ISSN: 0974-2115
www.jchps.com Journal of Chemical and Pharmaceutical Sciences

The knowledge and attitude of women in Kermanshah on Osteoporosis (2015)

Ali Azizi*[1], Nasrin Mansori[2], Farhad Amirian[3]
[1]Department of Community Medicine, Kermanshah University of Medical Science, Kermanshah, Iran.
[2]Department of Gynecology, Imam Reza Reza, Medical and Research Center, Kermanshah University of Medical Science, Kermanshah, Iran.
[3] Department of Pathology, Imam Reza Reza, Medical and Research Center, Kermanshah University of Medical Science, Kermanshah, Iran.
***Corresponding author: E-Mail: Azizi Ali, Email: aliazizi@kums.ac.ir**

ABSTRACT

Objectives: Osteoporosis is a disease characterized by low bone mass that its prevalence in different parts of the world, due to the significant increase in life expectancy is increasing. This study was conducted to determine the knowledge and attitude of women about osteoporosis in Kermanshah city, Iran.

Methods: In this cross-sectional study 810 women aged 20 to 50 years old were selected by random sampling of households in Kermanshahin the West, Iran. For them completed a standard questionnaire of20 questions (to assess knowledge) and question 42 (the assessment of attitudes). The mean and standard deviation were used to describe the data for quantitative variables and the relative frequency for qualitative variables. ANOVA and multiple regressions were used to determine the relationship variables in the software SPSS v.20.

Results: Of the 810 women studied were 70.9% married, 81.6% housewives, 36.35% had diploma or higher level of education. The mean score for general knowledge questions 7.8 ± 2.3 (equivalent to 39.1% of the maximum possible score) and for the attitude of 116.6 ± 14.3 (equivalent to 55.5% of the maximum possible score) was reported. Subscale of "understanding the factors preventing osteoporosis" was a good predictor for subscales of the benefits of calcium, the benefits of exercise, exercise barriers and obstacles calcium intake. ($p < 0.02$).

Conclusion: Women's knowledge and attitude is low about osteoporosis in Kermanshah city. It is therefore essential population- educational intervention.

KEY WORDS: osteoporosis, knowledge, attitude, women.

1. INTRODUCTION

Osteoporosis (Osteoporosis) is a bone disease characterized by decreased bone mass and changes in the microscopic structure of tissue (van Geel, 2010, Cunningham, 2014). That is one of the world's major health problems. Several factors are effective to its development, such as genes and various environmental conditions. Osteoporosis risk factors are divided into two categories variable and inevitable. Inevitable risk factors include age, sex, race and genetic characteristics and modifiable risk factors including weight, smoking, physical inactivity, prolonged use of corticosteroids and inadequate calcium intake (Geusens, 2002). The osteoporosis increases with age due to reduced bone mass. In women, bone loss accelerates due to losing of ovarian function at menopause (usually around age 50), so most of them are the criteria for diagnosing osteoporosis at the age of 80-70 years (Hodgson, 2003). Osteoporosis is called the silent disease because cannot be detected until bone fractures. Osteoporotic fractures occur as a result of minor trauma (which would otherwise not be able to create fractures) (Shepherd, 2004).

The prevalence of osteoporosis is increasing around the world, due to the significant increase in life expectancy. This disease affected nearly 75 million people in Europe, Japan and the United States and more than 200 million women around the world (Khani Jeihooni, 2015, Grossman, 2010). Worldwide, osteoporosis is responsible for over 9.8 million bone fractures and vertebral fractures occur each year so that every 3 seconds and 22 seconds respectively (Papaioannou, 2010, Kanis and Glüer, 2000).

About 25969046 people suffer from osteopenia and osteoporosis 3024798 people in Iran (Grossman, 2010). A multi-center study in Tehran showed 70% of women and 50% men 50 years and older had osteopenia or osteoporosis and the incidence of hip fractures increases with age, about 90% of hip fracture occurred in women (Rahnavard, 2009).

