Comparing the Effect of Lecturing and Mobile Phone Short Message Service (SMS), Based on the Theory of Planned Behavior on Improving Nutritional Behaviors of High School Students in the Prevention of Osteoporosis

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Abstract

Background: Osteoporosis is a common increasing disease on which the lifestyle has an important role. This study aimed to examine the two educational methods (lecture and texting) using the theory of planned behavior on improving the osteoporosis preventive nutritional behaviors in high school students.

Materials and Methods: This semi-experimental study conducted on 138 female students in who were randomly assigned to three groups (intervention group (Lecture), intervention group (mobile phone short message service [SMS]), and control group, with equal group of 46 people. The data collection tool was a researcher made questionnaire consisting of three parts; part A consists of demographic questions, part B consists of questions based on the theory of planned behavior, and part C was the Food frequency questionnaire (FFQ). The questionnaire was completed by students three times of before, immediately after, and two months after the intervention.

Results: There was no statistically significant difference in the mean of preventive nutritional behavior scores between the three groups before the intervention. But immediately after the intervention, and two months after that, a significant difference was observed between the mean scores of the preventive nutritional behaviors in the intervention and control groups (P<0.05). Also, the mean scores of preventive nutritional behavior in the two intervention groups, significantly increased in the three steps (P<0.05).

Conclusion: The text message method (mobile phone SMS) had a better impact on the improvement of the osteoporosis preventive nutritional behavior than the lecturing method. So considering the new generation tends to the use of today's technology as well as principles of education based on the use of innovative methods, is more effective and affordable.

Key Words: Nutritional behavior, Theory of planned behavior, Osteoporosis, SMS, Students.

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1- INTRODUCTION

Osteoporosis is the silent disease of the present era in which the bone mass is gradually destroyed and the bones are easily broken. The death risk of this disease during the life of a woman is equal to that of the breast cancer, and almost four times as that of uterus cancer (1). The World Health Organization (WHO) has named osteoporosis, along with cancer, heart and brain attack as the main enemies of the mankind (2). Osteoporosis is also stated as the most important cause of bone fracture in the world (3). In Iran, almost 34,000 years of the useful life is lost due to the osteoporosis, and approximately one from each three females, and one from each twelve males suffers from osteoporosis, and over six million Iranians are now with osteoporosis. In Iran, prevalence of osteoporosis is four times as that of men (4).

Enhancing the maximum bone mineral density during adolescence is the most important factor in the primary prevention of osteoporosis. On the other hand, adolescence is the beginning of bad food habits, skipping of meals, turning to fast food, smoking and following weight loss diets, especially among girls (5). Various factors have been identified as risk factors of this disease such as poor nutrition and lack of calcium and lack of daily appropriate physical activity (6). In this regard, the girls seem more important than boys, because girls are future mothers and many of the diet concepts are obtained in this age by them, and they will affect not only their health, but also their infants and families in the future (7). However, osteoporosis is preventable and the simplest prevention is teaching preventive behaviors (8). In the lecture method, the information is directly passed to the learner from the teacher. In this method, the teacher presents the information to the learner verbally or using a variety of teaching techniques and communication

tools (9). Mobile phone (cell phone), is one the multimedia which as a method of communication and service, despite its very short history, has become the context of various communication, training, and marketing services through its influence and attraction among users (10). The most important and most central question raised by the health education specialist is that in what circumstances does the education leaves a profound impact so that these effects literally create new behaviors and thereby maintain and improve the health of communities (11). Theory of Planned Behavior provides a framework for regular and substantive investigation of issues related to decision for a behavior. In accordance with this theory, the most important determinants of individual behavior are his/her intention. Intention is the result of three factors of attitude, subjective norm, and perceived behavioral control. The person's belief to the results of his evaluation and behavior leads to the formation of attitudes. Some behavioral beliefs come directly from one's own experiences; some come from obtaining information, and some others from direct experience of others.

Attitude toward behavior is the reflection of the outcome of person's positive or negative evaluation in adopting that behavior. The perceived behavior control means the degree of the person's feelings about the fact that how much control one has on doing or not doing a behavior. The perceived control behavior, both directly and indirectly may affect the behavior through intention. The structure is influenced by the opinion of the person about the ease or difficulty of the behavior and is often induced by the actual control on the behavior (12). Among the researches carried out in Iran in the field of osteoporosis nutritional preventive behaviors, inspired by the patterns of behavior change, to study by Ghaffari et al. (3), as well as the study by Amini et al.

