of 160 nurses, 143 of them completed the questionnaire (response rate: 89.3%). The total mean ± SD knowledge and attitude scores were 11.60 ± 3.10 and 3.47 ± 0.92 respectively. Six nurses (4.2%) had participated in osteoporosis training courses after graduation, and 39 (27.3%) had been aware of the national osteoporosis clinical guideline. Knowledge and attitude scores among nurses who practice in private hospitals was higher than those practices in the teaching hospitals. These differences were statistically significant based on student t-test. According to Pearson correlation coefficient, there was positive and significant correlation between nurses' knowledge and attitude score (Correlation coefficient: 0.199, p-value = 0.037).*
Conclusion. *Our findings reveal that nurses' knowledge and attitude regarding osteoporosis was not satisfactory. Most of them were not aware of national osteoporosis clinical guideline and had not participated in osteoporosis training courses after their graduation. We need more empowered nurses to lowering burden of osteoporosis and its consequences in the future.*

Introduction

Osteoporosis, the most common metabolic bone disorder, is a chronic and progressive disease associated with gradual bone loss and increased risk of fracture [1-3]. As a major public health issue in all over the world, it is estimated that more than 15% of women aged 50 and over have osteoporosis, based on defined criteria by world health organization [4, 5]. According to Iranian reference data at 2006, the prevalence of osteoporosis in lumbar vertebrae was 44.4% in women and 13.4% in men aged 50 years or more [6].
While osteoporosis is a preventable disease with modifiable risk factors, which have been previously described very well [7-11], it is responsible for about 36,027 years lost due to premature mortality and disability, based on disability-adjusted life years (DALYs) [12-14]. Therefore, health care professionals, especially nurses, are well-positioned to reduce the cost burden of osteoporosis by increasing the knowledge of patients and community people [10, 15-17].
Lack of knowledge about osteoporosis and loss of awareness regarding national guidelines among health care professionals is evident in the previous researches [15, 18, 19]. A cross-sectional survey among public health nurses in Taiwan evaluated knowledge of nurses about six dimensions of osteoporosis using a 50-item self-report scale. Chen and et al. reported low level of knowledge regarding osteoporosis especially in symptoms/signs, diagnosis/treatment and risk factors. Moreover, only 13.0% of Taiwanese' nurses had attended osteoporosis classes as their continuing education experience [15]. Current study was conducted to evaluate the knowledge and attitude regarding osteoporosis among nurses in orthopedic wards and their experience with national clinical osteoporosis guideline.

Methods

This cross-sectional study was conducted from August to December 2016 among all nurses working in orthopedic wards of all hospitals, located in Shiraz, the largest city in southern Iran. All nurses with a bachelor's or master's

degree with more than one year of experience in orthopedic ward were eligible to participate in this study. Nurses without consent to participate or unavailable after three visits were excluded from the study.

Ethical considerations

The study protocol complied with the Helsinki Declaration and was approved by local research ethics committee of Shiraz University of Medical Sciences (95-01-56-121-89). Permission was obtained from all hospital administrators. Verbal informed consent was obtained from all participants and anonymity and data confidentiality were guaranteed.

Questionnaire

The main questionnaire was a 23-item self-administered scale designed by the authors based on a review of the relevant literature and the national osteoporosis clinical guideline released at 2014 for the diagnosis and management of osteoporosis [18, 20-23]. It consisted of knowledge questions (18 items regarding definition, risk factors, prevention, and screening) and attitude questions (5 items regarding socio-cultural attitude, importance of prevention, and self-perceived responsibility). Demographic data and professional characteristics of the participants including gender, setting of practice [non-profit (teaching hospital) or for-profit (private hospital)], years of practice, participation in osteoporosis training courses (continuing education), and awareness of the national osteoporosis clinical guideline were collected.

The questionnaire underwent face and content validation by an expert panel comprised of three community medicine specialists, two orthopedic surgeons, and one epidemiologist. A literature review and experts' opinions established the validity of the questionnaire's content. Its reliability was verified in a pilot test with 30 participants. Cronbach α coefficient was in acceptable range for knowledge and attitude questions, and it took, on average, 25-30 minutes to complete.