Health care centers are obliged to educate patients and their families are raising awareness on osteoporosis and its prevention. Health care worker should consider ensuring of receiving enough calcium - vitamin "D" and appropriate physical activity in the population coverage for prevention and treatment of osteoporosis (Baradaran-Seyed and Majdzadeh, 2012, Eslamian and Jamshidi, 2008, Ghaffari, 2015). In other words, Population-based interventions are one of the important strategies for the prevention of osteoporosis and reduction of risk factors. Determine the knowledge, attitude and practice of community is a prerequisite for this type of intervention (Green and Kreuter, 2005). Studies have shown that the knowledge, attitude and practice in the field of osteoporosis are not desirable in different groups of community in the world and Iran (Terrio and Auld, 2002, Jalili, 2007, Rasolabadi, 2015). According to the high prevalence of osteoporosis and its complications in women (than men) and preventable,

this study was conducted to determine knowledge and attitude of women about osteoporosis in Kermanshah province in West Iran.

2. METHODS & MATERIALS

Methods: Considering P = 0.5, q = 0.5, α =0.05, α =0.01 and d = 0.05, the required sample size was calculated of 660 women. There are a total of 30 health centers in the Kermanshah city. From the population covered by each of health center 27 family files (660 ÷ 30 = 22, 27 to ensure more) selected with systematic random sampling (a total of 810 women). One 20 to 50-year-old woman was selected from each household randomly (if there is more than a 20 to 50-year-old woman in the household). For the women completed a questionnaire by trained interviewers each Health Center (Family Health Workers).

The questionnaire was used contains three parts. The first part included underlying questions (age, education level, occupation, monthly income, family size and source aware of osteoporotic). The second part was a standard questionnaire of 20 questions to assess osteoporosis knowledge assessment tool (OKAT) and the third part of the questionnaire of 42 questions to assess osteoporosis health belief scale (OHBS) (Winzenberg, 2003, Kim, 1991). The validity of the Persian version reported for knowledge questionnaire, 0.73 and 0.87 to attitude questionnaires (Baheiraei, 2005). The knowledge questionnaire includes 20 questions to assess knowledge 3 option (true, false, I do not know), respectively. To "correct" answer a rating and for an answer "false" and "do not know" was considered zero points. A maximum point in the questionnaire was 20 (if the person has the right answers to all questions in the questionnaire) and a minimum of zero. The Knowledge questionnaire includes four sub-groups or subscale "to understand the symptoms of osteoporosis and fracture risk, "recognize the risk factors for osteoporosis", "Identity the Barriers" (physical activity and diet-related osteoporosis) and "availability treatment ". Attitude questionnaire consists of 42 items and the whole five-point Likert scale from "strongly disagree" (Code 1) to "strongly agree" (code 5). Maximum points were in the questionnaire, 210 (5 × 42) and at least 42 (1 × 42). Subscales of the attitude questionnaire included "sensitive understanding of osteoporosis", "perceived a risk of osteoporosis", "Benefits of Exercise", "Benefits of Calcium", "Sports barriers", " Barriers calcium intake" and "motivation Health". The collected data were analyzed using software SPSS V20. The level of significance was set at P- value less than 0.05. Descriptive results are presented using frequency, mean and standard deviation, suffering and table's next one. To determine the relationship between variables used one-way analysis of variance and multiple regressions.

3. RESULTS

The mean age of the 810 women aged 20 to 50 was 34.8 ± 10.2 years. The results showed that of 810 women; 70.9% were married, 81.6% were housewives, and 47.3% family income less than 20 million rails' Iran, 36.5% of upper secondary education and 41.2% were illiterate and primary education. Most sources of information about osteoporosis were reported, Broadcasting (45.2%) and the lowest on the Internet (3.2%) (Table1). Table 2 shows the relative frequency of women who have each correct answer knowledge questions. 50% of respondents had responded to four questions out of 20 questions in the Knowledge questionnaire (Increased risk of bone fractures, less common in men, the impact of smoking, effects of increasing age). The highest percentage of correct answers was related to the question "accelerates osteoporosis in women after the age of 50" (51.8%) and the lowest to the "The effect of alcohol on osteoporosis" (5.6%). The mean score for general knowledge questions was 7.8 ± 2.3, with regard to the code 1 for the answer "correct" and zero for "false" or "do not know". Knowledge Level was low in all three subgroups important of the knowledge (understanding the symptoms of osteoporosis and fracture risk, identifying risk factors for osteoporosis, identify factors inhibiting). Especially "Understanding the symptoms of osteoporosis and fracture risk" with a mean of 2.1 ± 1.1 scores equivalent to 40.1% of the maximum possible score (6). One Way ANOVA test showed statistically significant differences mean sub-score "Identify the Barriers" with "Understanding the symptoms of osteoporosis and fracture risk" and "identification of risk factors for osteoporosis" ($p<0.02$).