(13) could be mentioned as the most outstanding studies. However, these studies faced some limitations, because various educational methods were used in the study by Ghaffari et al., so it was not clear which method was more effective and the study by Amini et al. (13) was the effect of education on knowledge, attitude and behavior which was not based on a specific behavior pattern. Other studies had also often traditional education process. The lack of a proper educational model, providing educational content without compliance with psychological needs, and weaknesses in the methods and materials used in educational interventions on osteoporosis in the country, were good reasons to conduct a new study using practical theories and comparison of teaching methods. Therefore, the aim of this study was to examine the two educational methods (lecture and mobile phone SMS) using the theory of planned behavior on improving the osteoporosis preventive nutritional behaviors in female high school students.

2- MATERIALS AND METHODS

2-1. Method

This study is a semi-experimental study; conducted among female students (16-17 year old) in district 5 of Mashhad Education (Mashhad city, Iran) during 2016-17. To estimate the sample size in this study, based on sampling formula of comparison between two independent groups and taking into account the mean test power of 80% and 95% confidence level (CI), also mean values and standard deviations from the study by Ghaffari et al. (3), the number of each group was determined as 42 persons, where by calculating 10% drop in the samples, the sample size for each group was considered as 46 persons (a total of 138 for the three groups). Samples were selected using multi-phase random sampling method. So that first, district 5 was randomly chosen

among the seven districts of Mashhad education, then a list of public high schools for girls in district 5 was developed and 3 high schools were randomly selected, again two high schools were randomly selected from the three for the intervention groups (an intervention group with lecture method, and another intervention group with mobile phone SMS method), and a high school as the control group. In every school, 46 persons from second grade students were randomly selected based on the sample size. The information were gathered in three phases of before the intervention, immediately after and two months after the intervention, using a researcher made questionnaire consisting of three parts; part A consists of demographic questions, part B consists of questions based on the theory of planned behavior, and part C was the Food frequency questionnaire (FFQ).

In this study, the scale was examined from the perspectives of validity, content and reliability (Cronbach's alpha of 0.81). The first part of the questionnaire included 11 questions related to the demographic information, which consisted of individual and family information, such as age, number of family members, father's education, mother's education, father's occupation, mother's occupation, average family income, and family history of a disease. The second part of the questionnaire included 4 structures related to assessment of the structures of the theory of planned behavior (attitude, subjective norms, behavioral planned control, behavioral intention), where the assessment of the individual attitude structure about osteoporosis and osteoporosis preventive nutritional behaviors, included 11 specific questions with 5-choice Likert scale (strongly agree, agree, no idea, disagree, strongly disagree). Each was given a score of 1 to 5; where in total, it was a variable between 11 and 55. Assessing the structure of

subjective norm on osteoporosis preventive nutritional behaviors included 5 specific questions with 5-choice Likert scale (strongly agree, agree, no idea, disagree, and strongly disagree). Each phrase was given a score between 1 and 5; a total variable of 5 to 25. Assessing the structure of perceived control behavior, about osteoporosis preventive nutritional behaviors included 6 specific questions with 5-choice Likert scale (strongly agree, agree, no idea, disagree, and strongly disagree). Each statement was given a score of 1 to 5; totally varying from a score of 6 to 30. Assessment the structure of the behavioral intention, about the osteoporosis preventive nutritional behaviors, contained of 7 specific questions with 5-choice Likert scale (strongly agree, agree, no idea, disagree, and strongly disagree); each statement was given a score between 1 and 5; totally varying from a score of 7 to 35. The third part of the standard FFQ included 31 statements of nutrition. The 7 nutrition groups include bread, milk and dairy, meat, eggs, beans, vegetables, fruits and drinks, and salt; which was used by the choices of the frequency of consumption per day, the frequency of consumption per week, and the frequency of consumption per month, and I do not used at all for the assessment of the food intake of calcium and vitamin D (according to the ingredient table), and the nutrition intake which interfere with the absorption of calcium.

