Self-Empowerment of Female Students in Prevention of Osteoporosis

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Abstract

Background: Osteoporosis is a chronic disease affecting society, particularly women and girls. Osteoporosis is a chronic, multifactorial disease, which is currently prevalent as the life expectancy and aging population is increasing. The purpose of this study is to evaluate self-empowerment (knowledge, attitudes, life skills and self-efficacy) of female students for prevention of osteoporosis.

Methods: This study used a descriptive survey. Participants included 60 female students of Islamic Azad University, Sharekord. Data was collected by a researcher-made questionnaire measuring self-empowerment for prevention of osteoporosis. In addition to descriptive indicators, t-test and chi-square test were used to analyze data by SPSS software.

Results: Self-empowerment of female students, including attitude, social skills and self-efficacy, is optimal for prevention of osteoporosis. The mean of these three components is significantly higher than the assumed mean (3). However, their knowledge is not optimal. There is no significant difference in frequency of correct and incorrect responses.

Conclusion: Female students do not have adequate knowledge for prevention of osteoporosis and require training in this area.

Keywords: self-empowerment, attitudes, knowledge, self-efficacy, social skills, osteoporosis

1. Introduction

Health is a great wealth for people (Keshavarz-Mohamadi & Hoseyni, 2003). Over the recent decades, medical advances have been associated with increased longevity and life expectancy; however, industrialization and changes in life styles as well as environmental factors has caused changes in disease pattern (Hoseynnejad, 2003). Currently, researchers and planners are concerned with remarkable spread of chronic diseases in all countries and the change in epidemiological pattern of diseases in middle age and tendency toward chronic diseases (Davari, 2010). Osteoporosis is a chronic disease affecting society, particularly women (Ghaffari, 2010). Osteoporosis is the most common metabolic bone disease characterized by decreased bone mass and microstructural degradation of bone tissue. Currently, osteoporosis is increasingly prevalent due to the increase in life expectancy and aging population (Johnell, 1997). Osteoporosis is known as a major problem in public health, particularly women; osteoporosis becomes increasingly important as the average age of population increases (Ghaffari, 2010). The world's population over 60 years is expected to increase from 11% to 22% during 2000-2050. It is expected that the exact number of people aged 60 and older increase from 605 million to two billion in 2050 and the number of people aged 80 and older increase to 395 million by 2050 (Rizzoli et al., 2014). A significant increase is expected in the elderly population of developing countries, particularly Asia, by 2030. Changes in the population structure have raised concerns about a potential increase in cases of osteoporosis (Huang et al., 2014). World Health Organization reported osteoporosis as well as cancer, stroke and heart attack as the main enemy of humankind; statistically, annual mortality of osteoporosis is higher than that of cancer. According to various studies, a woman's lifetime risk of dying from osteoporosis is equal to, if not higher than, breast cancer and four times the risk of mortality from uterus cancer (Bazrafshan, 2012). According to studies, more than 200 million people worldwide are affected by osteoporosis (Reginster, 2006). Statistics show that about 10 million Americans suffer from osteoporosis and 34 million people suffer from bone loss (Ghaffari, 2010). The women are almost four

