



Journal Homepage: -www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/3247
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/3247>



RESEARCH ARTICLE

EFFECTIVENESS OF EDUCATIONAL INTERVENTION ON IMPROVING AWARENESS ABOUT OSTEOPOROSIS AMONG UNIVERSITY FEMALE EMPLOYEES.

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Manuscript Info

Manuscript History

Received: 15 December 2016
 Final Accepted: 20 January 2017
 Published: February 2017

Key words:-

Osteoporosis, Saudi Arabia, female, education

Abstract

Background of the problem:- Osteoporosis affects around 200 million female in the world and 34% of Saudi female suffer from it. Measuring the extent of the community's awareness especially in target groups is the beneficial way to reduce the prevalence.

Objectives: Assess the baseline knowledge about osteoporosis among female employees, to implement health education program and to evaluate the effectiveness of health education program.

Method: An educational intervention study carried out in three phases' assessment, education, and evaluation. To measure the change in the knowledge by comparing the change between the pre and posttest group. Questionnaire was collected from 112 female employees in the college of Administration and Business at Princess Nourah bint Abdulrahman University.

Result: There was a significant improvement in the level of knowledge in the posttest in all what is related to the planned educational program about osteoporosis was ($p \leq .001$) except for diagnosis ($p = .116$). The mean total knowledge score has significantly increased in the posttest (41.6 ± 3.83).

Conclusion: The educational intervention program about osteoporosis was effective. The knowledge improved and the aim was successfully achieved.

Recommendations: In this intervention study the majority of the participants were educated and employees aged between 21-30 years old. However, the most beneficial way to reach the effectiveness of the educational program is through the most affected group in women at menopausal stage, unemployment house wives with different background.

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Introduction:-

Osteoporosis is one of the important health problems due to the global spread, there are around 200 million women in the world suffer from it.^[1] Osteoporosis is known as silent disease, most affected individuals are not diagnosed or treated and remain asymptomatic, bones become weaker and more likely to break, from a minor fall or even from simple actions, like sneezing or bumping into furniture.^[2,3] Osteoporosis affects both men and women at any age, but

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older women (postmenopausal) are more susceptible to the higher risk.^[4] It has major socioeconomic burden, causing loss of work days and income among adults who are still active in the work place. Moreover, huge direct costs for medical, hospital and surgical care. Therefore, rising indirect costs that result when patients lose their independence and require nursing care either at home or in institutions.^[5]

Regarding previous study conducting in Saudi Arabia which revealed that femoral fractures yearly cost \$1.14 billion,^[6] but this has not necessarily been translated into more effective management of osteoporosis health education campaign, which needed to fill the gap between the high prevalence and the drain of health care resources. If there are lacking in knowledge and good application subsequently, the preventive health education is needed to ameliorate knowledge and motivating healthy behaviors. Without doubt the Ministry of Health efforts on improving health awareness of osteoporosis is significantly obvious and taking its course over the past years. However, there's still significantly high prevalence percentage that we cannot marginalized it, according to study conducted among Saudi female, the prevalence of Osteoporosis is 34%. Although the treatments and prevention methods are safe, available, affordable and it effectiveness to reduce the risk of fractures, there is still need to find the loophole in order to detect if there is need for further efforts or further health campaigns that targeting specific population to reduce this percentage. Based on barzanji et al "There is a limitation regarding some studies that indicate women knowledge irrespective of age about osteoporosis risk factors".^[7] Therefore, measuring the extent of the community's awareness, especially in target groups is the beneficial way to reduce the prevalence. Also, it is important and necessary to measure the progress and possibility efforts that will provided through the whole society.^[8]

Research question:-

Is the health education program effective in improves awareness of osteoporosis among Princess NourahBintAbdulrahman University employees?

Hypothesis:- Health education will improve awareness of osteoporosis among Princess NourahBintAbdulrahman University employees.