Educational content was provided based on the needs derived from analysis of the questionnaires completed in the first phase and based on the theory of planned behavior and the training program was held in 4 sessions of 60 minutes for the test groups with lecture (by MSc in health education and nutrition expert) for a month and at the same time, every day at 5 pm a message was sent to the intervention group with SMS during the one month. A total of 50 SMS messages were sent to the second intervention group. Also, there was no educational intervention for the control group. Administrative process of the study was conducted by the coordination of the University of Medical Sciences and the Department of Education of Khorasan Razavi. For moral considerations, the purpose and nature of the research was explained for students and their families; so the study was voluntary. Subjects were assured of confidentiality of information. The right to dissuasion was granted for the subjects. Permissions to have the phone number of the subjects so as to send the educational messages were obtained.

2-2. Inclusion and exclusion criteria

Inclusion criteria in this study, were female students in high schools in district 5 of education of Mashhad, aged 16 and 17 year-old, inclined to participate in the study, and exclusion criteria were absence of more than one session in training sessions, not wanting to continue with the study for any reason, occurrence of any event so that subjects could not further participate in the study like migration, marriage, accident and death etc.

2-3. Data Analysis

After filling the questionnaires by the subjects of the intervention and control and groups, data were analyzed using SPSS software version 20.0. To determine normality of the variables, the Kolmogorov-Smirnov test was used and based on its results, given the abnormality of the data, nonparametric tests were used. In the descriptive statistics, the descriptive statistics index from the absolute and relative frequency distribution was used for quantitative variables. To determine the relationship between variables, theSpearman correlation coefficient (given the abnormality of the data) was used, and for the data analysis, nonparametric equivalent tests of Mann Whitney, Kruskal-Wallis, and Friedman were used.

In the tests conducted, the significance level was considered as P <0.05.

3- RESULTS

One hundred and thirty-eight students of second grade high school girls of Mashhad city participated in this study (in three groups, two interventional groups and one control group, 46 persons in each group). In total, the average age of the research units was 16.2±0.41 years, and the Kruskal-Wallis test showed no significant difference among the three groups (p=0.337). **Table.1** of Chi-square test results showed that the three study groups had no significant difference in terms of underlying and demographic variables (family size, parental education, occupation and family income) (p>0.05).

Table-1: The comparison of demographic characteristics of research units divided in the three groups

Demographic variables	Variable levels	Lecture Group		SMS phone Group		Control group		P-value
		Number	Percent	Number	Percent	Number	Percent	
Family size	Member < 4	28	60.9	32	69.6	32	69.6	0.841
	Member > 4	18	39.1	14	31.4	14	31.4	
Father's education	Diploma or under diploma	26	56.52	32	69.56	30	60.87	0.051
	University	20	43.48	14	30.44	16	39.13	
Mother's education	Diploma or under diploma	25	54.4	21	63	28	61.6	0.054
	University	21	45.6	17	37	18	38.4	
Father's occupation	Employee	10	21.7	7	15.2	5	10.9	0.964
	Free	36	78.3	39	84.8	41	89.1	
Mother's occupation	Practitioner	42	91.3	41	93.5	39	84.8	0.392
	Housewife	4	8.7	5	6.5	7	15.2	
Income Family	Appropriate	23	50	19	41.3	24	52.2	0.113
	Inappropriate	23	50	27	58.7	22	47.8	

The Kruskal-Wallis test showed that before the educational intervention in the investigated variables (attitude, subjective norms, behavioral intention, perceived control behavior), there was no significant difference between the three groups (2 experimental groups and one control group) (**Table.2**). Also, the Kruskal-Wallis test showed that before the intervention there was no significant difference between the mean scores of attitude (p=0.821), intention (p=0.981), subjective norms (p=0.631), perceived control behavior (p=0.741) in the three groups. But immediately after the interventions, and 2 months after the intervention, a significant difference was observed between mean scores of attitude, behavior, subjective norms, and perceived behavioral control, of two intervention groups and the control group (p<0.05). Results of the Friedman test showed that the mean score of attitude, behavioral intention, subjective norms, and perceived behavioral control in the two intervention groups (lecture , SMS phone) had a significant difference in the three phases before the education, immediately and after 2 months, after the education (p<0.05), but in the control group, the mean scores of attitude, behavioral intention, subjective norms, and perceived behavioral control did not increase in the three levels (P>0.05) (**Table.2**).

