What Are the Effective Health Literacy Skills in Adopting Walking Behavior to Prevent Osteoporosis?

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Research

Abstract

Background:

Considering the effect of exercise and health literacy in preventing osteoporosis, the effect of health literacy in adopting preventive behaviors, and the role of health volunteers in transferring the health messages to the community, this study aimed to determine the relationship between health literacy skills and adopting walking behavior to prevent osteoporosis in health volunteers.

Methods:

In a descriptive cross-sectional study, 290 health volunteers referring to Qazvin health centers in 1399 were selected through Multi-stage random sampling. Data were collected using a health literacy questionnaire (HELIA) and a questionnaire for the adoption of walking behaviors for the prevention of osteoporosis, and they were analyzed using descriptive statistics and logistic regression in SPSS software version 23.

Results:

The mean and standard deviation of the adoption of walking behaviors were 10.57 ± 1.43which was moderate. Age (P = 0.025, 1/098), decision-making skills and application of health information (P <0.001), perception (P = 0.037, 054/1 = OR) and evaluation (P = 0.029, 049 = OR) were factors affecting the adoption of this behavior, so that by increasing one score to these variables, the chance of adopting the behavior increased 135/1, 1.054 and 049/1 respectively. Also, the level of education was another effective factor in adopting this behavior, so that having a favorable level of adoption of this behavior in health volunteers with diploma degree (P = 0.017, OR = 0.736) and below diploma (011/0 = P, 960 = OR), were 0.736 and 0.960 times of those with university degrees respectively.

Conclusion:

To improve the adoption of walking behaviors to prevent osteoporosis, we should pay special attention to effective health literacy skills in the health volunteers.

Background:

Osteoporosis is one of the most influential chronic diseases in women's lives in a community [1, 2]. More than 200 million women have osteoporosis worldwide [3 and 4] and approximately one in 3 women and one in 12 men have osteoporosis [5 and 6]. Epidemiologically about 8 million women and 2 million men have osteoporosis in the United States [3]. According to the Tehran Rheumatology Research Center, over 6 million Iranians have osteoporosis [7 and 8]. The main cause of this disease is not yet known. Age, gender, genetic characteristics, smoking, diet, low physical activity, long-term Glucocorticoid intake, inadequate calcium intake, and vitamin D deficiency, and estrogen levels are considered as factors associated with bone density changes [4 and 8]. Although osteoporosis can be prevented and treated, it is

irreversible and can disable the patient. In addition to physical problems, it also imposes a lot of costs to these individuals and the health care systems in society [6 and 9]. Prevention of osteoporosis has several aspects, including nutrition, sports, lifestyle, and initial screening. WHO believes that women should be aware of a balanced diet such as vitamin D, calcium, and regular exercise exercises to prevent osteoporosis [10].

Although many people are aware of the benefits of physical activity for physical and psychological health, unfortunately, physical activity has decreased in recent years. In fact, physical activity is an effective factor in the incidence of some chronic diseases such as osteoporosis, diabetes, hypertension, cardiovascular disease, obesity, and overweight [11]. According to the World Health Organization, more than 60 percent of adults do not have enough physical activity to maintain their health [12]. Studies showed that health literacy could affect the levels of physical activity in individuals [11, 13–15]. Also, health literacy was one of the effective factors in the prevention of osteoporosis in women [16]. Considering the role of health literacy in adopting the health promotion activities and preventive behaviors, the role of health literacy on women's knowledge, and its impact on women's ability to pursue clinical care programs, it seems that increasing the health literacy in women can reduce the possibility of developing Osteoporosis in them. In other words, health literacy can be one of the most important factors in preventing osteoporosis among women by improving understanding, perception, and assessing the benefits of diagnostic and preventive behaviors [16]. According to some studies, health literacy is inadequate in women [18, 17].