Table 4 shows the average score for each of the subscales measuring attitudes. It was reported the mean score for the whole of the questionnaire (for all questions) 116.6 ± 14.3. Perceived susceptibility to osteoporosis lowest mean (11.9 ± 92.4 or 37.9% of the maximum points possible) and "benefits of exercise" had the highest average (8.2 ± 4.4 or 69.2% the maximum points possible). Regression analysis showed that "Identify the Barriers" a good predictor for subscales of the benefits of calcium, the benefits of exercise, exercise barriers and obstacles calcium intake ($p <0.02$). The standardized beta coefficient was of the above order of 0.59, 0.42, (-0.51) and (-0.39-).

DISCUSSION

Using population-based interventions for reducing risk factors is one of the most important strategies for the prevention of osteoporosis in communities. A prerequisite for this type of intervention is to determine the knowledge, attitude and practice of the population (Green and Kreuter, 2005). This study is a population-based study and its data is collected through household interviews conducted by trained interviewers. The main finding of this study is the low level of knowledge (39.1%) women about osteoporosis in Kermanshah.

In this study, the knowledge of women about osteoporosis 39.1% of the total score possible for consciousness (With an average 7.8 ± 2.3 of 20). The attitude was 55.5% of the total score possible, in other words, 44.5% had a negative attitude. Although the studies Knowledge, Attitude, Practice the lot to do, but knowing the limitations of such a study is necessary. In the case of knowledge, sometimes the answer may be due to superficial knowledge and without analysis and recognition. About attitude and performance cannot be predicted very well the human mind and human behavior is innocent of change. It is possible to follow the trends appear without the knowledge of the behavior and awareness as well. The low level of awareness of the approach in this study is justified. Whenever behavior or attitudes occur prior to knowledge is usually due to imitation or need (Green and Kreuter, 2005, Ehsanpour, 2011).The results of some studies also indicate the lack of association between knowledge and attitude or lack of knowledge and attitudes impact on the performance of osteoporosis (Mahmoodi and Salehi, 2011, Barzanji, 2013, von Hurst and Wham, 2007, Rahimi, 2014).This heterogeneity results could be due to the fact that "the possibility of adopting appropriate behavior Health" Contract under the influence of a series of intermediate factors such as demographic characteristics (age, gender, race), psychosocial factors (Individual characteristics, social class), structural factors (information about the disease) (van Geel, 2010).

These results show the knowledge of women has reported 39.1%about osteoporosis. These results agreement with report Mobaraki & et.al on 320 women aged 15 to 65 years old referring to health centers in Yasouj and Islamian study on 390 women referred to Shariati Hospital in Tehran matches (Eslamian and Jamshidi, 2008, Mobaraki, 2006).But more than the amount declared in a study of 447 women aged 40 years and older in Taiwan (Yu and Huang, 2003).This level of knowledge (39.1%) less than the knowledge of Jalili & et.al reported in a study on 770 women household Kerman (44.3%) and the Alshammari in Riyadh, Saudi Arabia (56%) (Barzanji, 2013, Jalili, 2007).The Swedish rate for women 20 to 79 years were 61% and 63% for Turkish women (Werner, 2005, Ungan and Tümer, 2001). The cause of the difference in knowledge in various studies may be due to differences in knowledge assessment tools (using different questionnaires), differences in methodology (including sample size, study population, data collection source, etc.) and environmental, social and cultural factors (Green and Kreuter, 2005, Winzenberg, 2003, Safizadeh, 2015).

The results of this study show that a positive attitude about osteoporosis 5.55% more than the percentage of positive attitude in the study reported that Jalili in Kerman (9.50%) and Islamian in Tehran (6%), but less than declared attitude promising study Yasouj (3.72%), the study Alshammari in Riyadh, Saudi Arabia (70%) and study Sayed-Hassan in Syria (9.59%)(Jalili, 2007, Eslamian and Jamshidi, 2008, Mobaraki, 2006, Sayed-Hassan, 2013, Moballeghi, 2013).

