An Interventional Study for Osteoporosis Prevention among Female Employees of Faculty of Medicine, Ain Shams University.

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Abstract

Background: Osteoporosis is a debilitating and silent metabolic disorder that millions of people suffer from [1]. It is considered preventable by means of adequate nutrition, sufficient physical activity and healthy lifestyle [2]. Participation in "Health educational intervention programs" is effective in osteoporosis prevention and treatment [3].

Objective: To measure the level of knowledge, attitude and practice about osteoporosis prevention among female employees of faculty medicine at Ain-Shams University before and after implementation of health education intervention program.

Methodology: An Interventional study was conducted in January till the end of May 2014. All female employees in Ain Shams University – Faculty of Medicine fulfilling the inclusion criteria were included (n= 260) in the study. A self-administered questionnaire was completed by the study subjects before, immediately after and two months after a health education intervention program. This program was a lecture in the form of power point presentation to raise the awareness and improve the attitude and practice towards osteoporosis prevention.

Results: There was a significant increase in the mean scores of the participants᾽ knowledge (from 2.7 ±2.8 pretest to 12.4 ±1.3 post-test as regard knowledge about risk factors. Also from 1.1 ±1.4 pretest to 5.4 ±0.9 post-test as regard knowledge about preventive and diagnostic practices) attitude, and preventive practice after implementation of health education program.

Conclusion: The health education intervention was effective in increasing knowledge, attitude and practice as regards osteoporosis prevention.

Introduction

Osteoporosis is a debilitating and silent metabolic disorder characterized by a decrease in bone mass and an increased susceptibility to fractures. It is considered as a "silent killer" of public health concern owing to its high morbidity and mortality [1].

With socio-economic development in many countries and rapid ageing of populations, osteoporosis has become one of the most prevalent and costly health problems [4]. It affects more than 75 million people worldwide [5]. Its prevalence among Egyptian population is 10% [6].

Osteoporosis can result in fragility fractures particularly in wrist, hip and vertebral fractures which can lead to substantial morbidity and mortality; they are associated with limitations in functional capacity, pain, reduced social participation, reduced quality of life and fear of falling [7].

Insufficient awareness of osteoporosis and related education are among the

most important reasons for osteoporosis [8]. Healthcare professional found educational programs effective in osteoporosis prevention and treatment [3] as they increase their awareness about modifiable factors as proper nutrition and regular physical activity that would eventually lead to maximizing the bone mass and preventing osteoporosis [2].

Aim of Work:
To measure the level of knowledge, attitude and practice about osteoporosis prevention among female employees before and after implementation of health education intervention program (faculty of medicine, Ain Shams University).

Methodology: An Interventional study in the form of Health education program was carried out in the period from January to the end of May 2014. It was conducted on 260 female employees of faculty of medicine – Ain Shams University aged 30-60 years old.

Sample size (257 women) was calculated assuming an improvement in osteoporosis knowledge among interviewed females ranging between 40-50%, 0.05 alpha error and 0.90 power of the test. (Total number of employees is 880).

The knowledge, attitude and preventive practice of the participants were assessed by a self-administered questionnaire developed by the researcher from related references [9,10,11] pretest, posttest and 2 months after the educational intervention program. The questionnaire included socio-demographic characteristics, knowledge, attitude, dietary and preventive practice sections.

The intervention was a health education program in the form of one lecture (power-point presentation) about osteoporosis. It included general information about osteoporosis as definition, prevalence, modifiable and non-modifiable risk factors, clinical picture, complications, prevention, diagnosis and treatment. Pamphlets included the important points that were in the lecture were distributed to the participants at the lecture after completing the posttest questionnaire, to ensure knowledge sustainability after the end of the program.

The answer categories for questions assessing knowledge were true, false, don't know. The data was coded into (1= true) and (zero= wrong and don't know). The average total score of knowledge about risk factors and preventive practices was 13 and 6 respectively

Attitude questions consisted of 4 questions about preventive practice of osteoporosis. Answer categories for the attitude questions were 5 point Likert scale; coded as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The total score of the attitude was 20.

