Effectiveness of osteoporosis prevention instruction program on nursing college students' knowledge at Baghdad University

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المستخلص

الهدف: تقييم فاعلية برنامج تثقيفي لمنع هشاشة العظام على معارف طالبات كلية التمريض في جامعة بغداد.

المنهجية: دراسة شبه تجريبية لتقييم فاعلية البرنامج التثقيفي لمنع هشاشة العظام على طالبات كلية التمريض في جامعة بغداد للمُدّة من نيسان ٢٠١١ ولغاية أيلول ٢٠١١. أختيرت عينة عشوائية شملت (٤٠) طالبة من الصف الأول في كلية التمريض - جامعة بغداد. تمّ جمع البيانات من خلال إستعمال إستبانه مصممة ومكونة من ثلاثة أجزاء؛ الجزء الأول: يتألف من المعلومات الديموغرافية والخصائص الصحية. الجزء الثاني: يتألف من السلوكيات الحياتية اليومية للطالبات والتي تشمل سلوكيات حول التغذية وسلوكيات حول الرياضة. الجزء الثالث يتكون من أسئلة حول معرفة الطالبات بهشاشة العظام، ويتألف من ثلاثة محاور، المحور الأول حول تشريح وفسلجة العظام، المحور الثاني العناصر الغذائية الضرورية لبناء العظام، المحور الثالث هشاشة العظام. تمّ تحديد ثبات الاستبانة من خلال دراسة تجريبية (إستطلاعية) وصحتها حددت من خلال لجنة مكونة من (١٤) خبير. استعملت إجراءات التحليل الإحصائي الوصفي وإجراءات التحليل الإستنتاجي لتحليل البيانات وبمستوى دلالة ٠,٠٥% أو أقل.

النتائج: أظهرت النتائج أنّ ٦ من أصل ٩ سلوكيات غذائية للطالبات كانت جيدة. وإن معرفة الطالبات المتعلقة بمنع هشاشة العظام كانت منخفضة قبل تنفيذ البرنامج ولكن بعد تنفيذ البرنامج التثقيفي كان هناك تحسّن عالٍ لمعارف الطالبات. فاعلية البرنامج لم تتأثر بالخصائص الديموغرافية والسلوكيات الحياتية اليومية وهذا يعني أنّ البرنامج ممكن تنفيذه لجميع الطالبات وتحقيق أهداف البرنامج.

التوصيات: أوصت الدراسة بضرورة تطوير مناهج العلوم في جميع المستويات التعليمية (ما قبل المدرسة، الإبتدائية، الثانوية، الكلية، ومدارس التمريض) لمعالجة عوامل الخطر وأساليب الوقاية الصحية السلوكية ونمط الحياة التي تعود إلى هشاشة العظام. البحوث في المستقبل لمنع هشاشة العظام يجب أن تركز على المجتمعات الأصغر سناً، وهم المراهقين، من أجل تحسين معارفهم من مرض هشاشة العظام في وقت مبكر بما يكفي للتأثير على كفاءتهم الذاتية لتغيير نمط حياتهم السلوكية والصحية.

Abstract

Objective(s): Assess the effectiveness of osteoporosis prevention instruction program on nursing college students' knowledge at Baghdad University.

Methodology: A quasi-experimental design was used to assess the effectiveness of osteoporosis prevention instruction program on nursing college students at University of Baghdad from April 2011 to September 2011. A random sample consisted of (40) females students from first year of Nursing College \ Baghdad University. The data was collected by using constructed questionnaire, which consists of three parts. Part one: consists of demographic information and health characteristics .Part two: consists of students' daily life behaviors which include, dietary behaviors, and sport behaviors. Part three: consists of questions regarding students' knowledge about osteoporosis, it contains three domains which are: Domain I: Anatomy and physiology of bones. Domain II: Nutritional elements those are necessary for bones building. Domain III: Osteoporosis. Reliability of the questionnaire is determined through the pilot study and the validity through a panel of (14) experts. Descriptive statistical analysis procedures and inferential statistical analysis procedures were employed for data analysisand all the statistical procedures were tested at P value ≤0.05.

Results: The results revealed that 6 of 9 dietary behaviors of the students was good and the knowledge of the students concerning osteoporosis was low before implementation of the program but after implementation of the instruction program the knowledge of the students are highly improved. The effectiveness of the program is not affected by demographic characteristics and daily life behaviors, that means the program can be implemented for all females students and achieve the objectives of the program.