In this study, the subscales “perceived susceptibility to osteoporosis "with 37.9% was the lowest. In Taiwan, the lowest level attitude in the Group 'perceived susceptibility "(Yu and Huang, 2003). The rate for women in Kerman 53% and 44% respectively for Syrian women (Sayed-Hassan, 2013, Jalili, 2007). “Perceived susceptibility” indicates person's perception of its vulnerability to diseases. This means that people consider their risk of osteoporosis and whatever you’re individual more prone to see, would be more likely to force it out of action (Becker, 1977). Ghafari & et.al also was reported statistically significant relationship between the mean score of physical activity and perceived susceptibility to osteoporosis ($p<0.05$) (Ghafari, 2014).

Table.1. Relative frequency distribution of source of information about osteoporosis in women

	N	%
Source of information about osteoporosis		
Family and friends	237	29.3
Health workers	149	18.4
Broadcasting	366	45.2
Internet	26	3.2
Magazines and newspapers	32	3.9
Total	810	100
Literacy		
illiterate	141	17.4
Primary School	193	23.8
Middle School	181	22.3
High School	213	26.4
Collegiate	82	10.1
Total	810	100
Job		
housewife	661	81.6
Employed	149	18.4
Total	810	100
Marital status		

Single	164	20.3
Married	575	70.9
Isolated	27	3.5
Death of spouse	43	5.3
Total	810	100
Average monthly income (Million Rails)		
Less 10	317	39.1
10 to 20	383	47.3
More than 20	110	13.6
Total	810	100

Table.2. Correct answers for the OKAT among the study women (n=810)

Question	Correct response	N (%)
1. Osteoporosis leads to an increased risk of bone fractures.	true	408(50.4)
2. Osteoporosis usually causes symptoms (e.g. pain) before fractures occur.	false	199(24.6)
3. Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life.	false	245(30.3)
4. Osteoporosis is more common in men.	false	411(50.7)
5. Cigarette smoking can contribute to osteoporosis.	true	416(51.1)
6. White women are at highest risk of fracture as compared to other races.	true	122(15.1)
7. A fall is just as important as low bone strength in causing fractures.	true	369(45.6)
8. By age 80, the majority of women have osteoporosis.	true	228(28.1)
9. From age 50, most women can expect at least one fracture before they die.	true	419(51.7)
10. Any type of physical activity is beneficial for osteoporosis.	false	253(31.2)
11. It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors.	true	368(45.4)
12. Family history of osteoporosis strongly predisposes a person to osteoporosis.	true	138(17.1)
13. An adequate calcium intake can be achieved from two glasses of milk a day.	true	332(41)
14. Sardines and broccoli are good sources of calcium for people who cannot take dairy products.	true	141(17.4)
15. Calcium supplements alone can prevent bone loss.	false	347(42.8)
16. Alcohol in moderation has little effect on osteoporosis.	true	45(5.6)
17. A high salt intake is a risk factor for osteoporosis.	true	264(32.6)
18. There is a small amount of bone loss in the ten years following the onset of menopause.	false	315(38.9)
19. Hormone therapy prevents further bone loss at any age after menopause.	true	213(26.3)
20. There are no effective treatments for osteoporosis available in Australia.	false	366(45.2)

Table.3.Mean scores for OKAT subscales among the study women (n=810)

OKAT Theme	Mean ± SD	%	Rang
1-Understanding (symptoms and risk of fracture of osteoporosis) (Q1,2,8,9,11)	2.1 ± 1.1	40.1	0- 5
2-Knowledge of risk factors for osteoporosis(Q 3, 4, 5, 6, 7, 12, 18)	2.5 ± 1.3	35.5	0- 7
3- Knowledge of preventive factors as physical activity and diet relating to Osteoporosis (Q 10, 13, 14, 15, 16, 17)	2.6 ± 1.1	43.3	0- 6
4- Treatment availability (Q 19, 20)	0.7 ± 0.6	35.7	0- 2
5- All Items (Q 1–20)	7.8 ± 2.3	39.1	0- 20

Table.4. Mean scores for OHBS subscales among the study women (n=810)

OHBS Theme	Mean ± SD	%	Rang
Susceptibility of osteoporosis (Q 1–6)	11.9 ± 4.2	39.7	6- 30
Seriousness of osteoporosis (Q 7–12)	17.2 ± 4.5	57.5	6- 30
Benefits of exercises (Q 13–18)	20.8 ± 4.4	69.2	6- 30
Benefits of calcium intake (Q 19–24)	19.6 ± 4.7	65.2	6- 30
Barriers to exercises (Q 25–30)	13.2 ± 4.5	44.1	6- 30
Barriers to calcium intake (Q 31–36)	16.1 ± 4.2	53.4	6- 30
Health motivation (Q 37–42)	17.8 ± 3.8	59.3	6- 30
All items (Q 1–42)	116.6 ± 14.3	55.5	6- 30