The Objectives of the study are to:-

- Assess the baseline knowledge about osteoporosis among female employees at Princess NourahBintAbdulrahman University.
- To implement health education program for female employees at Princess NourahBintAbdulrahman University.
- To evaluate the effectiveness of health education program

Methodology:-**Study Design, sitting and duration:-**

An educational intervention study. At Princess Nourahbint Abdulrahman University, from April- September to December 2016

Study population:-

The study was on female employees at princess NourahbintAbdulrahman University.

Inclusion and exclusion criteria:-

This study only included Saudi (teaching and administrative staff) after excluding those who refuse to participate as their participation was voluntary.

Sampling technique:-

A Multi-stage cluster sampling technique was used. Different stages were conducted to select the sample, in the first stage one college was selected randomly by simple random sampling. At the 1st stage, the Sciences colleges were randomly selected out of the three main categories (humanities collages, health colleges, and sciences colleges) at Princess Nourah Bint Abdulrahman University. Then in the 2nd stage, the college of business and administration was randomly selected out of the four Sciences colleges (college of sciences, college of computer and information science, college of business and administration, college of art and design) included in the sciences colleges as illustrated in figure 1

Sample Size:-

A total sample size of 120 teaching and administrative female employees calculated in this study by using an open epi calculator.^[9] The following parameters were used to calculate the required sample: 95% confidence level, 80.0% power of the test assuming that the change of knowledge can reach up to 25%, according to the findings from the pilot study. Then the sample was doubled to be $51 \times 2 = 102$, in addition to 15% expected non response from the participants so the final sample = 120. They were from the college of Administration and Business at Princess Nourah BintAbdulrahman University. After removing the incomplete filled questionnaire, the remaining sample number became 112