In knowledge section, two response options were provided: "correct" or "incorrect". One point was given for each correct response, and 0 point was given for each incorrect response. In the attitude section, a 5-point Likert scale was used to rate the extent to which the participant agreed with each statement: "strongly disagree", "disagree", "neutral", "agree" and "strongly agree". The 5-point Likert scales were re-categorized into 2 groups: "strongly agree" and "agree" were combined into the "agree" group, and the other responses were combined into the "did not agree" group to rate the extent of agreement with items. Knowledge and attitude scores were classified into three levels using Bloom's Theory [24], which categorizes by percentage based on summed scores: ≤ 60% represented poor knowledge, >60-80% moderate knowledge, and > 80% a good level of knowledge. Likewise, attitude scores were classified into poor (≤ 60%), moderate (> 60-80%) and good level of attitude (> 80%).

Statistical analysis

The collected data were entered, verified, and analyzed with SPSS software (version 16, SPSS Inc., Chicago, IL, USA). Descriptive variables including number, percentage, mean and standard deviation (SD) were calculated for demographic and professional data and for knowledge/attitude items. Student t-test was used to compare total knowledge and attitude score between gender, practice setting (Private/ teaching), participation in training courses (yes/no) and awareness of guideline (yes/no). Pearson test was used to calculate the correlation between total knowledge and attitude score and years of practice (as a nurse, as an orthopedic nurse). A p value less than 0.05 was considered statistically significant.

Results

Among 160 orthopedic nurses, 10 were not available during the data collection and 7 refused to participate in the survey, thus the participants were 143 nurses (response rate: 89.3%). Most of participants were female (83.9%) and 98 (68.5%) of the nurses worked in the teaching university hospitals. The mean (SD) of years of practice as an orthopedic nurse was 5.17 (4.75) years. Only 6 nurses (4.2%) had participated in osteoporosis training courses after their graduation, and 39 (27.3%) had been aware of the national osteoporosis clinical guideline (Tab. I).

The overall mean (± SD) score of knowledge and attitude for all participants was 11.60 ± 3.10 (out of maximum possible score of 18) and 3.47 ± 0.92 (out of maximum possible score of 5), respectively. Based on Bloom's scale, mean total knowledge and attitude score regarding osteoporosis were in moderate level.

Table II shows frequency of nurses' responses to knowledge and attitude questions. Among 143 participants, less than 50% of them correctly responded the following questions (yes/no): "Osteoporosis is rarer in white and

Tab. I. Demographic and professional characteristics of the participants.

Variables	N (%) or mean ± SD
Gender	
Male	23 (16.1)
Female	120 (83.9)
Practice setting	
Teaching	98 (68.5)
Private	45 (31.5)
Years of practice	
As a nurse	5.17 ± 4.75
As an orthopedic nurse	7.31 ± 5.73
Participate in continuing education	
Yes	6 (4.2)
No	137 (95.8)
Awareness of national guideline	
Yes	39 (27.3%)
No	104 (72.7%)
Total	143 (100%)

Tab. II. Frequency of participants' responses to knowledge and attitude questions.