Recommendations: The study recommended that science curriculums at all educational levels (pre-school, elementary, high school, college, and nursing schools) should be developed to address risk factors and preventive behavioral health lifestyle related to osteoporosis. Future researches on osteoporosis prevention should focus on a younger population, namely adolescents, to improve their knowledge of osteoporosis early enough to influence their self-efficacy for their health lifestyle behavioral changes.

Keywords: Osteoporosis, Prevention, Nursing College Students' knowledge

Introduction:

According to the International Osteoporosis Foundation (2003), osteoporosis is defined as a disease in which the density and quality of bone are reduced, leading to weakness of the skeleton and increased risk of fracture, particularly of the spine, wrist, hip, pelvis, and upper arm [(1)]. Osteoporosis, often referred to as "The Silent Disease," is a painless weakening of the bones that allows bones to fracture and break more easily. The disease can continue to progress until even a slight twisting or bending motion can cause bones to fracture and break [(2)]. This is a worldwide problem because of the fractures that occur. The burdens of fractures are increasing in direct correlation with life expectancy. This increase is greater in underdeveloped countries. By 2030, the increase in the aged population will affect developing countries more than developed ones, and this increase will occur in both sexes [(3)]. Complications due to osteoporosis-related fractures lead to more deaths each year than the combined mortality rates of breast and ovarian cancers [(4)]. Adequate dietary calcium intake and regular physical activity maximizes the development of peak bone mass throughout the adolescent and young adult growth period. Prevention of osteoporosis should begin in adolescence and continue throughout adulthood, such as intake high calcium diet and exercise, have been very effective in preventing osteoporosis, particularly among adolescents women [(5)].

Methodology:

A quasi-experimental design was carried out throughout the present study with the application of pre-test and two posttests for the study group through the period from April 2011 to September 2011.The study was conducted at College of Nursing in the University of Baghdad. A random sample consisted of (40) females students from first year of Nursing College, University of Baghdad. The study group was exposed to an instructional program. The purpose of this study was to test the effectiveness of osteoporosis prevention instruction program on knowledge of young females' students. The instruction program about osteoporosis was presented in (5) session's interactive learning methods, such as discussion, demonstration, and lecture. The program contents, session learning methods and media were formulated and organized into instructional form. Each session was implemented during the time of approximately 30 minutes. The content of the classroom sessions consists of the followings:

1. Anatomy and physiology of bones, types of bones, functions of bones.

2. Nutritional and elements those are necessary for bones building, some herbals that can prevent osteoporosis.

3. Osteoporosis; definition, signs and symptoms.

4. Diagnosis and testing technique methods.

5. Treatment and sport activities. During these sessions, the students involved to discuss their problems and provide information and instruction about osteoporosis prevention in the future. Through the review of related literatures and previous studies, the investigator constructed the questionnaire format, and it was applied before implementation of the instructional program. Booklets and clarification of some herbals and drugs using in osteoporosis treatment managed by the program sessions. The questionnaire format comprised of three main parts

Part one: This part includes the following: **Demographic Characteristics:** It is concerned with the identification of the demographical characteristics of the study group, which include the following variables (age, age at menarche,

days of mense flow, length of menstrual cycle, regularity of menstrual cycle). **Health Characteristics:** Which include Body Mass Index (BMI), information about osteoporosis disease, source of the information? **Part Two:** Students' Daily Life Behaviors; it includes the followings: Dietary behaviors it consists of (9) items which are (drinking tea and coffee, drinking beverage , drinking milk or yogurt, eating food rich with vitamins and minerals, eating red meat, exposure to sun light , following weight loss program). Sport behaviors: It consists of (5) items which are (walking for at least half an hour daily, playing exercise , climbing stairs , play skipping robe , and doing daily home activities). The responses for each behavior were rated according to 3 levels of Likert scale which are (always), (sometimes), (never) and scored as 3, 2, and 1.

Part Three: Students' Knowledge: This part consists of statements (items) concerning knowledge of students toward osteoporosis disease. It includes three main domains and they are responded by know (correct answer, scored 1), or don't know (wrong answer, scored 0) and these domains are : **Domain I:** Anatomy and physiology of bones: It includes (11) items, total score is (11) mark.

Domain II: Nutritional and elements those are necessary for bones building: It includes (20) items, total score is (20) mark.

Domain III: Osteoporosis: this domain includes 6 sections, which are: **1.General information:** It includes (13) items, total score is (13) mark.