Table-2: Comparison of mean scores of attitude, behavioral intention, subjective norm, and perceived behavioral control in three phases: before, immediately after and two months after the educational intervention in the control and intervention groups

Variables	Groups	Before the intervention Mean± SD	Immediately after the intervention Mean± SD	Two months after the intervention Mean± SD	P- value*
Attitude	Lecture Group	39.82 ± 3.5	44.82 ± 2.9	44.82 ± 2.9	P<0.001
	SMS phone Group	40.1 ± 4.2	48.36 ± 3.4	48.37 ± 3.5	P<0.001
	control group	40.4 ± 3.9	40.54 ± 3.85	40.46 ± 3.7	P= 0.071
	P- value**	P= 0.821	P<0.001	P<0.001	
Behavioral intention	Lecture Group	23.95 ± 5.15	29.23 ± 3.80	29.76 ± 3.34	P<0.001
	SMS phone Group	24.56 ± 3.69	30.80 ± 3.35	31.34 ± 2.91	P<0.001
	control group	24.43 ± 4.77	24.67 ± 4.78	24.67 ± 4.73	P= 0.071
	P- value**	P= 0.981	P<0.001	P<0.001	
Subjective Norms	Lecture Group	16.71 ± 5.17	19.21 ± 2.02	19.41 ± 1.90	P<0.001
	SMS phone Group	17.86 ± 3.41	20.04 ± 2.45	20.47 ± 2.39	P<0.001
	control group	17.02 ± 4.55	17.43 ± 4.22	17.24 ± 4.09	P= 0.082
	P- value**	P= 0.631	P= 0.002	P<0.001	
Perceived behavioral control	Lecture Group	23.52 ± 4.64	25.78 ± 3.62	26.08 ± 3.28	P<0.001
	SMS phone Group	24.17 ± 4.31	25.45 ± 3.17	25.91 ± 2.58	P= 0.042
	control group	23.76 ± 4.39	24 ± 4.2	23.85 ± 4.19	P= 0.065
	P- value**	P=0.741	P= 0.041	P= 0.012	

*Friedman Test; **Kruskal-Wallis Test.

According to **Table.3**, the Kruskal-Wallis test showed that before intervention, there was no significant difference between the mean scores of preventive nutritional behavior (P=0.832), and predisposing factors (P = 0.071) in the three groups, but immediately after the intervention and two months later, a significant difference was observed in the mean scores of preventive and predisposing nutritional behavior between the intervention groups and the control group (P<0.001). Friedman test results showed that the mean scores of preventive nutritional behavior has significantly increased in all the three groups in the three phases (P<0.001). The mean difference of the preventive nutritional behavior, before and two months later is 2.47 in the lecture group, and 4.32 in the SMS phone group, and 0.18 in the control group, and the mean score of the predisposing nutritional behavior in both groups (lecture and SMS phone) significantly reduced in the three phases (P <0.001), the mean scores of the predisposing nutritional behavior has not changed in the control group in the three stages (P = 0.122). The mean difference of predisposing nutritional scores, before and two months after was 2.23 in the lecture group, and 1.99 in the SMS phone group, and insignificant in the control group.

Table-3: The Comparison of the mean times of daily intake of osteoporosis preventive and predisposing nutritional factors in the three phases of before, immediately, and two months after the intervention in the three groups and comparing them

Variable	Factors	Groups	Before intervention Mean± SD	Immediately after the intervention Mean± SD	2 months after the intervention Mean± SD	P-value*
Behavior	Preventive nutritional factors	Lecture group	11.92 ± 6.58	14.23 ± 5.53	14.39 ± 5.53	P < 0.001
		SMS group	12.87 ± 6.43	16.24 ± 4.18	17.19 ± 4.15	P < 0.001
		Control group	12.45 ± 6.95	12.74 ± 6.89	12.63 ± 6.91	P = 0.18
		P- value**	P =0.832	P < 0.001	P < 0.001	
	Predisposing nutritional factors	Lecture group	3.29 ± 1.86	1.35 ± 0.67	1.06 ± 0.62	P < 0.001
		SMS group	2.45 ± 1.57	0.69 ± 0.53	0.46 ± 0.37	P < 0.001
		Control group	2.86 ± 1.64	2.89 ± 1.73	2.88 ± 1.7	P =0.122
		P- value**	P =0.071	P < 0.001	P < 0.001	

* Friedman Test; **Kruskal-Wallis Test.