	Answers [n (%)]	
Knowledge questions	**Correct**	**Incorrect**
Definition		
1-Osteoporosis is a most common metabolic bone disease. (Yes)	106 (74.1)	37 (25.9)
2-Osteoarthritis is an another name of osteoporosis. (No)	87 (60.8)	56 (39.2)
Risk factors		
3-Osteoporosis is rarer in white and Asian. (No)	64 (44.8)	79 (55.2)
4-Genetic factors are associated with osteoporosis. (Yes)	88 (61.5)	55 (38.5)
5-The likelihood of osteoporosis in men and women is the same. (No)	120 (83.9)	23 (16.1)
6-The decline in bone density begins at age 45 and it accelerated after menopause. (Yes)	118 (82.5)	25 (17.5)
7-Physical activity decreases the risk of osteoporosis. (Yes)	108(75.5)	34 (23.8)
8-Smoking is one of the risk factors for osteoporosis. (Yes)	102 (71.3)	41 (28.7)
9-Alcohol use is not associated with osteoporosis. (No)	86 (60.1)	57 (39.9)
10-The use of corticosterone for more than three months causes a rapid decrease in bone mass. (Yes)	120 (83.9)	23 (16.1)
11-Some diseases and medications have effect on the rate of bone loss. (Yes)	87 (60.8)	56 (39.2)
12-Menarche age is associated with osteoporosis in women. (Yes)	105 (73.4)	38 (26.6)
Prevention		
13-Fracture is a most important complication of osteoporosis in the elderly. (Yes)	122 (85.3)	21 (14.7)
14-Daily need for calcium to prevent osteoporosis in different age groups ranged 1,000-1,300 milligram. (Yes)	42 (29.4)	77 (53.8)
15-Daily need for vitamin D to prevent osteoporosis in different age groups ranged 600-800 units. (Yes)	41 (28.7)	73 (51.0)
Screening		
16-All postmenopausal women should be evaluating for osteoporosis risk factors. (Yes)	131 (91.6)	12 (8.4)
17-For all women aged over 65 years measuring BMD *is necessary. (Yes)	35 (24.5)	108 (75.5)
18-Osteoporosis can be screened by plain x-ray. (No)	70 (49.0)	73 (51.0)
Attitude questions	**Agree n (%)**	**Disagree n (%)**
1-Osteoporosis is a silent disease	102 (71.4)	41 (28.7)
2-Osteoporosis is a preventable disease so screening is necessary	134 (93.8)	9 (6.3)
3-It is our culture that osteoporosis is a not- treatable disease	35 (24.5)	108 (75.5)
4-Patient education on osteoporosis prevention and screening is my responsibility	110 (76.9)	33 (23.1)
5-I am confident in giving counseling regarding osteoporosis prevention and screening to public and patients	27 (18.9)	116 (81.1)

Asian" (44.8%), "For all women aged over 65 years measuring bone mineral density (BMD) is necessary" (24.5%), "Osteoporosis can be screened by plain x-ray" (49 %), "Daily need for calcium to prevent osteoporosis in different age groups ranged 1,000-1,300 milligram" (29.4%), and "Daily need for vitamin D to prevent osteoporosis in different age groups ranged 600-800 units" (28.7%). Most of these questions with lowest correct answers were related to prevention and screening aspects of osteoporosis.

Regarding nurses' attitude towards osteoporosis; 102 participants (71.4%) agreed with "Osteoporosis is a silent disease". Screening for osteoporosis was believed to be necessary (93.8%). A majority of nurses perceived that patient education is a part of their job responsibilities (76.9%); however, only 27 (18.9%) of them confident in giving counseling to public and patients.

Table III presents the result of comparison of knowledge & attitude scores with demographic and professional variables. Mean knowledge score was 13.13 ± 2.17 among nurses who work in private setting and 11.02 ± 3.29 among those who work in government/public settings ($P = 0.01$). Mean attitude scores were 3.32 ± 0.90 and 3.80 ± 0.89 among nurses who worked in public and private settings, respectively, and this difference was statistically significant ($P = 0.04$). Nurses participated in the osteoporosis training courses and that awareness of the national guideline had higher knowledge scores; however, there were no statistically significant association between these variables. According to Pearson rank correlation coefficient, there was a significant positive correlation between mean knowledge and attitude scores ($r = 0.199$, $P < 0.037$). There was positive correlation between nurses' knowledge and attitude scores and years of practice, but these correlations were not statistically significant (Tab. IV)

Discussion

Osteoporosis will become a future public health issue especially in our country with upward trending of elderly population [25, 26]. High mortality rate after hip fracture in elderly Iranian population reported in

Tab. III. Mean of knowledge and attitude scores towards osteoporosis by categorical demographic and professional data.