Questions assessing change in preventive practices to osteoporosis (sun exposure, calcium supplementation and bone mineral density measurement) were asked only twice: pretest and 2 months posttest to give opportunity for the participants to change their behavior. The answer categories were "yes" and "no".

Both descriptive and inferential statistics were done using SPSS program version 20. Student paired - t test was used to compare quantitative data. McNemar and Wilcoxon non parametric tests were used to compare

qualitative data. Level of significance is considered when P value is < 0.05.

A pilot study was carried before the program upon other employees in the faculty so as to ensure clarity of the questions but they were excluded from the results of the study.

Results

The total number of study participants was 260. The majority of them (92.3%) were between 40-60 years old, 56 % finished secondary education and 79% of them were married. (Table 1)

Figure (1) revealed that most of the participants (73%) gained their knowledge about osteoporosis from media and 33.5% from magazines and newspaper.

Table (2.1) shows that the participants had poor knowledge about risk factors of osteoporosis in the pretest. Shortage of dairy products was the most identified risk factors by the participants (71.9%). Lack of physical Activity, smoking and weight loss as osteoporosis risk factors were identified by less than half of the participants in the pretest. There was significant increase in the mean score of the participants knowledge about osteoporosis risk factors in the posttest and 2 months posttest with significant difference (P<0.001)

Table (2.2) summarizes the participants' knowledge about osteoporosis preventive and diagnostic methods. About 58% of study subjects approved that bone mineral density measurement is an early diagnostic method of osteoporosis in the pretest. Physical activity as preventive measure for osteoporosis was

identified by11% only in the pretest. There was significant increase in the mean score of the participants' knowledge about osteoporosis preventive and diagnostic methods in the posttest and 2 months posttest with significant difference (P<0.001)

Table (3) shows significant increase in the mean score of the participants attitude towards preventive practice from 14.9 ±2.2 in the pretest to 19.6 ±0.8 and 19.5 ±1.1 in the posttest and 2 months posttest respectively.

Table (4) shows significant increase among participants in preventive practice in the 2 months posttest (P<0.01). In morning sun exposure (71.2% pretest compared to 86.5% 2 months posttest), daily sports performance (20.4% pretest compared to 43.5 % 2 months posttest), Calcium supplement (18.5% pretest compared to 22.7% 2 months posttest) and BMD measurement (15.4% pretest compared to 19.2% 2 months posttest)

Discussion

The current study revealed that television was the major source of osteoporosis prevention knowledge by the participants, the same finding was reported in Thailand by Puttapitakpong et al, and by Barzanji et al, in Saudi Arabia [12,13] as they signifies the importance of television as a universal source of health education.

As regards participants' knowledge about osteoporosis risk factors in the pretest, the most known risk factor was shortage of dairy products reported by 71% of the participants. This finding agrees with Monsanto, 2010, whose study was conducted in South America and he reported same finding among 74% of the participants

[14]. The present study revealed that 37.7% of the participants know that lack of physical activity was a risk factor of osteoporosis in the pretest. This goes hand in hand with the study conducted in Saudi Arabia with the same finding among 39% of their participants [15].

Only 15% of the participants in the present study know that smoking was a risk factor for osteoporosis in pretest, the same finding was reported by Monsanto et al, study in South America [14]. As regards Excess weight loss as a risk factor for osteoporosis it was confirmed by only 7.5% of the study participants, this percentage was lower than that reported by Shakil et al, study (13%) among South Asian women [16].

As regard participants` knowledge about preventive and diagnostic practices of osteoporosis, the highest knowledge was about BMD measurement, where it was reported by 58.8% of the participants. This satisfactory percentage of awareness could be related to the place of work of the study participants, (Faculty of Medicine). Similar finding (61%) was reported by Asian women [16]. The least knowledge was about the milk consumption (2.8%), Ca supplementation (8.5%) and physical activity (11.2%). Low knowledge about physical activity was also confirmed by Hassan et al, (22%) that carried similar study among female nursing school students in Damascus and it was much less in Zhang et al, study carried out upon Chinese nurse students (2%). [17,18]

A significant improvement in the mean scores of correct knowledge as regards osteoporosis general information, risk factors, clinical picture, complications, preventive and diagnostic methods in both the post-test and the 2 months posttest after the health education intervention program compared with mean scores during pre-test (P<0.001). This result reflected the importance and the effectiveness of health education intervention programs in raising the level of knowledge among target groups.