4. CONCLUSION

These results show that the level of "perceived seriousness of osteoporosis" was 57.5%. This attitude level was in women in Kerman 436% and 57% have been reported in women in Syria. Perceived seriousness of the feelings people has about influences osteoporosis (Jalili, 2007, Sayed-Hassan, 2013). This assessment includes evaluation of physical effects (such as pain, disability, death), and social outcomes (such as the impact on family life, social relationships and conditions of employment categories). Whatever the individual is considered more serious these

consequences, the more likely he is performing health measures (Becker, 1977). Regression analysis in this study showed "understanding the factors preventing osteoporosis (exercise and calcium intake)" is a good predictor for the "benefits of taking calcium", "Benefits of Exercise" and "exercise barriers and obstacles calcium intake". This is consistent with the findings of the study Ghaffari in Tehran and Sayyed Hassan in Syria (Ghafari, 2014, Sayed-Hassan, 2013). While the results showed only statistically significant between physical activities and perceived barriers in Ghaffari study (Ghafari, 2014).

5. ACKNOWLEDGMENTS

The authors thank the authorities and personnel in health centers in Kermanshah city.

REFERENCES

Baheiraei A, Ritchie J.E, Eisman J.A & Nguyen T.V, Psychometric properties of the Persian version of the osteoporosis knowledge and health belief questionnaires. *Maturitas*, 50, 2005**,** 134-139.

Baradaran-Seyed Z & Majdzadeh R, Evidence-based health care, past deeds at a glance, Challenges and the future prospects in Iran. Iranian journal of public health, 41**,**1, 2012.

Barzanji AT, Alamri FA & Mohamed A.G, Osteoporosis: a study of knowledge, attitude and practice among adults in Riyadh, Saudi Arabia. Journal of community health, 38**,** 2013, 1098-1105.

Becker MH, Haefner DP, Kasl SV, Kirscht JP, Maiman LA & Rosenstock IM, Selected psychosocial models and correlates of individual health-related behaviors, Medical care, 15**,** 1977, 27-46.

Cunningham T, DI Pace B & Ullal J, Osteoporosis treatment disparities: a 6-year aggregate analysis from national survey data, Osteoporosis International, 25**,** 2014, 2199-2208.

Ehsanpour S, Mohammadifard M, ShahidI S & Nekouyi N, A comparative study on attitude of contraceptive methods users towards common contraceptive methods. Iranian journal of nursing and midwifery research, 15, 2011.

Eslamian L & Jamshidi A, Knowledge, attitude and behavior regarding osteoporosis among women in three age groups: Shariati hospital, Tehran. Tehran University Medical Journal TUMS Publications, 65**,** 2008, 16-21.

Geusens P, Hochberg M.C, Van Der Voort D.J, Pols H, Van Der Klift M, Siris E, Melton M.E, Turpin J, Byrnes, C & Ross P.D, Performance of risk indices for identifying low bone density in postmenopausal women. Mayo Clinic Proceedings, 2002, 629-637.

Ghafari M, Nasirzadeh M, Aligol M, Davoodi F, Nejatifar M, Kabiri S & Nezhadmohammad S, Determinants of physical activity for prevention of osteoporosis among female students of Shahid Beheshti University of Medical Sciences: Application of health belief model, Pajoohandeh Journal, 19**,** 2014, 244-250.

Ghaffari P, Nadiri M, Gharib A & Rahimi F, The effects of vitamin C on diabetic patients. *Der Pharmacia Lettre*, 7**,** 2015, 68-71.

Green LW & Kreuter MW, Health program planning: An educational and ecological approach, McGraw-Hill Companies, 2005.

Grossman JM, Gordon R, Ranganath VK, Deal C, Caplan L, Chen W, Curtis. JR, Furst DE, Mcmahon M & Patkar NM, American College of Rheumatology 2010 recommendations for the prevention and treatment of glucocorticoid-induced osteoporosis, Arthritis care & research, 62**,** 2010, 1515-1526.

