

# The impact of Education on Modification of Lifestyle Personality Dimensions Associated with Osteoporosis in Female Students

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## ABSTRACT

**Background & aim:** Osteoporosis is considered as a chronic and progressive skeletal condition that might be associated with some alterations in lifestyle of different populations. Lifestyle of the students can highly affect the community due to the large young population in country. Therefore, the present study aimed to investigate the impact of education on modification of the lifestyle personality dimensions related to osteoporosis in female students.

**Methods:** This quasi-experimental trial was conducted on the female students of Islamic Azad University of Kazerun, Iran in 2016. Sampling was performed using multistage random method through which a total of 133 students were selected. Afterwards, the subjects were randomly assigned to the two groups of intervention and control. The intervention performed as weekly lectures during two months with 40 minute session in each domain. The participants filled out the demographic and Health Promoting Lifestyle Profile II questionnaires pre- and post-intervention, as well as two months later. All the data were analyzed by repeated measures analysis of variance (ANOVA) to assess the changes in lifestyle scores using SPSS software version 24.

**Results:** Results revealed that changes in the mean lifestyle scores regarding each of the related dimensions, including accountability, stress management, interpersonal support, and self-actualization were statistically significant in both groups. Moreover, the effect of time on improving accountability, stress management, and self-actualization was significant ( $P < 0.05$ ).

**Conclusion:** The Findings of this study demonstrated that educational intervention might enhance the personality dimensions that are related to lifestyle and play role in prevention from osteoporosis. Consequently, it could be concluded that the training programs in this regard should be taken into consideration in policy making issues. Further studies on other aspects and health behaviors can be of great benefit and are recommended.

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## Introduction

Osteoporosis is a chronic and progressive skeletal condition characterized by low bone density causing a high risk of fracture in the affected people (1, 2). The risk of death in

women with osteoporosis is at least equal to breast cancer and four times higher than ovarian cancer. Osteoporosis affects 50% of the women over 50 years old in the US (3).

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Moreover, one out of every three women and one out of 12 men aged over 50 years in the UK are affected by osteoporosis (4). Some studies carried out in Iran reported 2.5 million cases of osteoporosis among 5 million postmenopausal women (5). The major complication associated with osteoporosis is bone fracture, especially hip fracture, which most commonly occurs in the upper hip close to hip joint requiring hospitalization and surgery. Such fractures are accompanied by various complications, including disability and dependence on assistance of others. Mortality rate may reach 20% after a year from hip fracture (6).

Considering the fractures that demand care and rehabilitation, complications associated with osteoporosis impose a high health costs on patients and government as well. Prevalence of osteoporosis is rising almost rapidly; however, the exact rate and expenses are not known yet in Iran (5, 7). Given that osteoporosis is among the most common bone diseases in Iran leading to high mortality and costs in community, raising awareness especially in young girls who are known as the high-risk group seems to be a very effective strategy (8).

Gender, overage, short stature, Asian white race, and family history are among the prominent risk factors for osteoporosis. Other risk factors include sex hormone changes, anorexia, vitamin D and calcium deficiencies, medication usage, physical inactivity, smoking, and alcohol consumption (9).

Distinct studies report that most changes in bone density are influenced by lifestyle due to the influence through biological and psychological factors. In other words, lifestyle is based on recognizable patterns of behavior derived from interplay between the personality traits, psychosocial interactions, and economic conditions of an individual (10).

Health behaviors address different dimensions, such as interpersonal relationships, health accountability, and self-actualization. Interpersonal relationships are known as a network of interpersonal communication providing assistance, accompaniment, and emotional nourishment. Moreover, health accountability could be defined as people responsibility for their health

and is determined by a wide range of self-care activities. Self-actualization is regarded as the attitude of an individual toward life and an internal force referring to development of positive behaviors.

In addition, stress management, nutritional habits, and physical activity could also be considered under the umbrella of health behaviors. Stress management is identifying the sources of stress, as well as getting familiarized with ways and strategies to deal with it. Furthermore, pursuing a regular sport pattern that supports the quality of life is important in terms of physical activity (11).