2. Signs and symptoms of osteoporosis: It includes (5) items, total score is (5) mark.

3. Risk factors of osteoporosis: It includes (10) items, total score is (10) mark.

4. Prevention from osteoporosis: It includes (9) items, total score is (9) mark.

5. Sports activity that protect body from osteoporosis: It includes (6) items, total score is (6) mark.

6. Treatment of osteoporosis: It includes (5) items, total score is (5) mark. The total items for the three domains are (79), and the total score is (79) mark. Data was collected through utilization of the study instrument and the implementation of the program for the period from 3rd April 2011 to 22th May 2011.30-45 minutes were consumed to fill the questionnaire; data collection was carried out through the following techniques:

1. All participant students were exposed to pre-test to assess their knowledge about osteoporosis prevention.

2. All students were exposed to osteoporosis instruction program.

3. After the implementation of the program for six weeks, the students were exposed to post –test 1 immediately.

4. Two weeks later, all students were exposed to post-test 2.

Data were analyzed through the application of descriptive and inferential statistical approaches, and all the statistical procedures were tested at $P \leq 0.05$.

To evaluate the behaviors and knowledge of the study group that is based on Mean Score (MS), cut off point and relative sufficiency (RS) and as follow:

A. Behaviors:

Cut off point $\frac{1+2+3}{3} = 2$

MS above 2 means good behavior (pass).

MS below 2 means bad behavior (failure).

B. Knowledge:

Cut off point $\frac{0+1}{2} = 0.5$

MS above 0.5 means good knowledge (pass).

MS below 0.5 means poor knowledge (failure).

Failure < 0.50, R.S ≤ 66.66

Pass 0.50 – 0.59, R.S 67.67 - 77.76

Moderate 0.60 -0.69, R.S77.77 - 88.87

Good 0.70 – 100, R.S 88.88 - 100

Results:

Table 1. Distribution of daily dietary behaviors for the studied group

Variables	Groups	f	Percent	Cum. Percent	M.S.	S.D.	R.S. %	Ass.
*Drinking tea and coffee	Never	2	5	5	2.50	0.60	83.33	Failure
	Some times	16	40	45				
	Always	22	55	100				
*Drinking beverage	Never	4	10	10	2.02	0.48	67.33	Failure
	Some times	31	77.5	87.5				
	Always	5	12.5	100				
Drinking milk or yogurt	Never	5	12.5	12.5	2.07	0.57	69.00	Pass
	Some times	27	67.5	80				
	Always	8	20	100				
Eating food contains calcium	Never	2	5	5	2.40	0.59	80.00	Pass
	Some times	20	50	55				
	Always	18	45	100				
*Eating food contains fat	Never	0	0	0	2.50	0.51	83.33	Failure
	Some times	20	50	50				
	Always	20	50	100				
Eating food rich with vitamins and minerals	Never	0	0	0	2.70	0.46	90.00	Pass
	Some times	12	30	30				
	Always	28	70	100				
Eating red meat	Never	4	10	10	2.08	0.53	69.33	Pass
	Some times	29	72.5	82.5				
	Always	7	17.5	100				
Exposure to sun light at least 15 minutes per day	Never	0	0	0	2.68	0.47	89.33	Pass
	Some times	13	32.5	32.5				
	Always	27	67.5	100				
Follow weight loss program	Never	25	62.5	62.5	1.40	0.55	46.67	Pass
	Some times	14	35	97.5				
	Always	1	2.5	100				

Ass.= Assessment; S.D.= Standard deviations; f. = frequency; Cum.= Cumulative; M.S.=mean of score; R.S.= Relative Sufficiency; *Negative Relative Sufficiency (RS)

Finding of this table demonstrates that most of the daily dietary behaviors (6 out of 9 behaviors) for the studied group were good (Pass) which includes (Drinking milk or yogurt R.S 69.00%, Eating food contain calcium R.S 80.00%, Eating food rich with vitamins and minerals R.S 90.00%, Eating red meat R.S 69.33% Exposure to sun light at least 15 minutes per day R.S 89.33%, Follow weight loss program R.S 46.67%). While the behaviors toward (Drinking tea and coffee R.S 83.33%, Drinking beverage R.S 67.33%, Eating food contain fat R.S 83.33%, were assessed bad or (Failure).