4- DISCUSSION

Osteoporosis is a common disease which is strongly influenced by lifestyle. However, it is preventable and the easiest way to deal with this disease is educating preventive behaviors, especially nutritional behaviors (3). The results of this study showed that there is no significant relationship between demographic variables (parents' education, parents' occupation, family size, family income), and osteoporosis preventive and predisposing nutritional behaviors; there was only a significant relationship in the variable of family income and the osteoporosis preventive nutritional behavior (use of carbonated beverages and salt at the table), and students with family income less than 5,000,000 Rials per month, consumed more osteoporosis predisposing foodstuffs. The study by Peyman and Nasehnezhad (14) showed that there is a negative correlation between the consumption of fast food (pizza and donuts), and family income which is consistent with the results of this study. The results of this study are consistent with the study by Dehdari et al. (15) which did not show a significant difference between fruit consumption among female students and the variables of parental education, parental occupation; but finding of the study by Nader et al. (16) showed that reception of sufficient calcium and phosphorus and vitamins B12, B6 in girls is affected by parental occupation and education and family income which is not consistent with the results of this study. In this study the mean score of students' attitude before the educational intervention among the three groups had no significant difference (p> 0.05); but the comparison of the mean scores of students' attitude in the intervention groups (lecture and mobile phone SMS) in the previous phase, increased immediately after the intervention which was statistically significant (p<0.05), but control group students who had not receive the education program, were in the same condition in terms of attitude before and immediately after the intervention. This means that the education program has been able to positively impact on the attitudes of students in the field of osteoporosis and

the importance of nutrition in preventing it. It should be noted that in the mobile phone SMS group, the mean score difference of attitude, was greater than the lecture group. In order to monitor and evaluate the attitudes gained, again, two months after the intervention, the three groups (two interventional groups and one control group) were studied where the comparison of the mean scores of attitude in the intervention groups (lecture and mobile phone SMS), in the previous phase and two months after the educational intervention, indicated an increase in the mean, but in the control group, the mean score of attitude before and two months later, were not significantly different.

The results of the effectiveness of education in improvement of attitudes in this study, was consistent with the studies by Ping Zhang et al. (17) who dealt with the effect of osteoporosis preventive training program among nursing students in China, as well as the study by Tusing et al. (18), and also a survey conducted by Ghaffari et al. (3), which was conducted in 2011 on middle school students, also the increased attitude before, and 2 months after the intervention in the mobile phone SMS group was more than the lecture group which is consistent with the study by Jalali (19), but the present study was not consistent with the study by Hosseini et al. (20). In the study by Mohammed et al. (2014) the students' mean attitudes about the prevention of osteoporosis significantly increased after the intervention (21). Results of the study by Ebadi Fard et al. also showed that the mean score of attitude before and after the education is significant, so that after the educational intervention, the experimental group felt more exposed to the risk and had a greater understanding of the magnitude and seriousness of the risk and its consequences (22); Mahamed et al. (2009) also showed that the attitude of female students about the prevention of

osteoporosis has a significant difference after the implementation of the educational program (23). The results of the research on behavioral intention showed that in the interventional groups, there is a significant difference between the mean score of behavioral intention, before, immediately after and two months after the educational intervention according to the Friedman test, and the intention of students on the use of foods containing calcium and vitamin D (increased consumption of milk and other dairy, dark leaf vegetables, beans, eggs, and consumption of fish at least once per week), and avoiding bad nourishment habits and replacement of proper eating habits (avoiding the habit of salting food at the table, and replacing low salted yoghurt and mineral water instead of carbonated soft drinks) to prevent osteoporosis, were significantly increased after the intervention.

The results of the study by Tosing and colleagues (18) who examined the effect of the osteoporosis preventive education on Health Belief model and the Theory of Reasoned Action on calcium intake, revealed that, 96% of subjects reported increased use of dairy products after intervention, which is consistent with the results of this study as well as the results of studies by Mohamed et al. (23), Peyman and Nasehnezhad (14). The results of this study on subjective norms is consistent with the studies by MohammadiZeidi and Pakpour (24), and Peyman and Nasehnezhad (14). Another component of the theory of planned behavior is perceived behavioral control. Perceived behavioral control means the person's perceptions about the fact that how much does one have in doing or not doing a behavior (25). This study showed that before intervention there was no statistically significant difference between mean scores of perceived behavioral control in the three groups, but immediately after the intervention a significant difference was

observed between mean scores of perceived behavioral control in the three groups (two interventional groups and one control group), and also two months after the intervention, there was a significant differences between mean scores of perceived behavioral control in the three groups. Friedman test showed that the mean score for perceived behavioral control in the two groups (lecture and mobile phone SMS) in the three phases of before, immediately after, and two months after the intervention has significantly increased, but the mean score of perceived behavioral control in the control group in three phases had not significantly increased. Overall, the study results regarding perceived behavioral control are consistent with the results of the studies by MohammadiZeidi and Pakpour (24), and Peyman and Nasehnezhad (14).