Women's participation is one of the important factors in the success of health programs, which means total involvement of women in decision-making and implementation in health matters relating to the community. Accordingly, the "health volunteers" program was designed and implemented. The purpose of this plan, in addition to teaching the materials and skills necessary, is the transfer of health messages by them [19]. The health volunteers are housewives or employed women who volunteered to provide a variety of services, including health education, screening, and referral of individuals to health centers at the community level [20]. They have an important role in identifying risk factors, supporting and educating individuals to decrease their risky behaviors, and adopting proper lifestyles [21]. In fact, they act as bridges between the individuals and health centers, and their knowledge and behavior can affect the health of households and ultimately the whole society [22].

Despite numerous studies on the impact of health literacy in adopting different levels of exercise, most individuals ignore its role in adopting physical activity especially walking behavior. Therefore, due to the important role of exercise in preventing osteoporosis, the role of health literacy in adopting different levels of exercise [11 and 14 and 15], adopting preventive behaviors [10 and 23 and 24], and preventing osteoporosis [16 and 25] and the role of health volunteers in the transfer of health messages to the community [19] and the daily increase in of osteoporosis [26], this study aimed to determine the relationship between health literacy skills and adopting walking behavior to prevent osteoporosis in the health volunteers.

Methods:

This was a cross-sectional and descriptive-analytic study conducted among active health volunteers referring to health centers in Qazvin in 1399. Multi-stage random sampling was used so that the list of health centers in Qazvin was prepared and then it was divided into two parts of north and south. Then, two health centers were randomly selected in each section. Finally, health volunteers were randomly selected through a lottery in each health center.

According to the results of the pilot study in 30 health volunteers (r = 0.15 for the correlation between the adoption of walking behaviors to prevent osteoporosis and health literacy) as well as the sample size table for correlation studies, the minimum sample size was estimated to be 175 [27]. The sample size was estimated to be 263 considering DESIGN EFFECT = 1.5. Finally, to compensate for the probable loss of the samples, 290 people were enrolled in the study.

The inclusion criteria of the study were reading and writing literacy, Iranian citizenship, 18 to 65 years old, active as a health volunteer during the study, active presence in weekly or monthly volunteers' meetings in Health Centers, and informed written consent. Exclusion criteria were no unwillingness to continue the study and incomplete questionnaires.

The data collection instrument consisted of three parts: a) demographic and background information questionnaire including items about age, marital status, education level, address, weight, height, number of delivery, number of lactation, number of family members, and monthly family income.

B) To measure health literacy and its skills, the health literacy questionnaire for the urban population between 18–65 years old (HELIA) was used [28]. This questionnaire included 5 main skills (reading, access, understanding, evaluation and decision making, and use of health information) and 33 items. The scoring scale was based on 5 -score Likert, so that 5,4,3,2 and 1 were given to quite easy, easy, not easy and not hard, hard, and completely hard in reading items respectively. In 4 other health literacy skills, 5,4,3,2, and 1 were given to always, quite often, sometimes, rarely, and never respectively. To score the questionnaire, the raw score for each individual in each skill was obtained by the sum of his scores. Then, to convert this score to a zero to one hundred range, the raw scores minus the minimum possible raw score were divided by the maximum possible score minus the minimum possible score. Finally, to calculate the total score, scores of all skills (based on a range of zero to 100) were added and it was divided by the number of skills (number 5), so that 0 to 50, 50.1 to 66, 66.1 to 84, 84.1 to 100 were considered as inadequate health literacy, adequate health literacy, sufficient health literacy, and excellent health literacy respectively. The questionnaire had a favorable validity and acceptable reliability (The alpha Cronbach between 72–89%) [28]. In the present study, it was first pilot studied in 30 of the health volunteers and the alpha Cronbach coefficient were 0.85, 0.82, 0.79, 0.81, 0.76, and 0.79 for reading, access, understanding and perception, evaluation, the decision making and application of health information, and the whole questionnaire respectively.)