Although developed osteoporosis cannot be restored to normal condition, some measures, if taken on time, are helpful in prevention from progression in majority of people (8). Several studies in Iran have demonstrated the association between lifestyle and osteoporosis-related influential factors (12-14). Obviously, lifestyle affects all aspects of life as a dynamic chain and plays a critical role in health. In particular, lifestyle during adolescence and early adulthood is of great significance in osteoporosis prevention. This importance can be attributed to 20% longitudinal bone growth and 50% bone mass formation within these stages of life (15).

More than 30% of the Iranian population constitutes of women aged 14-45 years. The increased role of women in the society and workplaces has changed their activities, lifestyle, and family patterns (16, 17). In this regard, students form a large portion of young population in the country. Moreover, age and social status of the students as a well-educated community can make them a model for others. Therefore, selection of any lifestyle by this group not only affects their own personal lives, but also influences the behaviors and lifestyle of other community classes.

Consequently, health-promoting lifestyle in this group can be highly crucial and may promote the issues related to health, family, and society (18). Such studies also express that the educational programs could remarkably improve knowledge of young people and their attitudes (8, 19, 20).

As a result, implementation of an educational intervention for this group of

community is highly suggested. With this background in mind, the present study aimed to investigate the effect of training on personality dimensions concerning lifestyle modification in female students.

## Materials and Methods

This quasi-experimental trial was conducted on the female students of Islamic Azad University of Kazeroon, Iran in 2016. A total of 133 students were selected as the participants and were assigned to the two groups of intervention and control.

The sample size was obtained with a 95% confidence interval and 0.5% error. Afterwards, the subjects were divided as 58 people for each of the test and control groups. Based on the results of the pilot study, the mean total score of the lifestyle questionnaire in the case and control groups was  $18.4 \pm 3.1$  and  $15.5 \pm 4.1$ , respectively.

To determine the sample size, we used the formula for comparing two means from two independent samples based on Cohen's effect size (21). As a result, the size of each group was determined as 58 individuals and considering an 18% dropout rate, the final size was determined as 68 participants.

Sampling was performed using multistage random sampling method. First, four educational groups of Literature, Law, Psychology, and Islamic Education were randomly selected from the educational departments of Islamic Azad University of Kazeroon in order to recruit the subjects for the intervention group. In addition, four groups of Mathematics and Physics, Chemistry, Mechanics, as well as Computer were considered as the control group. Next, a class with at least 30 students was selected based on random numbers from each of these groups.

The inclusion criteria entailed being female, age of 18-35 years, completion of the consent form, not to be the last term student, and not to change the residence location during the study. The exclusion criteria encompassed failure to complete the form, unwillingness to continue the study, and absence in class meetings.

Prior to training intervention, the participants of both intervention and control groups completed the consent forms, in addition to demographic data and Health Promoting Lifestyle Profile II (HPLP-II) questionnaires. The validity and reliability of the latter questionnaire

were approved in Iran (22).

The intervention was then performed as weekly lectures during two months with 40 minute session in each domain. It should be noted that accountability for health condition and stress management were discussed by a health education specialist in two sessions using PowerPoint presentation and a psychologist in a meeting. Moreover, peer inter-individual support was completed in a lecture session given by a psychiatrist. Afterwards, two discussion sessions were held under the supervision of an expert on health education.

In addition, self-actualization was trained through distributing pamphlets, as well as lectures and group discussions under the supervision of a health education specialist. At the end of the course, the educational package, including a CD and a training booklet were delivered to the subjects.

Following accomplishment of the intervention, the HPLP-II questionnaire was filled by the participants in both groups. Therefore, changes in the knowledge levels of the participants and their attitudes towards the above-mentioned variables were investigated. After two months, the same questionnaire was completed by the study groups in order to assess the alterations in their respective behaviors.

Due to the positive effect of the intervention, a training course was also conducted for the control group at the end of the study according to the program practiced for the test group. Three people in the intervention group did not complete the questionnaires. Therefore, the final data analysis was performed on 65 participants in the intervention group and 68 in the control group.