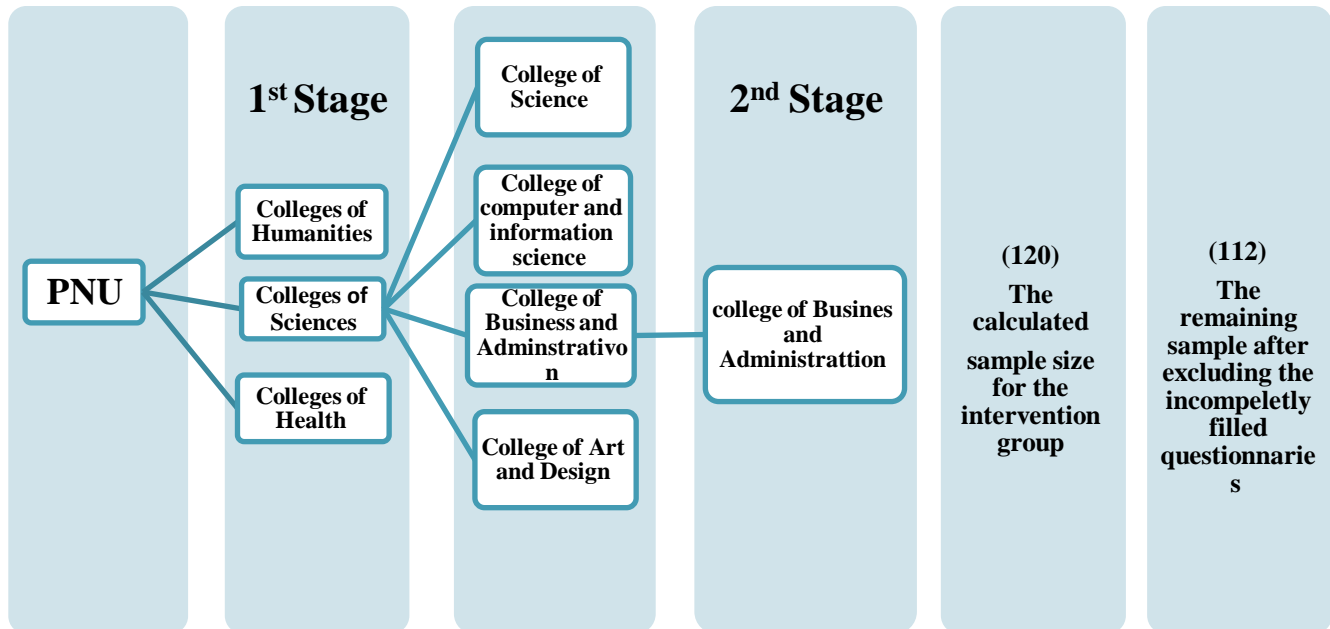


Figure 1:- Sampling technique

Study Tools:- A different tools used to achieve the objectives, which are:

Questionnaire:-

A self-administrated anonymous Arabic questionnaire, designed using a standard questionnaire, then modified to suit Saudi culture (The Impact of Osteoporosis Continuing Education on Nurses' Knowledge and Attitudes.)^[10] Pilot testing of the questionnaire was carried out on 20 females not included in the study. It was performed as an initial step for the study to check the easiness of the questionnaire and the time needed to complete it. Some modifications in some questions were done after the pilot study. The final version covers the following items **Personal information** included Nine questions, **Knowledge:** Assess their current knowledge about osteoporosis, with four questions includes (background, sources of information, magnitude problem estimation...etc.). **Risk factors** (Smoking, family history, early menopausal ...etc.). **Manifestations:** Two questions about **Complications and Diagnosis.** **Dietary Requirements:** Three questions about (Recommended daily calcium, source of daily calcium...). Questions about **Sun Exposure** (produce vitamin D, exposing to sunlight, recommended time ...etc.). Three questions includes assessing **Physical activity:**(type of exercise, duration and frequency). For all the previously mentioned items the responses were either (Yes/No/I don't know).

Intervention tools:-

The tools used displays the main item that was covered in health education message, knowing that it was carried out in Arabic and it was guided by the items asked in the questionnaire which ware:

1. **Poster (roll up panel):**covered the main outlines of the questionnaire in brief through pictures and small sentences.
2. **Booklet:** also covered the main outlines of the questionnaire in more details with pictures and verity of tables that shows detailed daily requirement of calcium, vitamin D, sun exposure and physical activity. To motivate

the participants and to increase their cooperation, motivations rich in calcium and vitamin D was attached with the booklets.

- Lecture:** covered the overall idea of the questionnaire which contained seventeen slides that took around fifteen minutes with the opportunity for the participants to ask oral questions. The lecture conducted into different days and different times to take the most advantages of involving more participants.

Data Collection phases:-

The data collection strategy performed in the form of three phases in three weeks, one week for each phase. The first phase was the assessment phase took place in the first week was the pretest phase via the questionnaire and took about 7 to 9 min to be completed after obtaining the informed consent from the females. Followed by the next phase in the second week, which was the intervention program by conducting the health education sessions aided by booklet, poster and lecture. Finally, post-test used in the evaluation phase to compare the effectiveness of the educational intervention through the same questionnaire that carried out in the first phase.

Statistical Analysis:-

The data was presented and analyzed by SPSS 23^[11] using descriptive and analytical statistics. McNemar test was used to assess the significant difference between post and pretest results. The main outcome was to measure the change in the knowledge by comparing the change between pre and posttest by using paired T test. Level of significance assessed at $p < .05$.

Ethical Approval:-

Ethical approval was taken from the ethical committee at health and rehabilitation sciences collage. As well as, from the dean of business and administration college. Informed consent was attached with the questionnaires to explain the objective and importance of the study, in addition to explaining the phases of the research confirming that their participation or drop out is voluntary. Knowing that the confidentiality of their information is secure by using anonymous coding of the questionnaires.