times more than men at risk for osteoporosis (Khoshnoudi, 2011). Nearly, half of the women aged 50 years and older are at the risk of osteoporosis (Woolf & Pfleger, 2003). In other words, one out of every three postmenopausal women is affected by osteoporosis (Khoshnoudi, 2011). Osteoporosis affects more than 22 million European women over the age of 50 years or, in other words, 22% of the female population in 2010. At the age of 50 years, life expectancy with a femoral head fracture is 7 to 25%, which involves 50% of major osteoporotic fractures among women in Europe. In 2010, 3.5 million new fragility fractures emerged (Rizzoli et al., 2014). In Iran, osteoporosis is highly prevalent (Pazhuhi, 2003). Statistically, 6 million Iranians are affected by osteoporosis (Abdoli, 2001). Overall, 50% of men over 50 years old and 70% of women over 50 years old suffer from osteoporosis and osteopenia (Pazhuhi, 2003). Primary studies of osteoporosis in Tehran Rheumatology Research Center showed that 6 million Iranians suffered from osteoporosis and 2.5 million out of 5 million postmenopausal women were affected by osteoporosis (Bolbol-Haghighi, 2012). A study conducted in several provinces of Iran found that 47% of women and 44% of men older than 50 years suffered from deficient bone density. Generally, one out of three women and one out of five men are affected by osteoporosis after age 50 (Iran Rheumatology Association, 2010). The 2003 slogan of the World Health Organization was "spend for your bones to avoid first fractures" (Khoshnoudi, 2011). Fractures are the most common and serious symptom of osteoporosis. Osteoporosis is responsible for 1.5 million fractures per year (Azizzade-Foruzi, 2009; Torshizi, 2007). The estimated annual cost of fractures caused by osteoporosis is 17 billion dollars (Huth, Dirienzo, & Miller, 2006). International studies show that more than half of the femoral head fractures will occur by 2050 in Asia due to the low bone mineral density of Asian women (Fujiwara, 2005).

In addition to economic costs, osteoporosis considerably influences one's quality of life and socio-psychological function (Black, Hokanson, & Knee, 2001). The anxiety caused by a lifetime chronic bone disease leads to depression, reduced social tasks, reduced independence in performing daily activities and finally reduced confidence. Changes in personal image are caused by loss of height, curvature of the spine, increased waist and belly bulge; this can lead to the loss of confidence (Torshizi, 2007).

On the other hand, lifestyle is a dynamic chain in all aspects of human life and plays an important role in health. In particular, the lifestyle associated with prevention of osteoporosis is of particular importance in adolescence and early adulthood; because more than 20% of longitudinal bone growth and about 50% of bone density occur in these periods (Paget et al., 2006). In general, bone formation is higher than bone degradation up to age 30; afterwards, this process is reversed by unknown reasons and bone degradation is higher than bone formation. Maximum bone mass is formed at early years of life until the late teens or early twenties (Khoshnoudi, 2011). Osteoporosis is a preventable disease; the easiest and cheapest way to deal with osteoporosis is to prevent and correct lifestyle and earn maximum bone mass (Delaun & Ladner, 2002). In all age groups, women are at higher risk of osteoporosis than men (4 times). Bone density of Iranian women is low compared to international standards. Considering the fact that women are key members of the society, it is essential to maintain their health and prevent osteoporosis (Gurney, 2007).

One of the ways to prevent osteoporosis is self-empowerment. A self-empowered person is able to act consciously and selectively. A set of individual and social factors are involved in self-empowerment (Rafieifar, 2005). Self-empowerment as the heart of health promotion is a dynamic and inclusive process by which people has more control on their decisions, lifestyles and activities effective on their health. Self-empowerment can be considered as a social action to increase individual and collective control and a set of individual and social behaviors (Safari, 2009). Self-empowerment leads to the increased self-control, self-confidence and self-efficacy. Self-empowerment is to cope with disabilities and trigger a sense of power and self-efficacy. Therefore, it is vital to promote self-empowerment among women to encounter rapid changes of societies (Moorhead & Griffin, 2008). Most definitions of self-empowerment are concerned about active participation and decision of the individual or people involved with the problem. According to Tones, self-empowerment refers to a situation in which one is actually able to choose, believes in the control and its practical role in health promotion and realistically controls his health and life by self-esteem and skills as a symbol of power. The purpose of self-empowerment is to increase self-control over life to promote health (Beyt-Saeed & Parandeh, 2013). Based on dynamics of the self-empowerment developed by Tones and Tillford, components of self-empowerment include self-concept and perceived locus of control as the most important components raised by Bandura. Bandura defines self-efficacy as one's confidence in his ability to organize and do a series of actions to achieve a specific goal (Rafieifar, 2005). People with strong self-efficacy believe that they can effectively control the events of their lives. This belief differentiates them from people with weak self-efficacy; because it directly influences their behaviors. Self-efficacy can be a vital factor in the success and failure throughout life (Bandura, 1999). Self-efficacy refers to one's confidence in empowerment of self-care behaviors in certain circumstances.