Variables	Knowledge score	Attitude score
	Mean ± SD	Mean ± SD
Gender		
Men	11.05 ± 3.26	3.60 ± 0.98
Women	11.70 ± 3.07	3.45 ± 0.91
p-value	0.418	0.453
Practice setting		
Governmental/public	11.02 ± 3.29	3.32 ± 0.90
Private	13.13 ± 2.17	3.80 ±0.89
p-value	0.001	0.004
Participate in training courses		
Yes	11.75 ± 1.50	3.83 ± 0.40
No	11.59 ± 3.14	3.45 ±0.93
p-value	0.922	0.335
Awareness of national guideline		
Yes	11.71 ± 2.91	3.43 ± 0.088
No	11.56 ± 3.17	3.49 ± 0.94
p-value	0.823	0.755

previous studies [27, 28]. Therefore, role of nurses as a frontline staff, in patient education and prevention of osteoporosis is critical.

Our findings revealed that majority of nurses were not aware of most up-to-date national osteoporosis clinical guideline. Low level of guideline awareness among health care professionals had been reported in previous studies. Sixteen percent of awareness among practitioners in the Kingdom of Saudi Arabia, 25% among general practitioners in the United Kingdom, and 24% among family physicians in Iran [18, 29, 30]. Fourie et al. reported low adherence with osteoporosis published recommendations among New Zealand orthopedic nurses [11]. Directors of nursing from Duke university were aware of guidelines and strongly agreed that osteoporosis guidelines are useful and cost-beneficial; however, they have some barriers in use of these guidelines [31]. The lack of awareness in our setting may be explained by how the latest guideline are advertise or disseminate. In this regard, managers could be used of new methods of announcements such as mobile notification or tack periodic quick examinations from the last version of guideline.

In nurses' knowledge evaluation, knowledge score of our participants were not satisfactory. The correct answers in some important questions such as method of screening/risk factors of osteoporosis/daily need for vitamin D and Ca were low. Knowledge results were in line with previous findings. Zhang et al. and Vered et al. reported low or modest level of osteoporosis knowledge among hospital nurses [16, 32]. Swedish nurses stated in focus group interview that they have insufficient knowledge about diagnosis, fracture risk assessment tool such as fracture risk assessment tool (FRAX®) and bone-specific medications [19]. New Zealand nurses perceived that play a passive role in osteoporosis prevention and educating patients, because of inadequate osteoporosis knowledge [11].

Although the education of health care professionals has been improved in recent years; however, our results revealed that we need more plans to empower nurses. So use of practical/motivational training methods and some revision and possibly changes in nursing student curricula seem necessary.

In our analysis, nurses worked in the private hospitals had higher knowledge and attitude scores than those in the teaching hospitals. One reasons for this association may be more inexperienced workforce due to large influxes of graduate nurses in the teaching hospitals; however, more studies are required to further document the influence of this factor.

Regarding attitude, majority of nurses had positive attitude about necessity of osteoporosis screening. Also, more than two thirds of them perceived that patient education is a part of their job responsibilities. Majority of nurses were not confident in giving counseling to public and patients. This can be related to low level of nurses' knowledge in osteoporosis. Low level of knowledge perceived as a barrier to improve osteoporosis care among Alabama nursing directors [33]. Bandura's of self-efficacy theory [34], low level of person's knowledge can be effect on their future confidence and practice.

Limitation and strength

Our participants were recruited from orthopedic ward of hospitals affiliated to Shiraz University of Medical Sciences. This participants might not be representative of all Iranian nurses. But this was the first study in Iran to evalute awarness of nurses regarding most recent up-to-date national osteoporosi guideline.

Tab. IV. Correlation between age and work experience with participant.