Results:-

Table 1:- Frequencies and Percentage for Personal Information of Saudi Female Employees at Princess NourahBintAbdulrahman University

After excluding incompletely filled questionnaires(8), a total of 112 Saudi female employees took a part in the study. The participants were from the college of Administration and Business. Forty percent of the participants were aged between 21- 30 and they were the highest percent group. More than half (53.6%) of the respondents were from

3. Variable	4. No	5. %
6. Age	7.	8.
9. 21-30	10. 45	11. 40.2
12. 31-39	13. 38	14. 33.9
15. 40-49	16. 26	17. 23.2
18. 50-59	19. 3	20. 2.7
21. Employment state	22.	23.
24. Full Time	25. 85	26. 75.9
27. Part Time	28. 27	29. 24.1
30. Level of education	31.	32.
33. High school	34. 29	35. 25.9
36. Bachelor degree	37. 53	38. 47.3
39. Master	40. 22	41. 19.6
42. PhD	43. 8	44. 7.1
45. Occupation	46.	47.
48. Administrative	49. 60	50. 53.6
51. Educational	52. 52	53. 46.4
54. Marital status	55.	56.
57. Single	58. 35	59. 31.3
60. Married	61. 66	62. 58.9
63. Divorced	64. 9	65. 8.0
66. Widow	67. 2	68. 1.8
69. Total	70. 112	71. 100.0

administrative staff and (75.9%) had a full time job, (47.3%) had a bachelor degree. Also, more than half (58.9%) of the participants were married as shown in [Table 1].

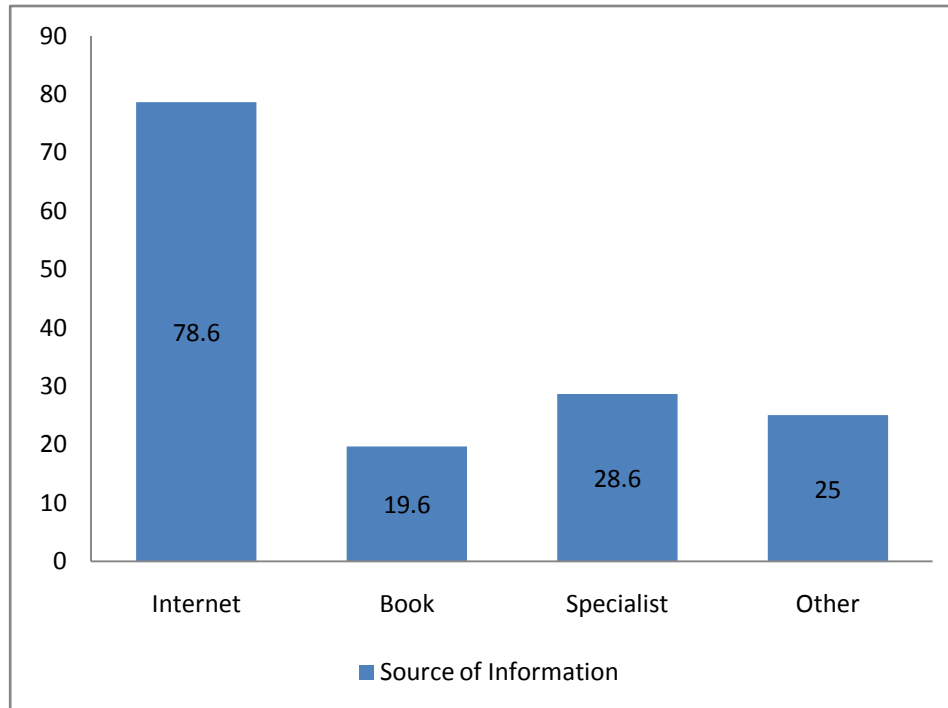


Figure2:-Participant source of information about osteoporosis

After assessing the source of information about osteoporosis, the Internet was the most frequently reported source (78.6%) followed by specialist (28.6%), other (25%) which falls below television, relatives and patient, then books (19.6%). Knowing that the participants were allowed to choose more than one source. Figure 2

Table 2:-Association between pre- and post-test in Knowledge Changing Score among the Participants.