This study is also consistent with the study by Mohammadimanesh et al. (26) in Hamadan. The main aim of health education is to change behavior; hence, measurement of health behaviors before and after intervention has been one of the purposes of this investigation. The researcher used the FFQ in the field of measuring the behavior of the subjects. The results of this study showed that the mean score difference of preventive nutritional behavior in the lecture group had 2.5±1.2 difference before and two months after the intervention, and this difference is equal to 4.3±1.4 in the SMS phone group. The results of the study by Absavaran et al. (27) showed that both lecture and mobile phone SMS methods impacted on the performance of the subjects, but the performance score difference was further observed in the SMS phone group rather than the lecture group. Furthermore, the research results with the results of the study by Bohaty and colleagues (28) conducted at the nursing faculty of Omaha, who showed that intake of calcium and vitamin D after the

educational program was significantly higher than before the test. This study, along with the studies by Winzenberg and colleagues (29), Ghaffari et al. (3), Khorsandi and colleagues (30), Nejati et al. (31) are consistent in terms of the significance of the mean of the nutritional performance after the intervention. The result of this research in the field of behavior modification after the educational intervention is not consistent with the study by Shojaeizadeh et al. (32), Mehrabbik (33), and Amini et al. (13); their studies show that there is no significant difference between the average daily intake of calcium and vitamin D, before and after the educational intervention. Also Torshezi (34) stated in his study that despite the increased performance mean regarding the calcium intake among the three groups, no significant difference was created between the three groups which is opposed to the results of the study.

Damore et al. (2007) (35) examined the impact of the training program on intake of foods containing calcium in the New York high school students, did not a significant relationship between the mean of the behavior before and after. The result of this research is not consistent with that of the present study. It seems that due to insufficient number of training sessions (2 sessions) and insufficient number of samples, the mean behavior has not changed. Also, the comparison of the mean of osteoporosis predisposing behaviors in this study showed that after the educational intervention, the mean of osteoporosis predisposing nutritional habits of students in the study, significantly reduced in proportion to before the educational program. In a way that the mean of the number of habits and osteoporosis predisposing nutritional behaviors of the students of the test groups, in the phase before and 2 months after the intervention, decreased as 2.23 times per day in the

lecture educational group and as 2 times per day in the mobile phone SMS group which indicates a statistically significant difference; and this result is consistent with the study by Amini et al. (13), and MohammadiZaidi and Pakpour (24).

4-1. Limitations of the study

In this study, the researcher presumed subject responses as honest, and this can affect the study data since adolescents may not be honest when responding to the questions, especially regarding the nutrition. Also, differences in psychological and intelligence quotient (IQ) and motivation features which can be effective on their responses, was not considered in the division of intervention and control groups. Given the use of cell phones for education via SMS, any defects in personal phones of the subjects, led to interruption in the training program which was somewhat solved by the subjects declaring of not receiving the entire SMS. Also, to hold the training sessions, because these sessions were not counted as official student education, some school teachers refused to cooperate.

5- CONCLUSION

The results of the present study show that planning and running an educational program may lead to a significant increase in the attitude, behavioral intention, and preventive behaviors as well as a significant decrease in the osteoporosis predisposing behaviors and habits. Although this study is conducted on a small sample of adolescent females aged 16-17 during the academic year in high school, but as the results show, despite the importance of prevention in girls, their performance was not in a good condition before applying the educational intervention, which multiplies the nee run educational interventions in the prevention of osteoporosis. Generally, the results of the present study indicated that the educational program has been able to

enhance the mean of daily consumption of foods containing calcium and vitamin D in order to prevent osteoporosis. Regarding the obtained results, education can be effective in two lecture and SMS phone methods, but education via mobile phone SMS was more appropriate due to permanent access, easy propagation, velocity of propagation, interaction and attraction, inclusiveness of a wide range of audiences with high coverage and lack of limitations of time and space, and the low cost of education compared to other health education methods, including lecture which has time and space limitations and high cost for persons in sessions.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENT

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