Self-efficacy highlights one's perceptions of his skills and abilities in successfully respectable performances (Schultz & Schultz, 2010).

Self-empowerment is a condition in which a person has approximately high rate of actual power, i.e. the power which is a potential and actual ability to choose. In short, an empowered and informed choice requires: 1) enough information on the subject (knowledge) for which one needs adequate health literacy, good, reliable and available information, and the skill to take advantage of health resources; 2) ability to act effectively (self-efficacy) which is ensured by perceived locus of control and self-concept; 3) the skills required to assess the situation, take a decision and act; 4) environmental support for a healthy behavior (Rafieifar, 2005).

There is no study conducted by self-empowerment model to prevent osteoporosis. Constructs of self-empowerment model can promote health in the society by improving knowledge, attitudes, self-efficacy, life skills, social support and empowerment to adopt self-care behaviors. This study evaluates self-empowerment of female students for osteoporosis preventive self-care using the relevant model.

2. Materials and Methods

The methodology used in this study is descriptive (non-trial) survey.

2.1 Population and Sample

The studied population included female students of Islamic Azad University, Shahrekord. A two-stage stratified random method was used for sampling. One class was randomly selected from each department; then, 15 to 20 female students per class were selected randomly. Finally, 60 female students participated in the study. Note that, informed consent was taken from subjects for their voluntary participation.

2.2 Materials

Self-empowerment for osteoporosis prevention: Given the fact that there is no standard inventory developed for constructs of self-empowerment model for osteoporosis prevention, a researcher-made inventory was used for this study. By extensive review of the standard materials related to the subject and health promotion literature, the researcher developed the inventory and tested its validity and reliability.

This questionnaire examines four components including knowledge, attitude, self-efficacy and life skills. Knowledge refers to awareness of participants regarding those factors which may or may not influence the risk of osteoporosis. Attitude refers to the tendency to change lifestyle involving diet and sports to prevent osteoporosis. Self-efficacy refers to one's ability to change his lifestyle in order to prevent osteoporosis. Skills involve behavioral and cognitive skills to prevent osteoporosis.

To determine content validity, the inventory was distributed among 10 experts (8 experts in health education and health promotion, 1 nutritionist and 1 orthopedist). To determine reliability, a test-retest was performed within two weeks; 30 female students were randomly selected as samples and asked to complete the questionnaire. After two weeks, the same students were asked to complete the questionnaires again. Reliability was confirmed by test-retest. Cronbach's alpha was used to examine internal consistency of constructs including knowledge (0.48), attitude (0.65), and self-efficacy (0.78) and life skills (0.82). The questionnaire is given in Appendix 1.

2.3 Data Analysis

Descriptive indicators (mean and standard deviation) as well as t-test and chi-square test were used to analyze data.

3. Results

Table 1 reports the mean and standard deviation of variables. Obviously, the mean scores of attitudes, self-efficacy and life skills are higher than the assumed mean (3).

Table 1. The mean and standard deviation of variables

Variable	Mean	Standard deviation
Knowledge	0.58	0.17
Attitude	4.38	0.37
Self-efficacy	4.16	0.48
Social skill	3.99	0.64

Table 2 lists the results for mean, one-sample t-test and significance of attitude. Obviously, t-value (28.68) is positive and significant at 0.001. Therefore, attitude of female students is optimal and significantly higher than the assumed mean (3).

Table 2. Attitude of female students

Mean	Std.	SEM	Mean difference	t-value	Df.	Sig.
4.38	0.37	0.05	1.38	28.68	59	0.001

Table 3 lists the results for mean, one-sample t-test and significance of self-efficacy. Obviously, t-value (18.67) is positive and significant at 0.001. Therefore, self-efficacy of female students is optimal and significantly higher than the assumed mean (3).