Table 2. Distribution of Some Sport Behaviors for the Studied Group

Variables	Groups	f	Percent	Cum. Percent	M.S.	S.D.	R.S. %	Ass.
Walking for at least half an hour daily	Never	0	0	0	2.78	0.42	92.67	Pass
	Some times	9	22.5	22.5				
	Always	31	77.5	100				
Playing exercise	Never	4	10	10	1.95	0.39	65.00	Failure
	Some times	34	85	95				
	Always	2	5	100				
Climbing stairs	Never	0	0	0	2.85	0.36	95.00	Pass
	Some times	6	15	15				
	Always	34	85	100				
Play skipping rope	Never	21	52.5	52.5	1.52	0.60	50.67	Failure
	Some times	17	42.5	95				
	Always	2	5	100				
Doing daily home activities	Never	0	0	0	2.60	0.50	86.67	Pass
	Some times	16	40	40				
	Always	24	60	100				

Ass.= Assessment; S.D.= Standard deviations; f. = frequency; Cum.= Cumulative; M.S.=mean of score; R.S.= Relative Sufficiency; *Negative Relative Sufficiency (RS

Table (2) reveals in term of distribution for some sport behaviors for the studied group, which were good (pass) for 3 out of 5 behaviors including (walking for at least half an hour daily R.S 92.67%, climbing stairs R.S 95.00%, doing daily home activities R.S 86.67%), and bad(failure) for (playing exercise R.S 65.00% and play skipping rope R.50.67%).

Table 3. Comparison Significant of Item's Responding for the Student's Knowledge about Osteoporosis Distributed Along Different of the Studied Periods

	Items of the studied Questionnaire	Test Statistics		C.S. P-value
		Cochran's Q	Asymp. Sig.	
Domain I Anatomy & physiology of bones	Human bone contains two types of bone tissue, which are cortical and spongy	Coincidence with I know		
	Cells have roles in bone formation are osteoblastis and osteoclastis	28.125	0.000	HS
	calcium phosphate is the essential component of bone formation	2.000	0.368	NS
	Effectiveness of osteoblastis cells increase from birth to 20 years old	20.947	0.000	HS
	Bone density in human is increased through childhood, adolescent and youth stages	2.250	0.325	NS
	Skeletal bone tissues in children are renewed every 2 years	57.086	0.000	HS
	Bones contain high level of collagen at childhood period than in adulthood so it cannot be broken easily	30.471	0.000	HS
	Peak bone density will be reached at age of 35 years	62.063	0.000	HS
	At old age the bone loss its minerals and become spongy and fragile	1.600	0.449	NS
	Woman will be loss 85%from bone density throughout her life	54.069	0.000	HS
	Bone density reduced in a high percentage at age of 50 for both man and woman and continue with aging	26.143	0.000	HS
Domain II Nutritional elements those are necessary for bones building	Minerals are necessary for keeping body fluid balance and formation of blood and bones	8.400	0.015	HS
	Calcium considered an essential element for bone formation	Coincidence with I know		
	Woman needs 1000 mg of calcium from age (19-50)	49.273	0.000	HS
	Almost, deficiency of calcium associated with (vitamin D) deficiency	18.952	0.000	HS
	Vitamin D works to absorb calcium and phosphors from intestine	28.261	0.000	HS
	Human skin can synthesize vitamin D by exposure to sun light.	7.143	0.028	S
	Vitamin D requirement for individual aged over 50 years should be doubled from (5-10) mcg.	40.258	0.000	HS
	Proteins can facilitate the absorption of calcium from intestine when they are broken to amino acids	15.125	0.001	HS
	Increased intake of (1 mg) protein out of body needs leading to loss (1mg) of calcium through urination	42.000	0.000	HS
	Phosphors consider the 2nd minerals salt following calcium for building bones as its amount in the body	19.600	0.000	HS
	The basic work of phosphors is interring in bones building.	26.000	0.000	HS
	Sing anti acid agents. Phosphors deficiency can be happened when increase	49.636	0.000	HS
	Increased amount of magnesium will be reduced calcium calcification in the bones	45.867	0.000	HS
	Magnesium activates the enzymes that help in bone calcification by calcium and phosphorus	26.643	0.000	HS
	Zinc is an essential and important element for growth and development of bones	38.100	0.000	HS
	Zinc deficiency in children may associate with their short structure	48.438	0.000	HS