The absolute and relative frequency, as well as the mean and standard deviation were calculated to describe the data. To compare the demographic characteristics of the students, Chi-square test was used. In addition, repeated measures analysis of variance (ANOVA) was applied to assess changes in lifestyle scores. All the data were statistically analyzed using SPSS software version 24 and  $P < 0.05$  was considered as significant. Normality of data distribution was evaluated using Shapiro-Wilk test.

**Results**

According to the findings of this study, the mean age of all the participants was 20.41±1.36 years. Moreover, the mean age was 20.43±1.35 and 20.49±1.37 years in the test and control groups, respectively. There was no significant

difference between the two groups regarding the mean age (P=0.534). Furthermore, 76.7% of the participants were single, 31.6% had job, and 25.6% were physically active. A summary of the demographic characteristics of the individuals in this study is presented in Table 1.

**Table 1.** Demographic characteristics of the participants

		Frequency (%)		Total	P-value*
		Intervention group	Control group		
	Unmarried/single	52 (80)	50 (73.5)	102 (76.7)	
<b>Marital status</b>	Married	13 (20)	18 (26.5)	31 (23.3)	0.378
	Total	65	68	133	
<b>Occupation</b>	University student	44 (67.7)	47 (69.1)	91 (68.4)	0.86
	With job	21 (32.3)	21 (30.9)	42 (31.6)	
	Total	65	68	133	
<b>Family income</b>	Low	5 (7.7)	8 (11.8)	13 (9.8)	0.718
	Average	38 (58.5)	39 (57.4)	77 (57.9)	
	High	22 (33.8)	21 (30.9)	43 (32.3)	
<b>Accommodation</b>	Total	65	68	133	0.858
	Owner	23 (35.4)	21 (30.9)	44 (33.1)	
	Rental	35 (53.8)	39 (57.4)	74 (55.6)	
<b>Physical activity</b>	Quarter	7 (10.8)	8 (11.8)	15 (11.3)	0.806
	Total	65	68	133	
	No	49 (75.4)	50 (73.5)	99 (74.4)	
<b>Smoking</b>	Yes	16 (24.6)	18 (26.5)	34 (25.6)	0.606
	Total	65	68	133	
	No	53 (81.5)	53 (77.9)	106 (79.7)	
	Yes	12 (18.5)	15 (22.1)	27 (20.3)	
	Total	65	68	133	

\*P < 0.05 is significant

The results of repeated measures ANOVA showed that changes in the mean scores of HPLP-II questionnaire in each aspect, namely

accountability, stress management, interpersonal support, and self-actualization were statistically significant in both groups (P <

0.05). In addition, the effect of time on the features of accountability, stress management, and self-actualization was significant ( $P < 0.05$ ).

On the other hand, the interactions between time and group concerning the total score of HPLP-II questionnaire and scores of the

different dimensions were not statistically significant ( $P > 0.05$ ). Sphericity as an assumption of repeated measures ANOVA was verified by Mauchly's test of sphericity. Table 2 provides detailed information on these issues.

**Table 2.** Comparison of the scores of HPLP-II questionnaire pre-intervention, immediately post-intervention, and two months post-intervention

	group	Mean (SD) pre-intervention	Mean (SD) post-intervention	Mean (SD) two months post-intervention	P-value effect of group	P-value Effect of the time
<b>Accountability</b>	Case	15.08 (1.5)	16.51 (4.99)	17.23 (3.93)	< 0.001*	< 0.001*
	Control	14.97 (1.65)	15.07 (3.8)	15.34 (3.27)		
<b>stress management</b>	Case	10.42 (1.31)	13.28 (4.31)	12.8 (3.73)	< 0.001*	< 0.001*
	Control	10.46 (66.1)	10.65 (3.49)	10.87 (3.09)		
<b>Peer inter-individual support</b>	Case	17.08 (2.75)	18.63 (5)	18.14 (4.06)	0.005*	0.318
	Control	17.25 (2.75)	16.97 (4.12)	16.5 (3.75)		
<b>Self-actualization</b>	Case	17.78 (2.85)	21.62 (6.26)	17.32 (4.55)	< 0.001*	< 0.001*
	Control	17.35 (2.83)	17.35 (5.27)	16.65 (4.1)		

\* $P < 0.05$  is significant

## Discussion

The results obtained in this study indicated that the educational intervention had a positive effect on awareness of the participants in the intervention group. Moreover, it was revealed that attitudes toward osteoporosis prevention aspects related to personal lifestyle changed in the test group, compared to the control group.