	Level Of Knowledge				pValue
	Pre		Post		
	M±SD		M±SD		
General knowledge	0.90±	0.73	2.29±	0.75	.000*
Non Modifiable Risk Factors	2.32±	1.35	5.24±	0.85	.000*
Modifiable Risk Factors	4.19±	1.44	6.21±	1.09	.000*
Manifestation	3.04±	1.84	6.17±	1.05	.000*
Complication	1.99±	0.95	2.91±	0.78	.000*
Prevention	1.74±	0.74	1.97±	0.49	.003*
Dietary Awareness	4.54±	2.07	6.77±	1.45	.000*
Sun Exposure	2.25±	0.88	1.94±	0.81	.001*
Physical Activates	0.54±	0.66	2.32±	0.85	.000*
Diagnosis	1.59±	0.90	1.70±	0.86	.116
DEXA Indication	3.06±	1.23	4.13±	0.83	.000*
Total	26.16±	4.21	41.64±	3.83	.000*

Table 2 presents the mean and standard deviation about the level of knowledge in pretest and posttest. The mean knowledge was found to be positively correlated ($p \leq 0.001$) between their knowledge and in general knowledge category as well as in non-modifiable risk factors, modifiable risk factors was, manifestations, complication, dietary awareness, sun exposure, physical activity and DEXA indication where it was. The mean and standard deviation in the pretest was 0.90 ± 0.73 , 2.32 ± 1.35 , 4.19 ± 1.44 , 3.04 ± 1.84 , 1.99 ± 0.95 , 4.54 ± 2.07 , 2.25 ± 0.88 , 0.54 ± 0.66 and 3.06 ± 1.23 . While it becomes 2.29 ± 0.75 , 5.24 ± 0.85 , 6.21 ± 1.09 , 6.17 ± 1.05 , 2.91 ± 0.78 , 6.77 ± 1.45 , 1.94

± 0.81 , 2.32 ± 0.85 and 4.13 ± 0.83 respectively in the posttest. In the same hand the mean and standard deviation of the prevention found to be moderate with ($p = .003$) and it was 1.74 ± 0.74 in the pretest and became 1.97 ± 0.49 in the posttest. However, a negative correlation was found between their level of knowledge in the pretest and posttest and the diagnosis category ($p = .116$) it was 1.59 ± 0.90 in the pretest and became 1.70 ± 0.86 in the posttest.

Discussion:-

The aim of this research was to reduce the osteoporosis rate due to lack of awareness among Saudi females. An intervention study was carried out where a designed self-administered questionnaire was used in order to collect data. The current study included a total number of 112 female employees. As regards the main source of information about osteoporosis, it was revealed that the internet was the main source of information among the majority (78.6%) of the studied women, while specialists were ranked as the second source of information was less than one third (28%). This was in agreement with what was reported in many studies carried out among (Egyptian, Turkish, American, Bruneian, Indian and Singaporean women) the mass media was rated as the main source of information in (54.2%, 53%, 55%, 70%, 74% and 76.4%) of the studied women respectively.^[12-19] This result ought to raise consideration toward the content of the health messages incorporated into broad communications in media programs, articles and advertisements.^[19, 20]

According to a study conducted in Texas that analyzed the data by using one-tailed t-test shows that there was a significant increase in the general knowledge of osteoporosis from the pre to the post ($p = .000$). Additionally, the mean and standard deviation of the pretest was 6.89 ± 3.30 while it became 9.96 ± 2.65 in the posttest when compared^[21] a paired-test was calculated in a study conducted in the United States of America and the results revealed that there was a statistically significant increase in knowledge scores in both groups. For women with a family history of osteoporosis the pretest mean was 12.66 (SD = 1.57), while it became 25.83 (SD = 5.19) in the posttest. The women without a family history of osteoporosis had a highly significant difference in posttest scores with the mean of 26.11 (SD = 2.67), while it was 12.11 (SD = 2.02) in the pretest.^[22] According to a study carried out in California State discussing the knowledge of osteoporosis risk factors, among 49 older adults, included 41 females and 8 males with ages ranging from 78-98 years. The osteoporosis knowledge mean number of correct responses was 8 (SD = 4) out of 20 possible questions.^[23] However, in this study the data was analyzed by using paired t-test and revealed that there was a similar significantly increasing as in the previous one in the mean of the knowledge level ($P < .0001$). The pretest mean and standard deviation was 26.16 ± 4.21 and changed to be 41.64 ± 3.83 in the posttest.