Variables	Analysis	Years of practice as a nurse	Years of practice as an orthopedic nurse	Knowledge score	Attitude score
Years of practice as a nurse	Correlation coefficient	1			
	p-value	-			
Years of practice as an orthopedic nurse	Correlation coefficient	0.80	1		
	p-value	< 0.001	-		
Knowledge score	Correlation coefficient	0.15	0.11	1	
	p-value	0.106	0.251	-	
Attitude score	Correlation coefficient	0.109	0.190	0.199	1
	p-value	0.197	0.143	0.037	-

Conclusions

Nurses' knowledge and attitude regarding osteoporosis was not satisfactory and most of them were not aware of national osteoporosis clinical guideline. Although, nurses had positive attitude in screening and patient education; however, they were not confident in giving counseling to public and patients. So in order to decrease the burden of osteoporosis and its consequences, we need to empower our nurses via revision and possibly changes in educational methods with measurable and reliable criteria.

Acknowledgements

Funding sources: this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
We appreciate the cooperation of the hospital administrators in providing essential logistic support, and thank K. Shashok (Author AID in the Eastern Mediterranean) for improving the use of English in the manuscript.

Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

HM and VK was contributed in study design, data gathering and writing the draft. MJE, ZK and ARV were contributed in study design, analyzed and interpreted the patient data, and critically appraise the draft of manuscript. All authors read and approved the final manuscript.

References

[1] Gajic-Veljanoski O, Papaioannou A, Kennedy C, Ioannidis G, Berger C, Wong AKO, Rockwood K, Kirkland S, Raina P, Thabane L, Adachi JD; CaMos Research Group. Osteoporotic fractures and obesity affect frailty progression: a longitudinal analysis of the Canadian multicentre osteoporosis study. BMC Geriatr 2018;18:4. https://doi.org/10.1186/s12877-017-0692-0

[2] Harris PE, Bouloux P-MG. Metabolic bone disease. Endocrinology in Clinical Practice: CRC Press 2014, pp. 243-64.

[3] Chin KY, Wong SK, Ekeuku SO, Pang KL. Relationship between metabolic syndrome and bone health - an evaluation of epidemiological studies and mechanisms involved. Diabetes Metab Syndr Obes 2020;13:3667-90. https://doi.org/10.2147/DMSO.S275560

[4] Johansson H, Kanis JA, Odén A, McCloskey E, Chapurlat RD, Christiansen C, Cummings SR, Diez-Perez A, Eisman JA, Fujiwara S, Glüer CC, Goltzman D, Hans D, Khaw KT, Krieg MA, Kröger H, LaCroix AZ, Lau E, Leslie WD, Mellström D, Melton LJ 3rd, O'Neill TW, Pasco JA, Prior JC, Reid DM, Rivadeneira F, van Staa T, Yoshimura N, Zillikens MC. A meta-analysis of the association of fracture risk and body mass index in women. J Bone Miner Res 2014;29:223-33. https://doi.org/10.1002/jbmr.2017. Erratum in: J Bone Miner Res 2017;32:2319.

[5] Werner P. Knowledge about osteoporosis: assessment, correlates and outcomes. Osteoporos Int 2005;16:115-27. https://doi.org/10.1007/s00198-004-1750-y

[6] Omrani GR, Masoompour SM, Hamidi A, Mardanifard HA, Taghavi SM, Talezadeh P, Larijani B. Bone mineral density in the normal Iranian population: a comparison with American reference data. Arch Osteoporos 2006;1:29-35. https://doi.org/10.1007/s11657-006-0005-2

[7] Larocque SC, Kerstetter JE, Cauley JA, Insogna KL, Ensrud K, Lui LY, Allore HG. Dietary Protein and vitamin D intake and risk of falls: a secondary analysis of postmenopausal women from the study of osteoporotic fractures. J Nutr Gerontol Geriatr 2015;34:305-18. https://doi.org/10.1080/21551197.2015.1054574

[8] Lehnert H. Unterschätzte krankheit osteoporose: neue wege in diagnostik und therapie [underestimated osteoporosis: new directions in diagnosis and therapy]. Dtsch Med Wochenschr 2015;140:1660. https://doi.org/10.1055/s-0041-107584