Different studies on high school girls (8) and health staff dealing with women, as well as some other studies (23, 24) support our findings. In this respect, some investigations demonstrated the impact of the intervention on awareness, elimination of physical activity hindering factors, and self-efficacy on calcium intake and physical activity, which are helpful for osteoporosis prevention (24, 25). This reflects the importance of comprehensive counseling and education in lifestyle and primary health care for the youth population and others.

Regarding accountability and stress management, there was a significant increase considering the impact of group and time.

Therefore, correct execution of the training program can lead to enhanced sense of responsibility in women for their health, as well as stress management associated with osteoporosis. The literature shows that osteoporosis is not a single factor issue in women and is multi-dimensional. Health promotion programs in the media and taking into consideration the importance of family role, especially men, provides conditions and infrastructures to empower self-care behaviors in women and patients (24, 26).

Consistent with the present study, an investigation on the influence of life skills training on responsibility and self-esteem of female students revealed significant augmentations in the experimental group, compared to the control group (27). In general, improving women education results in their empowerment and health enhancement.

In terms of interpersonal support, there was a significant difference between the two



intervention and control groups; however, the effect of the time on this area was not significant. Learning alone is not enough for improving interpersonal support and social aspects of the problem are important to get emphasized.

Moreover, another study revealed the effect of educational intervention on social protection and prevention from osteoporosis (28). Full cooperation of the government, policymakers, society, in addition to men and women themselves in establishing a health-based lifestyle will create attitudes that promote healthy behaviors.

Concerning self-actualization, results of the two groups were significantly different post-intervention. In this regard, the effect of time also indicated a significant difference. A study reported the efficacy of trainings for osteoporosis prevention in raising self-efficacy and taking calcium (29). In addition, another study considered self-efficacy as an influential factor in osteoporosis prevention (3).

According to humanistic psychologists, the most remarkable motivation that governs the behavior of people is self-actualization (30). Consequently, given the role of self-actualization and self-efficacy in conducting health behaviors, designing programs that enhance these factors seems to be necessary.

In fact, this study demonstrated a significant effect for educational intervention on improving the personality dimensions of lifestyle for osteoporosis prevention. Other studies also showed the impact of training on lifestyle modification in terms of preventing osteoporosis (31, 32). In addition, trainings were found to be beneficial in improving the knowledge and lifestyle of the osteoporosis patients with a bone fracture (33). Furthermore, awareness and self-efficacy in terms of increased calcium consumption were shown to get enhanced in high school girls following educational programs (34).

Finally, some essential factors can facilitate a common framework for health promotion and primary prevention in the cycle of life, harmonizing the integration of the common framework in the portfolio of the National Health System services. As a result, other sectors of the society get actively involved promoting participation of individuals and population in

order to raise the autonomy and capacity to have a greater control over their own behavior and health.

Other educational resources, such as television and radio were probable to influence the level of awareness in the students during the study regarding the quality of life. We tried to minimize the latter issue by limiting the duration of the study. The strength point of this study was application of clinical trials and cohort study method. Not being blind could be considered as a limitation for the current study; however, it was not possible and the authors attempted to control this problem by shortening the study duration.

## Conclusion

According to the results of this study, educational intervention had a positive effect on personality dimensions of lifestyle modification associated with osteoporosis among female students. Therefore, it can be suggested that education aimed at lifestyle improvement in young women can greatly diminish the incidence of osteoporosis, which threatens the community health during later stages of life.

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## Conflicts of interest

The authors declare no conflicts of interest.

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