Hodgson SF, Watts NB, Bilezikian JP, Clarke BL, Gray TK, Harris DW, Johnston JR C, Kleerekoper M, Lindsay R & Luckey MM, American Association of Clinical Endocrinologists medical guidelines for clinical practice for the prevention and treatment of postmenopausal osteoporosis: 2001 edition, with selected updates for 2003. Endocrine practice: official journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists, 9, 2003, 544.

Jalili Z, Nakhaee N, Askari R & Sharifi V, Knowledge, attitude and preventive practice of women concerning osteoporosis. Iranian Journal of Public Health, 36, 2007, 19-25.

Kanis J & Glüer CC, An update on the diagnosis and assessment of osteoporosis with densitometry, Osteoporosis international, 11**,** 2000, 192-202.

Khani Jeihooni A, Hidarnia A, Kaveh M.H & Hajizadeh E, The Effect of a Prevention Program Based On Health Belief Model on Osteoporosis. Journal of research in health sciences, 15, 2015, 47-53.

Kim KK, Horan ML, Gendler P & Patel MK, Development and evaluation of the osteoporosis health belief scale. Research in Nursing & Health, 14**,** 1991, 155-163.

Mahmoodi M & Salehi L, To Evaluate of Efficacy of Education Based on Health Belief Model on Knowledge, Attitude and Practice among Women with Low Socioeconomic Status Regarding Osteoporosis Prevention, Iranian Journal of Epidemiology, 7**,** 2011, 30-37.

Moballeghi J, Mohamadzadeh H, Gharibi F, Zarei M & Gharib A, Prevalence of goiter among high school students in Sanandaj, Iran in the year 2012, Life Science Journal, 10**,** 2013, 534-538.

Mobaraki A, Garmaznejad S & Zadehbagheri G, Women's level of knowledge, attitude and practice about osteoporosis in Yasouj 2006. Quarterly Journal of Yasuj Faculty of Nursing and Midwifery, 2**,** 2006, 33-42.

Papaioannou A, Morin S, Cheung A.M, Atkinson S, Brown J.P, Feldman S, Hanley D.A, Hodsman A, Jamal S.A & Kaiser S.M, clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. Canadian Medical Association Journal, 182**,** 2010. 1864-1873.

Rahimi F, Gharib A, Beyramijam M & Naseri O, Effect of self-care education on self efficacy in patients undergoing hemodialysis, Life Science Journal, 11**,** 2014, 136-140.

Rahnavard Z, Zolfaghari M, Hossein-Nezad A & Vahid Dastgerdi M, The incidence of osteoporotic Hip fracture: Iranian Multicenter osteoporosis study (IMOS), Res j Biol sci, 4**,** 2009, 171-3.

Rasolabadi M, Khaledi S, Khayati F, Kalhor M.M, Penjvini S & Gharib A, Scientific production of Medical Universities in the West of Iran, A scientometric analysis, Acta Informatica Medica, 23**,** 2015, 206-209.

Safizadeh M, Aminizadeh E & Safizadeh H, Awareness of osteoporosis among female employees in Kerman, Iran. Russian Open Medical Journal, 4, 2015.

Sayed-Hassan R, Bashour H & Koudsi A, Osteoporosis knowledge and attitudes: a cross-sectional study among female nursing school students in Damascus, Archives of osteoporosis, 8**,** 2013, 1-8.

Shepherd AJ, An overview of osteoporosis. Alternative therapies in health and medicine, 10**,** 2004, 26.

Terrio K & Auld GW, Osteoporosis knowledge, calcium intake, and weight-bearing physical activity in three age groups of women, Journal of Community Health, 27**,** 2002, 307-320.

Ungan M & Tümer M, Turkish women's knowledge of osteoporosis, Family practice, 18**,** 2001, 199-203.

Van Geel TA, Huntjens KM, Van Den Bergh J.P, Dinant G.J & Geusens P.P, Timing of subsequent fractures after an initial fracture, Current osteoporosis reports, 8**,** 2010, 118-122.

Von Hurst PR & Wham CA, Attitudes and knowledge about osteoporosis risk prevention, a survey of New Zealand women, Public Health Nutrition, 10, 2007, 747-753.

Werner P, Knowledge about osteoporosis, assessment, correlates and outcomes, Osteoporosis International, 16, 2005, 115-127.

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 Musculoskeletal Disorders, 4, 2003, 1.

Yu S & Huang YC, Knowledge of, attitudes toward, and activity to prevent osteoporosis among middle-aged and elderly women, Journal of nursing research, 11, 2003, 65-72.