Table 3. Continued

	Items of the studied Questionnaire	Test Statistics		C.S. P-value
		Cochran's Q	Asymp. Sig.	
	Manganese can activate the enzyme that responsible of bone tissue formation	43.613	0.000	HS
	Pain apple-soya tea- hole grains-considered the rich sources of manganese	48.222	0.000	HS
	Medical plants like flax-soya-and ginseng helping for increased levels of calcium, vitamin D and phosphors that is important in bones building	38.273	0.000	HS
	Ginseng have an important role by stimulation of producing estrogen from ovaries	70.000	0.000	HS
Domain III Osteoporosis 1.General information's	Osteoporosis means lack of bone density that it become spongy and fragile with age growing	6.000	0.049	HS
	Osteoporosis called silent disease it can happen with quiet and human cannot feel of it	28.000	0.000	HS
	Patient with osteoporosis their bones become fragile and easily to broken when they fall or expose external tense	3.500	0.174	NS
	Decrease of bone density in women more than in men	24.000	0.000	HS
	The most common bones that broken in patient with osteoporosis are Hip, thigh, wrist, humorous and vertebral column	26.000	0.000	HS
	When person become older the probability to having osteoporosis will be increased	7.000	0.030	HS
	Women having risk of Osteoporosis more than men do	10.000	0.007	HS
	Early menopause before age of 45make the women to have a risk of Osteoporosis	54.276	0.000	HS
	Incidence of osteoporosis disease most common in Asia ,Europe ,and north America	55.500	0.000	HS
	Osteoporosis happened to menopausal women due to decrease estrogen level they have	50.867	0.000	HS
	Woman can loss 1-2% of bone density after menopause	59.722	0.000	HS
	Oophorectomy of women at reproductive age leading to get osteoporosis	41.353	0.000	HS
	Loosing of bone density is higher during the first 5 years after menopause	49.750	0.000	HS
2. Signs of Osteoporosis	Persons who have osteoporosis may lose their height and have curved and bended back	14.600	0.001	HS
	About 80% of peoples who have hip fracture become disable to walk after 6 months	18.375	0.000	HS
	Sharp pain in the low back is one signs of osteoporosis	26.824	0.000	HS
	The late signs of osteoporosis is shortness and bending of vertebral column by aging	21.529	0.000	HS
	Osteoporosis can happened without pain in early stages	30.960	0.000	HS

Table 3. Continued

	Items of the studied Questionnaire	Test Statistics		C.S. P-value
		Cochran's Q	Asymp. Sig.	
3.Risk factors	No spacing pregnancies for more than 3 time considered risk factor for getting Osteoporosis	48.000	0.000	HS
	Persons with White skin are more risky to get osteoporosis than black skin	70.000	0.000	HS
	Family with history of osteoporosis increase the risk of woman to get the disease	25.391	0.000	HS
	Low weight and small body frame increase individual susceptibility to get osteoporosis	13.444	0.001	HS
	Immobility and no exercise leading to osteoporosis	18.000	0.000	HS
	Intake high amount of vitamin A for log time leading to decrease bone density	57.771	0.000	HS
	Hyperthyroidism leading to increase destruction process for most body tissue especially the bones	35.379	0.000	HS
	Taking steroid medications leading to destroy proteins inside the bones	59.471	0.000	HS
	Psychological disease have relations with osteoporosis	31.517	0.000	HS
	Uses of medications as anticoagulant like heparin for more than 3 months increase susceptibility to getting Osteoporosis	56.267	0.000	HS
4. Prevention from Osteoporosis	Regular checking of vision to prevent falling is one method of prevention from Osteoporosis	38.100	0.000	HS
	Avoid walking with stocks to reduce danger of slipping considered one method of protection from osteoporosis	38.273	0.000	HS
	Follow dietary system rich in dairy products and dark green vegetables protect us from dangerous of getting osteoporosis	8.857	0.012	S
	Increase eating of animals proteins will stimulate excretion of calcium with urine	51.152	0.000	HS
	Drinking coffee (caffeine) in large amount increased losing of calcium with urine	33.583	0.000	HS
	Drinking large amount of beverage (cola) leading to increase losing of calcium from bones	10.889	0.004	HS
	Smoking can reduce level of estrogen hormone in the body	29.238	0.000	HS
	Increased using of diuretics like lasix will increased losing of calcium from bones	54.276	0.000	HS
	Intake salt and candy food in highly amount leading to decrease calcium absorption in the body	34.300	0.000	HS