[9] Snellman G, Byberg L, Lemming EW, Melhus H, Gedeborg R, Mallmin H, Wolk A, Michaëlsson K. Long-term dietary vitamin D intake and risk of fracture and osteoporosis: a longitudinal cohort study of Swedish middle-aged and elderly women. J Clin Endocrinol Metab 2014;99:781-90. https://doi.org/10.1210/jc.2013-1738

[10] Smith CA. A systematic review of healthcare professional-led education for patients with osteoporosis or those at high risk for the disease. Orthop Nurs 2010;29:119-32. https://doi.org/10.1097/NOR.0b013e3181d24414

[11] Fourie H, Floyd S, Marshall B. Exploring New Zealand orthopaedic nurses' knowledge of osteoporosis. Orthop Nurs 2015;34:29-35. https://doi.org/10.1097/NOR.0000000000000111

[12] Abolhassani F, Mohammadi M, Soltani A. Burden of osteoporosis in Iran. Iranian Journal of Public Health.2004;33(Suppl. 1):18-28.

[13] Larijani B, Moayyeri A, Keshtkar AA, Hossein-Nezhad A, Soltani A, Bahrami A, Omrani GH, Rajabian R, Nabipour I. Peak bone mass of Iranian population: the Iranian Multicenter Osteoporosis Study. J Clin Densitom 2006;9:367-74. https://doi.org/10.1016/j.jocd.2006.05.001

[14] Meybodi HA, Heshmat R, Maasoumi Z, Soltani A, Hossein-Nezhad A, Keshtkar A, et al. Iranian osteoporosis research network: background, mission and its role in osteoporosis management. Iranian Journal of Public Health 2008;37:1-6.

[15] Chen IJ, Yu S, Wang TF, Cheng SP, Huang LH. Knowledge about osteoporosis and its related factors among public health nurses in Taiwan. Osteoporos Int 2005;16:2142-8. https://doi.org/10.1007/s00198-005-2015-0

[16] Zhang RF, Chandran M. Knowledge of osteoporosis and its related risk factors among nursing professionals. Singapore Med J 2011;52:158-62.

[17] Lau AN, Ioannidis G, Potts Y, Giangregorio LM, Van der Horst ML, Adachi JD, Papaioannou A. What are the beliefs, attitudes and practices of front-line staff in long-term care (LTC) facilities related to osteoporosis awareness, management and fracture prevention? BMC Geriatr 2010;10:73. https://doi.org/10.1186/1471-2318-10-73

[18] Mahdaviazad H, Keshtkar V, Emami MJ. Osteoporosis guideline awareness among Iranian family physicians: results of a knowledge, attitudes, and practices survey. Prim Health Care Res Dev 2018;19:485-91. https://doi.org/10.1017/S1463423618000014

[19] Claesson A, Toth-Pal E, Piispanen P, Salminen H. District nurses' perceptions of osteoporosis management: a qualitative study. Osteoporos Int 2015;26:1911-8. https://doi.org/10.1007/s00198-015-3086-1

[20] Nguyen VH. Osteoporosis exercise knowledge and education in medicine and nursing. Osteoporos Int 2017;28:3069-70. https://doi.org/10.1007/s00198-017-4119-8

[21] Soleymanian A, Niknami S, Hajizadeh E, Shojaeizadeh D, Montazeri A. Development and validation of a health belief

model based instrument for measuring factors influencing exercise behaviors to prevent osteoporosis in pre-menopausal women (HOPE). BMC Musculoskelet Disord 2014;15:61. https://doi.org/10.1186/1471-2474-15-61

[22] Winzenberg TM, Oldenburg B, Frendin S, Jones G. The design of a valid and reliable questionnaire to measure osteoporosis knowledge in women: the Osteoporosis Knowledge Assessment Tool (OKAT). BMC Musculoskelet Disord 2003;4:17. https://doi.org/10.1186/1471-2474-4-17

[23] Science V-CfHoTUoM. Osteoporosis Clinical Guideline. 2 ed. Iran: Poneh 2014.