Table 3. Self-efficacy of female students

Mean	Std.	SEM	Mean difference	t-value	Df.	Sig.
4.16	0.48	0.06	1.16	18.67	59	0.001

Table 4 lists the results for mean, one-sample t-test and significance of life skills. Obviously, t-value (11.98) is positive and significant at 0.001. Therefore, life skills of female students are optimal and significantly higher than the assumed mean (3).

Table 4. Life skills of female students

Mean	Std.	SEM	Mean difference	t-value	Df.	Sig.
3.99	0.64	0.08	0.99	11.98	59	0.001

Chi-square test was used to evaluate the knowledge of female students in preventing osteoporosis. According to Table 5, chi-square (1.067) is not significant. Therefore, there is no significant difference in frequency of categories. The number of people with correct responses is not significantly higher than the number of people with incorrect responses. There is no significant difference in frequency of these two groups.

Table 5. Frequency and chi-square test for knowledge

Category	Frequency	Chi-square	Df.	Sig.
Correct response	34	1.067	1	0.302
Incorrect response	26			

4. Discussion and Conclusion

The purpose of this study was to evaluate self-empowerment of female students to prevent osteoporosis. The results showed that their attitude, social skills and self-efficacy were optimal to prevent osteoporosis, while their knowledge was not optimal.

Self-efficacy of female students was optimal and significantly higher than the assumed mean. Self-efficacy refers to one's belief in his ability to carry out successfully a series of actions required to achieve optimum results (Bandura, 1977). Self-efficacy is an essential element in the control of thoughts, feelings and actions of people associated with their progress (Gan, 2005). Self-efficacy is particularly important when encountering difficult tasks. People with high self-efficacy are less likely to abandon the task compared to students who are skeptical about their abilities (Alderman, 2004). In addition to the ability and the skills required to do tasks, people need a strong believe in their successful performance. This strong belief motivates people to do their tasks. In preventing osteoporosis, the girls with high self-efficacy can exercise even if it is difficult, can change their diet to foods rich in calcium and vitamin D, can adopt a proper diet to keep their weight in moderation, can limit their coffee consumption, can avoid smoke and places where tobacco is consumed; while girls with low self-efficacy

may not be able to react properly in these situations.

Attitude of female students was optimal. The girls with a positive attitude toward osteoporosis preventive behaviors such as regular physical activity and fitness, calcium and vitamin D intake, low coffee consumption are less likely to develop osteoporosis.

Life skills of female students were optimal and significantly higher than the assumed mean. Female students are able to take responsibility of their health in prevention of osteoporosis, to use the available information correctly for prevention of osteoporosis, obtain new information from various resources for prevention of osteoporosis, identify behaviors which are effective in prevention of osteoporosis and act properly, pay attention to nutritional value of their food, resist against people who encourage behaviors increasing the risk of osteoporosis. Life skills are a set of capabilities which facilitate adaptation and positive behavior. These capabilities enable people to accept responsibility of their social role and deal with demands, needs, expectations and problems of daily life effectively without hurting themselves and others. The set of life skills is an individual-focused approach to help people develop self-helping behaviors. This set assumes that people have strengths and weaknesses on skills necessary for life. The goal of life skills is to help people to help themselves. This means that people acquire new skills for life and feel a sense of commitment and responsibility.

Knowledge of female students was not optimal. The results showed a significant difference in frequency of people with correct responses and people with incorrect responses. This means that a large number of female students did not have sufficient knowledge about osteoporosis and its prevention and needed training in this field.

In conclusion, attitude, social skills and self-efficacy which are components of self-empowerment are optimal for female students. They have positive attitude toward osteoporosis preventive behaviors; their life skills and self-efficacy are at good levels. However, the results showed that a large number of female students do not have the information and knowledge about osteoporosis and need training in this field.