5.Sport activities that protect body from Osteoporosis	Sport activity and hormonal therapy together make better results for increasing bones density	23.545	0.000	HS
	An active woman have less susceptibility nearly half to get osteoporosis	20.182	0.000	HS
	The average of walking which is useful for the body is about 1\2 hour daily or 20-30minuets 3 times weekly	26.000	0.000	HS
	Play skipping rope is not well for women after menopause	40.091	0.000	HS
	Climbing stairs about 10 stairs daily be enough to strength the bones	13.500	0.001	HS
	Running sport about 3 times weekly for 20-30 minutes at once working to made a strong bones	22.167	0.000	HS
6.Treatment of Osteoporosis	Hormonal replacement therapy is one method to replace estrogen that body of woman stopped to produce it after menopause	60.182	0.000	HS
	Bisphosphonate is un hormonal medication that treated osteoporosis works to stop the cells that responsible for damage the bones	52.722	0.000	HS
	Calcitonen is hormones found in our bodies secreted from some cells of parathyroid it prevent loss of bone materials and reduce some pain in case of fractures	59.027	0.000	HS
	An abolic steroid stimulate bone formation and development of bone materials	34.330	0.000	HS
	Florid works to increase bone mass in skeletal bones	26.696	0.000	HS

The findings of this table are structured for an overall comparison significant of item's responding for the student's knowledge about osteoporosis distributed along different studied periods, the results indicated that there were high and assessed good in post1 and post 2 after the implementation of the instructional program in all domains (Anatomy and Physiology of bones, Nutritional elements that are necessary for bones building, Osteoporosis which including: General information, Risk factors, Prevention from osteoporosis, Sport activities that protect from osteoporosis, and Treatment of osteoporosis). In addition to that, statistical result has indicated that there has been mostly highly significant difference at $P<0.01$ through the changeability between the pre and the two of post periods.

Table 4. Students' knowledge about osteoporosis distributed along different studied periods

Domains	Period	f	M.S.	SD	Std. Error	95% C.I. for M.S.		Ass.
						L.b.	U.b.	
I. Anatomy and physiology of bones	Pre	40	0.61	0.17	0.03	0.56	0.67	Mod.
	Post-1	40	0.95	0.09	0.02	0.93	0.98	Good
	Post-2	40	0.97	0.07	0.01	0.95	1.00	Good
II. Nutritional elements that are necessary for bones building	Pre	40	0.46	0.19	0.03	0.40	0.52	Failure
	Post-1	40	0.92	0.10	0.02	0.88	0.95	Good
	Post-2	40	0.96	0.08	0.01	0.94	0.99	Good
III.1. General information	Pre	40	0.53	0.19	0.03	0.47	0.59	Pass
	Post-1	40	0.95	0.07	0.01	0.93	0.98	Good
	Post-2	40	0.99	0.03	0.01	0.98	1.00	Good
2.Signs of osteoporosis	Pre	40	0.61	0.33	0.05	0.51	0.71	Mod.
	Post-1	40	0.94	0.15	0.02	0.89	0.98	Good
	Post-2	40	0.97	0.09	0.01	0.94	1.00	Good
3. Risk factors	Pre	40	0.35	0.20	0.03	0.28	0.41	Failure
	Post-1	40	0.89	0.12	0.02	0.85	0.93	Good
	Post-2	40	0.95	0.09	0.01	0.92	0.98	Good
4. Prevention from Osteoporosis	Pre	40	0.51	0.23	0.04	0.44	0.58	Pass
	Post-1	40	0.97	0.07	0.01	0.94	0.99	Good
	Post-2	40	0.97	0.09	0.01	0.94	0.99	Good
5. Sport activities that protect from Osteoporosis	Pre	40	0.64	0.23	0.04	0.57	0.72	Mod.
	Post-1	40	0.98	0.07	0.01	0.95	1.00	Good
	Post-2	40	0.98	0.07	0.01	0.96	1.00	Good
6. Treatment of osteoporosis	Pre	40	0.25	0.25	0.04	0.16	0.33	Failure
	Post-1	40	0.86	0.24	0.04	0.79	0.94	Good
	Post-2	40	0.94	0.19	0.03	0.88	1.00	Good
Osteoporosis	Pre	40	0.48	0.18	0.03	0.42	0.54	Failure
	Post-1	40	0.93	0.08	0.01	0.90	0.96	Good
	Post-2	40	0.96	0.07	0.01	0.94	0.99	Good
Overall Questions about instruction program for students knowledge about Osteoporosis	Pre	40	0.52	0.15	0.02	0.47	0.57	Pass
	Post-1	40	0.93	0.07	0.01	0.91	0.96	Good
	Post-2	40	0.97	0.06	0.01	0.95	0.98	Good

Ass.= Assessment; f= frequency; L.B= Lower border; M.S. = Mean of scores; SD= Standard deviation; U.B= Upper border

The findings of table 4. indicate that there are low mean of scores in most domains for the student's knowledge about osteoporosis in pre-test and most of them assessed as (Failure, Pass, and Mod.). While there were high, mean scores in all domains (Anatomy and physiology of bones, nutritional elements that are necessary for bones building, osteoporosis which including: general information, risk factors, prevention from osteoporosis, sport activities that protect from osteoporosis, and treatment of osteoporosis), and assessed good in post-1 and post-2 after the implementation of the instructional program.