[24] Haseeb Hwaid A. Knowledge and awareness of papillomavirus and cervical cancer among college students and health care workers women in Diyala, Iraq. American Journal of Public Health Research 2013;1:221-5.

[25] Janiszewska M, Firlej E, Żołnierczuk-Kieliszek D, Dziedzic M. Knowledge about osteoporosis prevention among women screened by bone densitometry. Prz Menopauzalny 2016;15:96-103. https://doi.org/10.5114/pm.2016.61192

[26] Puttapitakpong P, Chaikittisilpa S, Panyakhamlerd K, Nimnuan C, Jaisamrarn U, Taechakraichana N. Inter-correlation of knowledge, attitude, and osteoporosis preventive behaviors in women around the age of peak bone mass. BMC Womens Health 2014;14:35. https://doi.org/10.1186/1472-6874-14-35

[27] Pourabbas B, Emami MJ, Vosoughi AR, Mahdaviazad H, Kargarshouroki Z. Mortality and function after surgically-treated hip fracture in adults younger than age 60. Acta Ortop Bras 2017;25:129-31. https://doi.org/10.1590/1413-785220172504158145

[28] Vosoughi AR, Emami MJ, Pourabbas B, Mahdaviazad H. Factors increasing mortality of the elderly following hip fracture surgery: role of body mass index, age, and smoking. Musculoskelet Surg 2017;101:25-9. https://doi.org/10.1007/s12306-016-0432-1

[29] Taylor JC, Sterkel B, Utley M, Shipley M, Newman S, Horton M, Fitz-Clarence H. Opinions and experiences in general practice on osteoporosis prevention, diagnosis and management. Osteoporos Int 2001;12:844-8. https://doi.org/10.1007/s001980170035

[30] Saeedi MY, Al-Amri F, Mohamed A, Ibrahim AK. Knowledge, attitude and practice towards osteoporosis among primary health care physicians in Riyadh, Saudi Arabia. Sci J Public Healt 2014;2:624-30.

[31] Colón-Emeric CS, Casebeer L, Saag K, Allison J, Levine D, Suh TT, Lyles KW. Barriers to providing osteoporosis care in skilled nursing facilities: perceptions of medical directors and directors of nursing. J Am Med Dir Assoc 2005;6(3 Suppl):S61-6. https://doi.org/10.1016/j.jamda.2005.03.024

[32] Vered I, Werner P, Shemy G, Stone O. Nurses' knowledge and perceptions about osteoporosis: a questionnaire survey. Int J Nurs Stud 2008;45:847-54. https://doi.org/10.1016/j.ijnurstu.2007.01.011

[33] Levine DA, Saag KG, Casebeer LL, Colon-Emeric C, Lyles KW, Shewchuk RM. Using a modified nominal group technique to elicit director of nursing input for an osteoporosis intervention. J Am Med Dir Assoc 2006;7:420-5. https://doi.org/10.1016/j.jamda.2006.05.004

[34] Kang PS, Mohazmi M, Ng YM, Liew SM. Nurses' knowledge, beliefs and practices regarding the screening and treatment of postpartum depression in maternal and child health clinics: A cross-sectional survey. Malays Fam Physician 2019;14:18-25

Received on August 26, 2020. Accepted on February 17, 2021.

Correspondence: Hamideh Mahdaviazad, Assistant Professor of Community and Preventive Medicine, Department of Community Medicine, School of Medicine, Shiraz University of Medical Sciences, 7193634154 Shiraz, Iran - Tel.: +98-711-32302830 - Fax: +98-711-32302830 - E-mail: mahdavih@sums.ac.ir / drmahdavih@gmail.com

How to cite this article: Mahdaviazad H, Keshtkar V, Emami MJ, Kargarshouroki Z, Vosoughi AR. Osteoporosis guideline awareness among Iranian nurses: results of a knowledge and attitudes survey. J Prev Med Hyg 2021;62:E584-E420. https://doi.org/10.15167/2421-4248/jpmh2021.62.2.1738