(C) Part three included measuring the adoption of walking behaviors to prevent osteoporosis. This section included 7 items and it measured the time spent on walking over the past week based on the given guanines. To score this part, zero, one, two, and three were given to no walking, light walking, average walking, and heavy walking respectively. Thus, the range of scores was between zero o 21. The validity of this part was more than 0.7 in the study of John and colleagues, and its reliability was above 0.79 by Cronbach's alpha coefficient (29, 26). it was also pilot studied in 30 of the health volunteers and its alpha Cronbach coefficient was 0.81. The rate of preventive behaviors was classified into three levels of poor (scores less than 50% of the total score), moderate (scores of 75 – 50% of the total score), and good (scores above 75% of the total score) [30]. Also, the preventive behaviors were classified into two levels of poor (scores less than 50% of the total score) and good (scores between 100 – 50% of the total score) [25 and 31], and they were used in the logistic regression in the study.

The research number was received from the Deputy of Research and Technology of Qazvin University of Medical Sciences (Ethics code: ir.qums.rec.1398.380) in coordination with selected health centers. The purpose of the study was explained for the health volunteers to get their written consent. The questionnaires were self-reported, and all health volunteers were asked to complete the questionnaires honestly. They were also assured that all the information requested would be secret and without the names of the individuals. Data were analyzed using descriptive statistics and logistic regression in SPSS version 23, and the significant level was less than 0.05.

Results:

After completing the questionnaire, 10 cases were excluded from the study due to incomplete c questionnaires, and 280 were included in the final analysis (response rate of 96.5%). The mean and standard deviation of the participant's age, height, and weight were 41.71 ± 3.57 years, 160.51 ± 6.27 cm, and 65.58 ± 5.89 Kg respectively. 25% (70) had university education, 55% (154) diplomas and 20% (56) were under diploma degrees. The average and standard deviation of the monthly income of the participants' families were 329782 ± 2858462. Also, the mean and standard deviation for the number of delivery, the number of lactation, and the number of family members of the participants were 2.32 ± 1.35 and 1.85 ± 1.14, and 3.55 ± 1.25 respectively. 71.4% (200 people) lived in the city and 28.6% (80) in villages, and 20.7% (58) were single and 79.3% (222 people) were married.

The mean and standard deviation of the adoption of preventive behaviors were 11.57 ± 1.43 out of 21 and it was moderate. The adoption of preventive behaviors was at poor, moderate, and good levels in 41.4% (116), 46.1% (129), and 12.5% (35) respectively. Also, the mean and standard deviation of health literacy score was 65.47 ± 12.54 out of 100 which was at a moderate level. Table 1 showed the mean and standard deviation of the five skills scores of health literacy and the total health literacy score in the health volunteers. The results showed that among the five skills of health literacy, understanding and accessing had the highest, and decision making and reading, and applying the health information had the lowest mean scores. (Table 1)

Table 1. Mean scores and Standard Deviations of health literacy skills in the health volunteers

	Mean(Standard Deviation)
Access	69/44(14/66)
Reading	65/87(14/37)
Perception and Understanding	75/17(15/14)
Evaluation	66/28(13/74)
Decision Making and health information Application	54/89(14/55)
Health Literacy	65/47(12/54)

Table 2 showed the results of logistic regression to determine the factors affecting the adoption of walking behaviors to prevent osteoporosis in the health volunteers. The results showed that age, level of education and decision-making skills and use of health information, understanding, and evaluating were the effective factors in adopting walking behaviors.

The level of education affected the adoption of poppy behaviors so that the chance of having a favorable level of adopting preventive behaviors in health volunteers with diploma (P = 0.016, OR = 0.736) and below diploma degrees (0.012 = P, OR = 0.960) were 0.736 and 0.960 respectively which were the same as those with university degrees. Also, the age (P = 0.034, 1/098), decision making and health information application (P < 0.001), perception (P = 0.031, 054/1 = OR), and evaluation (P = 0.049, 1.049) affected such behaviors so that by increasing a score to these variables' level, the chances of adopting walking behaviors increased by 098/11, 1.154 and 1.049 and 1.049 respectively. Meanwhile, other demographic and background variables and reading and access skills did not affect the adoption of walking behaviors (P < 0.05).