There is a negative correlation between the study conducted in the Unaided States of America that discuss the benefits-exercise among the participant without family history of osteoporosis and the current study. The revealed results in the previous study was 26.0000 ± 2.74874 in the pretest and become 26.7368 ± 5.50598 in the posttest ($p = .630$).^[22] While the physical activity mean and standard deviation in this study was 0.54 ± 0.66 in the pretest and change to be 2.32 ± 0.85 ($P < .0001$).

There is a positive correlation between the previous study and the current study in relation to the dietary awareness were it was 4.54 ± 2.07 in the pretest and became 6.77 ± 1.45 in the posttest. Compared to the previous study that indicates calcium benefits were it was 23.6842 ± 2.05623 in the pretest and became 26.0000 ± 2.66667 in the posttest.^[22] On the other hand, a study carried out among 42 women who participated in an 8-week educational intervention. There was statistically significant regression equations were found for all pre intervention intentions related to calcium. Posttest intervention calcium intake significantly increased to 821 ± 372 mg/day ($P < .0001$).^[24]

There was a dramatically increased in the mean at the non-modifiable risk factors where it was 2.32 ± 1.35 in the pretest and increased to be 5.24 ± 0.85 in the posttest. As well as among the modifiable risk factors where it was 4.19 ± 1.44 in the pretest and increased to be 6.21 ± 1.09 in the posttest. However, comparing to a study conducted in Lublin Voivodeship reveals that varied scores between the pretest and the posttest. The level of knowledge about osteoporosis risk factors estimated as an average were it was ($M = 59.78$)^[25]

There is a negative correlation regarding the disease complication where it was 1.99 ± 0.95 in the pretest and increased to be 2.91 ± 0.78 in the posttest ($P < .0001$). Compared to the seriousness of the disease among the participants without family history of osteoporosis where it was 16.2105 ± 3.32631 in pretest and became 15.8421 ± 5.06911 in the posttest ($p = .702$)^[22]

Conclusion:-

The educational intervention program about osteoporosis was effective. The knowledge improved and the aim were successfully achieved. Preventing osteoporosis and its consequences considered as an important argument in the drive to encourage people to follow a healthy lifestyle. Knowledge of disease process, risk factors, and what can be done specifically for prevention and management may better prepare participants to make behavioral change required for successful participatory disease management. Commonly based providing osteoporosis educational programs and screening by knowledgeable health care team should be personalized and comprehensive in order to determine bone health decision. Preventing osteoporosis in women should be a useful strategy in preventing later health and socioeconomic consequences. This should aid in building and directing further modalities for the prevention and treatment of osteoporosis in Saudi Arabia.

Recommendations:-

1. Further research should focus on osteoporosis methods of diagnosis, to increase their awareness about it
2. In this intervention study the majority of the participants were educated and employees aged between 21-30 years old. However, the most beneficial way to reach the effectiveness of the educational program is through the most affected group in women at menopausal stage, unemployment or housewives with different backgrounds.
3. Controlling the quality of health information provided through the mass media is a must, as it is the main source for health information for the public as revealed by the current study results. Moreover, nutritional education should also emphasize on the importance of preventing osteoporosis should also motivate women to adopt a healthier lifestyle.
4. Health care providers' role in providing information regarding osteoporosis should give special care to women of osteopenia or premenopausal in order to increase awareness and protection methods as well as enhancing different communication channels should be provided in order to reach the biggest sector of the population.

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