Table 5. Association between demographical characteristics and overall assessments due to improvement status of the suggested program

Demographical Characteristics X Improvement Status(*)	Contingency Coefficient	Approx. Sig.	C.S.
Age groups	0.446	0.356	NS
Age at menarche	0.476	0.228	NS
Days of menses at menarche until now	0.390	0.620	NS
Length of menstrual cycle	0.268	0.797	NS
Regularity of menstrual cycle	0.189	0.687	NS
BMI	0.429	0.438	NS
Do you have information about osteoporosis disease	0.319	0.209	NS
If answer is yes what is the source of this information	0.294	0.583	NS
Drinking tea and coffee	0.091	0.848	NS
Drinking beverage	0.187	0.485	NS
Drinking milk or yogurt	0.092	0.843	NS
Eating food contain of calcium	0.301	0.136	NS
Eating red meat	0.241	0.293	NS
Exposure to sun light at least 15 mints per day	0.016	0.919	NS
Follow weight loss program	0.274	0.198	NS
Walking for at least half an hour daily	0.228	0.138	NS
playing exercise	0.355	0.056	NS
Climbing stairs	0.042	0.789	NS
Play skipping rope	0.145	0.651	NS
Doing daily home activities	0.082	0.604	NS

Approx. Sig.= Approximate Significance; C.S.= Comparative Significance; NS= Non-significant; Sig.= significant

The correlation through the contingency coefficient of the contingency tables that had been constructed in this table between the different levels of the demographical characteristics variables of the studied sample and their overall responding which were reported (under – upper) cut-off-point (0.50). The table has reported that the improvement of the students' knowledge about osteoporosis had no relationship with their socio-demographical characteristics in the overall assessments of student's knowledge of the program in different periods.

Discussion:

Table (1) reveals the distribution of daily dietary behaviors for the study group, which include the followings:

1.1 Drinking tea and coffee: 55% of the study group drinks tea and coffee (Always) with the R.S (83.33%), above the cut-off-point. This could be concluded as a failure behavior for the study group. Ilich et al., suggested in their study that drinking tea less than 4 cups a day, and does not drink tea immediately after meal decrease the risk of urinary excretion calcium [6].

1.2 Drinking milk or yogurt, eating food contain of calcium: the results indicate that the response of (Sometime) was constituted most of study sample (67.5%) and upper the cut of point R.S (69.00%), which indicated that the most of the studied individuals assessed as good or pass, then followed with the subject responses, of the question. Eating food contain of calcium, results indicate that highest percentage of the study sample are (Sometime) the answers with (50.0%) and upper the cut of point R.S (80.00%), which indicated that most of the studied group assessed as good or pass. Numerous studies provide evidence of a positive relationship between dietary calcium intake and BMD. Calcium absorption declines with age; therefore, recommendations for dietary intake of calcium are higher for adults age [7].

1.3 Eating food contains fat: The results reveal that (50.0%) of the study group answered (Sometime) and (Always) for each response and upper the cut of point with R.S (83.33%), which indicated that most of the studied individuals assessed as bad or failure. In a case–control study assessing an elderly. Mediterranean population, the researcher found that a high intake of polyunsaturated fat (PUFA) was associated with a higher risk of osteoporotic fractures [8].

1.4 Eating red meat: The results shows that highest percentage (72.5%) of the study group, for red meat was (Sometime) with R.S (69.33%), upper the cut-off-point, which indicated that most of the studied individuals assessed as good or pass. Early support came from a study of elderly North Alaskan Eskimo women, in which it was shown that these women had 10-15 percent lower levels of bone mineral content and a higher prevalence of osteoporotic vertebral fractures than non-Eskimo American women, although the Eskimo women consumed a high-calcium, high-protein diet. In addition, two cross-cultural studies reported a direct association between high protein consumption and rate of hip fracture [9].

1.5 Exposure to sun light at least 15 minutes per day: The results demonstrate that (67.5%) of the study group were exposed to sun light through outdoor activities .R.S of this study is (89.33) upper the cut-off-point it is assessed as good or pass behavior for the study group. Most people get enough vitamin D during typical day-to-day outdoor activities. To get enough sunlight for the body to make vitamin D, the person need to expose hands, face and arms (or equivalent area of skin) to sunlight for about 5-15 minutes 4-6 times a week. Elderly people and people with darker skins need more sunlight exposure– about 15 minutes 5-6 times a week [10].