These results agree with a study that used osteoporosis education Osteoporosis Management Self Prevention Program (OPSMC) upon Australian adults [19]. Similarly Nielson et al, 2010 upon osteoporotic Danish patients [20]. Iranian studies that reported similar results include one study using health belief model among female students and another study carried out upon working women and third one upon volunteers attending health center [21,22,23]. This study result was also supported by Zhang et al, 2012 upon Chinese nurse students and Abushaikha et al, 2009 study in Jordan [24,25].

Egyptian studies that reported same results include Hameed et al, 2008 that evaluated health education intervention program for female employees of the national research center towards osteoporosis. They reported that nearly 52% of female employees' answered correctly in the pretest about different knowledge aspects of osteoporosis which improved to 86% in the post-test with statistically significant difference (p<0.001) reflecting significant improvement in participants' awareness after health education intervention program. Also Mahfouz et al, had conducted a similar study upon adolescent female students in Minia city in Egypt that reported significant increase in knowledge

level from 6.5% pretest to become 86.2% after health education. [11,26]

However, Cram et al, 2006 found no changes in osteoporosis specific knowledge after intervention in which osteoporotic patients were identified upon screening, received their DXA results by mail supplemented by a call from nurse educator upon osteoporosis knowledge [27]. May be patients in Cram study are more aware about the disease owing to their illness, that made no difference in knowledge before and after the intervention

Results of this study revealed significant increase in the participants' attitude towards preventive practice of osteoporosis including Sunlight exposure, consumption of calcium rich diet, regular sports performance and early bone mineral density measurement (P<0.001). This finding is in agreement with ElSayed et al, whose results revealed positive increase in attitude of participants towards physical activity, nutrition and healthy lifestyle [10].

An Iranian study agree with this finding where the mean post–test attitude score of experimental group of working women receiving informational booklet for osteoporosis prevention (100.16 ±6.78) was significantly higher (p<0.001) than the mean post-test attitude score of comparison group (84.10 ±5.85) [22]. Another study carried implemented on volunteers attending health center and reported that mean attitude score of case group was significantly higher than control group (p<0.001) after the administration of educational intervention in a study that used health belief model for osteoporosis prevention [23]. Similar study upon Chinese nurse students reported

significant increase in perceived benefits of exercise and calcium intake in the posttest after the education intervention (p<0.001) [24].

However, this finding disagree with Sanaeinasab et al, as their study results didn't show significant difference in attitude of the participants. This was explained as both perceived benefits and barriers were high both before and after the intervention [21].

As regards sun exposure of the participants in the pretest 71% were exposed to sun on daily basis this finding disagree with Bazaranji et al, who reported that only 40% of participants are exposed to sun on daily basis this may be due to the hot climate of Saudi Arabia [13]. There was a significant increase in sun exposure after the education intervention posttest in the current study 86.5% versus 71.2% pretest (P<0.01). This finding agrees with Chan and Ko, who reported a similar finding upon Chinese women [28].

Physical activity of the participants of the current study before the intervention was low where 71% of study subjects rarely perform physical activity. This finding agrees with Bazaranji et al, who reported that 80% of study subjects rarely perform physical activity [13].There was significant increase in the physical activity performed by the participants after the education intervention these results agree with Sanaeinasab et al, they reported significant increase in physical activity behavior from 7.8 to 9 hours per week posttest (P=0.004) [21].

There was significant increase in calcium supplementation intake after the education intervention posttest in the current study (22.7%) vesrus

pretest (18.5%) pretest (P<0.01). This is in agreement with Laslett et al. [19] upon Australian adults and Winzeberg et al. [29] upon older American adults (P=0.004)

Study participants who had undergone BMD measurement in the pretest were 15.5 %, the same was noticed by Barzanji et al., [13] among 14.5% of participated Saudi females. There was significant increase in BMD measurement after the education intervention (19.2%) (P<0.001) these results agree with Liang et al. that conducted similar study in Taiwan and used patient education as a tool to increase screening for osteoporosis upon patients attending internal medicine clinics. It was reported that 19% of women in the intervention clinic who had received the education intervention in the form of brochure and educational poster conducted BMD screening compared to 9.6% in the control clinic (P<0.001) [30].