Table 2. Factors affecting the adoption of walking behaviors to prevent osteoporosis in health volunteers in the logistic regression test *

Variable		Regression Index Estimation	Odds Ratio (OR)	Standard Error (SE)	Wald statistic	P-value	P Value(0.95%) The Least Value	P Value(0.95%) The Most Value
Place of Residency	City	-	–	–	–	–	–	–
	Village	0/331	1/39	0/165	4/02	0/359	0/008	0/655
Education Level	University	-	–	–	–	.	–	–
	Diploma	-0/306	0/736	0/344	0/011	0/016	−0/712	0/64
	Below diploma	-0/036	0/96	0/34	0/011	0/012	−0/712	0/64
Marital Status Single		-	–	–	–	–	–	–
	Married	-0/010	0/99	0/029	0/125	0/654	−0/067	0/047
Monthly Family Income		0/007	1/007	0/006	1/086	0/258	−0/006	0/019
	Age	0/094	1/098	0/041	5/055	0/034	0/012	0/176
Number of Deliveries		-0/029	0/971	0/021	1/86	0/152	−0/07	0/013
	Height	-0/049	0/95	0/147	0/113	0/687	−0/337	0/239
	Weight	-0/010	0/99	0/029	0/125	0/413	−0/067	0/047
Number of lactating		-0/015	0/985	0/05	0/091	0/183	−0/115	0/084
Number of Family member		-0/044	0/956	0/035	1/581	0/254	−0/114	0/025
	Reading	0/033	1/033	0/04	0/689	0/186	−0/046	0/112
	Access	0/005	1/005	0/034	0/025	0/103	−0/062	0/073
	Perception	0/053	1/054	0/025	4/352	0/031	0/003	0/103
	Evaluation	0/048	1/049	0/0218	4/773	0/018	0/005	0/090
Decision Making and Application		0/127	1/135	0/031	16/514	<0/001	0/066	0/189

* Independent variables were entered concurrently into the logistic regression model

Discussion:

The study aimed to determine the relationship between health literacy skills and adopting walking behaviors to prevent osteoporosis in health volunteers.

The results showed that among the five skills of health literacy, understanding and access had the highest mean scores. These results are consistent with the results of Panahi et al. [32]. Also, in the studies of Panahi et al. [33], Glory et al. [34], and Ansari et al. [35] understanding had the highest mean score among health literacy skills. Moreover, these results are consistent with the results of the study of Mahmoudi and Taheri [36] in which access had the highest mean score. Since the participants were health volunteers in the present study, then it is likely that they had more access to health issues than other people. On the other hand, decision-making and use of health information and reading had the lowest scores in the present study two. These results are consistent with the results of Zia Pour and Kianpour [37], and the study of Panahi et al. in which decision making and health information application had the lowest mean scores [33]. However, these results are not consistent with the results of the study of Mahmoudi and Taheri [36], in which information evaluation skill had the lowest score. The possible reasons for this inconsistency are the participants' low level of health issues evaluation compared to the health volunteers in this study, the health volunteers' low accuracy in answering reading, decision making, and applying health information items, as well as the difference in health literacy level between the two groups.

Also, the results showed that health literacy level was moderate in the health volunteers. The results of the global study of Eftekhari and colleagues showed that the level of health literacy in health volunteers is low which is not consistent with the results of this study [38]. Considering the role of education level in increasing health literacy [39 and 40], One of the possible reasons for this inconsistency is that 61.5% of the health volunteers had elementary and upper elementary degrees and had lower health literacy levels compared to the participants of this study. Another reason can be the difference in the instruments used in both studies. Similarly, the study of Dehghankar and colleagues showed that health literacy level was moderate in female students [41].

The results showed that the adoption of walking behaviors was at a moderate level. In the study of Aligol et al. (42) and Bashiri Moosavi et al. (43), physical activity level was also moderate. Considering the moderate level of health literacy in the present study, as well as the relationship between health literacy and adopting preventive behaviors [25 and 31, 44 and 45], It was expected that the adoption of preventive behaviors was also at a moderate level.

Moreover, age affected the adoption of walking behavior to prevent osteoporosis. age also was one of the effective factors in adopting preventive behaviors in the study of Panahi et al. [25]. However, there was no significant relationship between age and adoption of preventive behaviors in Panahi et al., Hosseini et al. [46], Hossein et al. [47]. In fact, it seemed that with increasing age and increasing self-efficacy, people would have more successful experiences [49], due to the effect of self-efficacy on calcium and exercise (50) and the relationship between self-efficacy and health literacy [51].