1.6 Follow weight loss program: The results indicate that highest percentage of the study sample are (Never) answers with (62.5%) and under the cut-off-point (46.67%), which indicated that most of the studied individuals assessed as good or pass.

2. Sport Behavior: Table (2) reveals in term of distribution for some sport behavior for the studied group, the sport behaviors include:

2.1 Walking for at least half an hour daily: The highest percentage (77.5%) their responses for this behavior was (Always) with

R.S (92.67%) above the cut of point which assessed as good or pass behaviors.

2.2 Playing exercise: 85% of the study group plays exercise for (Sometimes) according to their responses with R.S (65.0%) and under the cut-off-point assessed as bad or failure behaviors.

2.3 Climbing stairs: 85 % of the study group climbing stairs (Always) which was a good or pass behaviors its R.S (95.0%), and upper the cut-off-point.

2.4 Play skipping rope: the response of (Never) play skipping rope accounted for (52.5%) of the study group. It is assessed as bad or failure behaviors; the R.S is (50.67%).

2.5 Doing daily home activities: 60% of the study group doing daily home activities (Always) these behaviors assessed as good, R.S (86.67%) and upper the cut-off-point.

Ridout et al. showed that there is strong evidence that physical activity can reduce the risk of fractures and improve BMD in postmenopausal women. It has been suggested that physical activity during youth has long lasting beneficial effects on bones in postmenopausal women [(11)].

Students' Knowledge Tables (3, 4) show the comparison significant of Items responding for the student's knowledge about osteoporosis distributed along different of the studied periods. The findings of these tables indicated that the results were a high and assessed good in post-1 and post-2 after the implementation of the instruction program in all domains. In addition to that, statistically result has indicated that there has been mostly highly significant difference at P<0.01 through the changeability between the pre and the two of post periods, which indicating that mean of scores in most domains of students' knowledge about osteoporosis in pre-test with low relative sufficiency and most of them assessed as bad. While there were high, mean scores in all items of the studied program. In addition to that, only two items registered perfect responding with I know along the three periods for all individuals and they are (human bone contain two types of bone tissue which are cortical and spongy, and calcium considered an essential elements for bone formation). The explanation for these finding, that the students may have some information concerning bone structure through previous secondary school studying, which indicating that they should be excluded from the questionnaire in the future. There are four items recorded a non-significant differences at P>0.05 and they are (calcium phosphate is the essential component of bone formation, bone density in human is increased through childhood, adolescent, and youth stages, at old age the bone loss its minerals and become spongy and fragile ,and finally patients with osteoporosis their bone become fragile and easily to broken when they fall or expose to external tense), which reflected low level of knowledge at this particular items and that due to recommend for more point of view and focus through applying the program. Education program had a positive association with osteoporosis knowledge, knowing someone/having a family member with osteoporosis had a positive association with osteoporosis knowledge [(2)]. The results of a study done by Ailinger and Emerson, indicate the majority of women surveyed (age 22 through 84 years) did not have adequate knowledge of osteoporosis, associated risk factors, and preventive behaviors [(12)]. Table (5) reports that the improvement of the students' knowledge about osteoporosis had no relationship with their socio-demographical characteristics, daily life behaviors in the overall assessments of students' knowledge program in multiple periods and that concluded that the program can be amend for all individuals of the population of the students. The study concluded that the

instruction program was effective according to the study findings which showed significantly low mean scores for the study groups responses in pretest, while were significantly high in post-1 and post-2. The effectiveness of the program is not affected by socio demographical characteristics and daily life behaviors which mean that an instruction program can be implemented for all female students and achieves the objectives of the program.

Recommendations:

1. Educational programs as early as adolescence may have a significant impact on their lifestyle behaviors.
2. Public health educational material about the nutrition and exercise needs of young women on mass media or web-based instruction is recommended for enhancing exercise and increasing their dietary calcium to the recommended level.
3. Science curriculums at all educational levels (pre-school, elementary, middle school, high school, college, and nursing school) should be developed to address risk factors and preventive behavioral health lifestyles related to osteoporosis.
4. Future research on osteoporosis prevention should focus on a younger population, namely adolescents, to improve their knowledge of osteoporosis early enough to influence their self-efficacy for their health lifestyle behavioral changes.

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