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Table (1) Socio-demographic characteristics of the study group:

Variable	№ (%)
Age Groups:	
30-	20 (7.7)
40-	53 (20.4)
50-60	187 (71.9)
Education:	
Preparatory Education	92 (35.4)
Secondary Education	147 (56.5)
University Education	21 (8.1)
Social Status:	
Single	19 (7.3)
Married	206 (79.2)
Divorced	3 (1.2)
Widow	32 (12.3)
Total	260 (100)

Table (2.1): Comparison of knowledge about osteoporosis risk factors before and after the educational intervention among the participated females:

Items of Knowledge	Pre-test		Post-test		2 Months Post-test	
	№	(%)	№	(%)	№	(%)
Excess caffeine	32	(12.3)	258	(99.2)	252	(96.9)
Excess weight loss	19	(7.3)	236	(90.8)	234	(90.0)
Lack of sun exposure	76	(29.2)	237	(91.2)	244	(93.8)
Longtime cortisone	39	(15)	252	(96.9)	252	(96.9)
Certain medications.	12	(4.6)	251	(96.5)	225	(86.5)
Lack of physical Activity	98	(37.7)	240	(92.3)	245	(94.2)
Family history	39	(15)	248	(95.4)	247	(95.0)
Smoking	38	(14.6)	255	(98.1)	252	(96.9)
Shortage of dairy	187	(71.9)	252	(96.9)	256	(98.5)
Excess carbonated beverage	46	(17.7)	228	(87.7)	244	(93.8)
Excess Brown Bread	36	(13.8)	254	(97.7)	226	(86.9)
Excess Salt Consumption	29	(11.2)	251	(96.5)	226	(86.9)
Hysterectomy	55	(21.2)	255	(98.1)	253	(97.3)
Total Score from 13 Mean (± S.D.)	2.7 (2.8)		12.4 (1.3)		12.1(1.6)	
P value			0.00			
			0.00			

P value by paired T-test:

- Between Pre-test and Post-test < 0.001
  Between Pre-test and 2 Months Post-test <0.001

Table (2.2): Comparison between knowledge about preventive and diagnostic practice of osteoporosis before and after the educational intervention among the participating females:

Items of Knowledge	Pre-test		Post-test		2 Months Post-test	
	№	(%)	№	(%)	№	(%)
Milk cups / day	6	(2.3)	162	(62.3)	166	(63.8)
Sardines and Broccoli	48	(18.5)	257	(98.8)	257	(98.8)
Physical Activity	29	(11.2)	255	(98.1)	251	(96.5)
Calcium Supplement	22	(8.5)	226	(86.9)	227	(87.3)
Hormone therapy	37	(14.2)	249	(95.8)	243	(93.5)
BMD	153	(58.8)	256	(98.5)	257	(98.8)
Total Score from 6 Mean (± S.D.)	1.1(1.4)		5.4 (0.9)		5.4 (0.9)	
P value	0.00					
	0.00					

P value by paired T-test:
- Between Pre-test and Post-test <0.01
- Between Pre-test and 2 Months Post-test <0.01

Table (3): Comparison between the female employees' attitude towards preventive practice of osteoporosis before and after the educational intervention among the participated females:

	Pre-test № (%)	Post-test № (%)	2 Months Post-test № (%)
Morning sun exposure:			
Strongly Agree	33 (12.7)	244 (93.8)	234 (90.0)
Agree	92 (35.4)	16 (6.2)	25 (9.6)
Neutral	134 (51.5)	0 (0.0)	0 (0.0)
Disagree	1 (4)	0 (0.0)	1 (0.4)
Strongly Disagree	0 (0.0)	0 (0.0)	0 (0.0)
Consumption of Calcium rich diet:			
Strongly Agree	35 (13.5)	246 (94.6)	241 (92.7)
Agree	177 (68.1)	13 (5.0)	17 (6.5)
Neutral	46 (17.7)	1 (0.4)	2 (0.8)
Disagree	2 (8)	0 (0.0)	0 (0.0)
Strongly Disagree	0 (0.0)	0 (0.0)	0 (0.0)
Regular sports performance:			
Strongly Agree	27 (10.4)	246 (94.6)	233 (89.6)
Agree	97 (37.3)	14 (5.4)	25 (9.6)
Neutral	133 (51.2)	0 (0.0)	0 (0.0)
Disagree	3 (1.2)	0 (0.0)	2 (0.8)
Strongly Disagree	0 (0.0)	0 (0.0)	0 (0.0)
Early Measurement of Bone Mineral Density:			
Strongly Agree	39 (15.0)	238 (91.5)	239 (91.9)
Agree	135 (51.9)	20 (7.7)	16 (6.2)
Neutral	85 (32.7)	2 (0.8)	4 (1.5)
Disagree	1 (4)	0 (0.0)	1 (0.4)
Strongly Disagree	0 (0.0)	0 (0.0)	0 (0.0)
Total Score from 20 Mean (S.D.)	14.9 (± 2.2)	19.6 (± 0.8)	19.5 (± 1.1)
P value	0.00		
	0.00		

P value by paired T-test:
 − Between Pre-test and Post-test <0.01
 − Between Pre-test and 2 Months Post-test <0.01

Table (4): Comparison between some preventive practice of osteoporosis before and after the educational intervention among the participated females:

Characteristic	Pre-test №̲ (%)	2 Months Post-test №̲ (%)	P value
1. **Morning sun Exposure:**	185 (71.2)	225 (86.5)	<0.01*
2. **Sports Performance:**			<0.01**
Daily	53 (20.4)	113 (43.5)	
3-4 times/week	7 (2.7)	8 (3.1)	
1-2 times/week	15 (5.8)	31 (11.9)	
Rarely	185 (71.2)	108 (41.5)	
3. **Calcium Supplement**	48 (18.5)	59 (22.7)	<0.01*
4. **BMD Measurement**	40 (15.4)	50 (19.2)	<0.01*

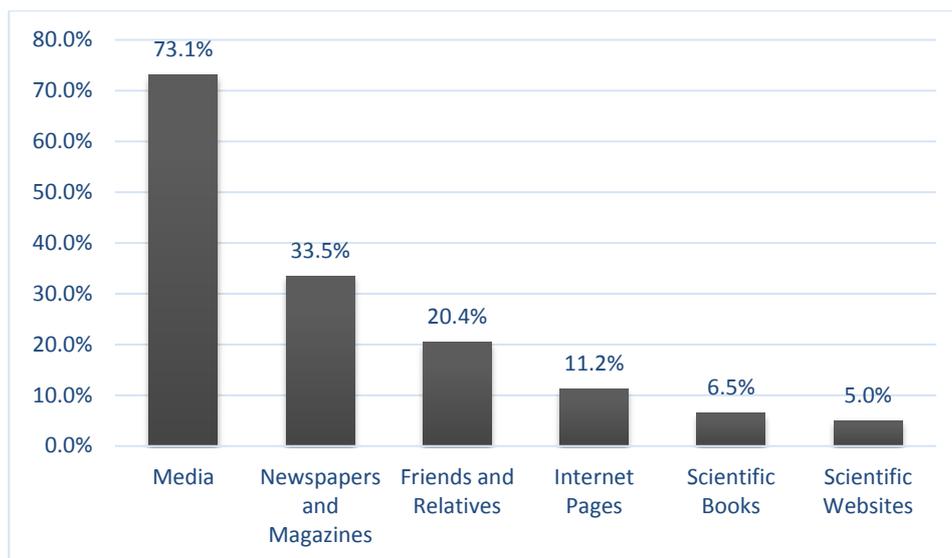*P value measured by McNemar test

**P value measured by Wilcoxon test

Figure (1): Sources of information of female participants about osteoporosis.