Therefore, training courses held in schools and universities for young female students to introduce proper nutrition and effective factors of osteoporosis as well as preventive behaviors and thus promotion of capabilities and skills can play an important role in reducing osteoporosis and its adverse social and economic consequences.

4.1 Limitation and Future Studies

The studied population here was female students at Islamic Azad University, Shahrekord; thus, cautions are required to generalize the results to other students. Moreover, the data are based on self-reported questionnaire. More qualitative and mixed methodologies are needed for future studies.

It is recommended to consider socioeconomic status of participants and compare the groups based on their socioeconomic status. These studies provide more information to present solutions for empowerment of women in order to prevent osteoporosis. It is recommended to use control and experiment groups in future studies and evaluate the role of training courses in improving behavior and knowledge of women.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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Appendix A

Personal empowerment questionnaire for osteoporosis prevention

1. Knowledge

The factors which may or may not influence the risk of osteoporosis are listed below. Please mark your answer to each of statements.

1. The diet with low amounts of diary:

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

2. The diet containing high amounts of dark green leafy vegetables:

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

3. A family member (e.g., mother, grandmother) with osteoporosis

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

4. Surgical removal of ovaries

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

5. Menopause

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

6. Regular physical activity

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

7. More than four cups of coffee intake a day

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

8. Not to be exposed to tobacco smoke

Increased risk of osteoporosis □   No effect on the risk of osteoporosis □

Reduced risk of osteoporosis □I do not know □

Mark your answer to the following multiple-choice questions:

9. Which one of the following physical activities is the best choice to reduce the risk of osteoporosis?

a) Swimming   b) Brisk walking   c) Household chores like washing dishes or clothes d) I do not know

10. In your opinion, how many days a week should be assigned to physical activity to strengthen bones?

a) Once a week b) Twice a week   c) Three days a week or more   d) I do not know

11. How long should a round of physical activity last to strengthen bones? (Minimum)

a) Less than 15 minutes   b) 20-30 minutes   c) over 45 minutes   d) I don not know

12. Which one of following foods is a good source of calcium?

a) Chicken   b) Broccoli   c) Grape   d) I do not know

13. Which one of following foods is a good source of vitamin D?

a) Cereals b) Diary   c) Fatty fish   d) I do not know

14. How much milk an adult should drink daily to receive calcium?

a) Half of the glass   b) One glass   c) More than two glass   d) I do not know

2. Attitude

1. Osteoporosis is a serious disease.

2. Osteoporosis is very costly.

3. I feel more joyful when I do regular physical activity for prevention of osteoporosis.

4. Physical activity both prevents osteoporosis and helps my fitness.

5. I have to take adequate calcium and vitamin D to prevent osteoporosis.

6. Reducing coffee intake reduces the risk of osteoporosis.

7. Avoiding tobacco smoke reduces the risk of osteoporosis.

8. Avoiding tobacco smoke reduces the risk of bone fracture.

3. Self-efficacy

1. I can do physical activity even if it is difficult.

2. I can change my diet to foods rich in calcium and vitamin D.

3. I can find foods that contain enough calcium and vitamin D.

4. I can adopt the suitable diet to keep my weight in moderation.

5. I can stay under the sunlight enough to absorb vitamin D.

6. I can reduce my coffee intake.

7. I can resist the temptation to drink coffee many times.

8. I can avoid tobacco smoke.

9. I can avoid places where tobacco is used.

10. I can resist the temptation of smoking.

4. Life skills

1. I can take responsibility for my own health in prevention of osteoporosis.

2. I properly use the information available for me for osteoporosis prevention.

3. I can find new information from different sources for prevention of osteoporosis.

4. I can identify behaviors effective in prevention of osteoporosis and correct my behavior.

5. I read labels of packed foods to know their nutritional value.

6. I can resist against demands of others to conduct behaviors which may increase the risk of osteoporosis.

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