Moreover, the results showed that the level of education was effective in adopting walking behaviors. These results were consistent with the results of Payman and colleagues [18] and Hernandez-rauda et al. [52]. Etehad Nezhad and colleagues' study showed that there was a relationship between the level of

women's education and the intake of calcium as preventive behaviors of osteoporosis [3]. In the study of Kani Jayhooni and colleagues, there was also a relationship between women's education and adopting preventive behavior [53]. The results of this part were inconsistent with the results of Panahi et al. [48] and Hosseini et al. [47]. One of the possible reasons for this discrepancy could be the younger age and lower health literacy level of the students compared to those of the health volunteers in the present study. It seemed that the higher their level of education, the more likely they are aware of health information and more likely to adopt preventive behaviors.

The results showed that decision-making skills and the use of health information, understanding, and evaluation skills were effective factors in adopting walking behaviors to prevent osteoporosis. In the studies of Panahi et al. [32] and Panahi et al. [33], decision-making skills and health information and evaluation were related to the adoption of preventive behaviors which is in line with these results. Martin et al. showed that perception and the use of information in decision-making were effective in treating behavior [54]. It can be concluded that health literacy is a set of skills, capabilities, and capacities in various dimensions. These skills and capacities emerge occasionally in obtaining medical and health information, reading, understanding, processing and interpretation, and decision making and the use of health information [39], and they can affect the adoption of preventive behaviors [55]. However, these skills and capacities have probably emerged in decision making and application of health information, understanding and evaluation skills and affected the adoption of preventive behaviors. Also, we can say that decision-making and the application of health information skills are somehow kinds of behavior themselves. Meanwhile, understanding and assessment were effective on the adoption of preventive behaviors due to the activities of the health volunteers and their presence in educational meetings in the health centers, and their transferring of these pieces of training to the households.

Conclusion:

In general, the results showed that we should pay attention to effective health literacy skills, especially in health volunteers to improve the adoption of walking behaviors to prevent osteoporosis. It seemed that the present study was the first study to determine the relationship between health literacy skills and adopting walking behaviors. It is suggested to use the findings of this study to design osteoporosis preventive interventions for health volunteers. The target group in this study was in Qazvin; therefore, the results of this study might not be generalized to other health volunteers. Moreover, it is suggested to replicate this study in the health volunteers of other cities as well as among different groups of women (in terms of education level, age, and living area). The most important limitation of this study was the lack of a specific instrument for measuring health literacy in osteoporosis. Moreover, ignoring other health skills related to health literacy such as self-efficacy, communication and calculation was another limitation of this study which could possibly study a wider and more comprehensive relationship between health literacy skills and adopting walking behaviors in osteoporosis. Ignoring cultural backgrounds and skills such as speaking, listening, and understanding basic and cultural knowledge of individuals was also another limitation of this study that should be paid attention to when measuring health literacy. In fact, they were also neglected in other instruments and studies. In addition, a relatively low number of

samples, sampling at the level of health centers, low number of related studies, and self-reported data collection were other limitations of this study.

Declarations:

Ethics approval and consent to participate

The ethical principles observed by the researchers included obtaining permission from the Ethics Committee of Qazvin University of Medical Sciences (Ethics code: ir.qums.rec.1398.380). In addition, written informed consent from all the participants were obtained and they were granted the right to withdraw from the study at any time. The principles of anonymity and confidentiality were applied and the participants were provided with the results upon their request.

Consent for publication

Consent was given to the participants so that their anonymity was not endangered

Availability of data and materials

The data that support the findings of this study are available from [Leila dehghankar] but restrictions apply to the availability of this data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [Leila dehghankar].

Competing interests

The authors declare no competing interests regarding the present study.

Authors' contributions

This study was designed by LD and RP, FS. LD, FS, RP wrote the proposal and LD and RP reviewed and modified it. MA, SK, and MSH performed the simulations of blindness. All authors have read and approved the manuscript.

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