MERIT RESEARCH JOURNALS
www.meritresearchjournals.org

Merit Research Journal of Medicine and Medical Sciences (ISSN: 2354-323X) Vol. 6(3) pp. 080-088, March, 2018
Available online http://www.meritresearchjournals.org/mms/index.htm

Original Research Article

Assessment of Bone Density in Married and Non-Married Female Students of Umm al-Qura University

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Abstract

Osteoporosis is a disease that affects many millions of people around the world. A low bone mineral content or density in an older person suggest a sub-optimal bone mass in young adulthood (peak bone mass) or greater bone loss in later life, or both. Aim of the study is to estimate bone density in married and non-married female students and determine major causes to prevalence of osteoporosis in age group (19-25years, 100 participants). The design of this study is Cross-sectional study using a convenience sampling technique. This research was conducted between February 2017 till June 2017. The study was carried out at the female student's site, Faculty of Applied Medical Science, Umm Al-Qura University, Makkah, Saudi Arabia. Personal information, Anthropometric measurements, and life style habits, were obtained by closed-ended questions questionnaire. Statistical analysis was performed by using computer program (SPSS 16) using chi square test. All obtained results were tabulated. Osteoporosis was observed in 7 participants, 2 single and 5 married females. The main risk factor for Osteoporosis in Umm Al-Qura University was related to oral contraception. 40% and 20%of subjects who take contraception were at risk of osteoporosis and already have osteoporosis with a significant difference (P ≤ 0.05) with them who did not take contraception represented 20.4% and 4.82% respectively. The results of this study found that married women are more susceptible to osteoporosis than non-married. A significant difference between female who take contraception, and who do physical activity in or less than 30 mins, and who didn't expose to sunlight and high prevalence of osteoporosis was observed.

Keywords: Osteoporosis, Fracture, Bone Density, Nutrition, Factors.

INTRODUCTION

Osteoporosis is a disease that affects many millions of people around the world. It is characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and consequent increase in fracture risk (Prentice, 1997). Fragility fractures are most common at the wrist, spinal vertebrae and hip, although they can occur throughout the skeleton. The incidence of vertebral and hip fractures increases exponentially with advancing age while that of wrist fractures levels off after the age of 60 years (Compston and Osteoporosis, 1993). Osteoporotic fractures are a major cause of morbidity and disability in the elderly and, in the case of hip fractures, can lead to premature death. In addition, they impose a considerable economic burden on health services, costing many billions of dollars each year (Johnell, 1997). World-wide variation in the incidence and prevalence of osteoporosis is difficult to determine because of problems with definition and diagnosis.

The WHO definition of osteoporosis is a bone mineral content (BMC) or bone mineral density (BMD), measured by techniques such as dual-energy X-ray absorptiometry

(DEXA), that is more than 22.5 SD below the young adult mean for the population (WHO, 1994). A low BMC or density in an older person suggest a sub-optimal bone mass in young adulthood (peak bone mass) or greater bone loss in later life, or both. While useful as a working definition within populations, it is unhelpful in comparing populations. Both BMC and BMD are strongly influenced by body size, and populations of shorter stature, such as those in the Far East and Africa, have lower bone mineral status than Western populations but do not have higher rates of osteoporotic fracture (Aspray et al., 1996; Prentice et al., 1994; Russel et al., 1993; Yan et al., 1997; Royal college of physicians 1989). Because of this, the most useful comparison of osteoporosis between populations is fracture rate amongst older people. However, this is not without problems. Many fractures, including those of the spine and wrist, are not life-threatening, can be asymptomatic, and may not come to medical attention. Only population-based screening can accurately determine prevalence rates for these fractures, and few such studies have been conducted. Hip fractures are the exception and many countries have hip fracture registers that can be used to estimate incidence. Even so, definitions vary about what constitutes an osteoporotic (i.e. minimal trauma) fracture, and the exclusion of traumatic fractures may underestimate the prevalence of fragility fractures (Sanders et al., 1998). In addition, quantitative data from developing countries are uncommon, and may be unreliable given the lack of access to medical facilities by older people in the surgeons, and the wonder of determining exact age and cause of fracture in these populations.

Approximately 30% of all postmenopausal women have osteoporosis in the United States and in Europe. At least 40% of these women and 15-30% of men will sustain one or more fragility fractures in their remaining lifetime. Ageing of populations worldwide will be responsible for a major increase in the incidence of osteoporosis in postmenopausal women (Melton et al., 1992; Randell, et al., 1995; Reginster and Burlet 2006).

In general, the most common cause of osteoporosis is its estrogen deficiency in women. Bone loss accelerates after menopause when older women have a quick drop in estrogen. Over time, the risk of osteoporosis and fracture increases as older women lose more bone than they replace. Younger women who stop menstruating such as thin athletes or girls with anorexia also have compromised bone density. Having both ovaries surgically removed, called a bilateral oophorectomy, may also cause osteoporosis and low bone density.

AIM OF STUDY

The aim of this study is to estimate bone density in married and non-married female students and determine major causes to prevalence of osteoporosis in age group (19-25years).

SUBJECTS AND METHODS

Cross-sectional study design using a convenience sampling technique. The research was conducted between February 2017 till June 2017. The study was carried out at the female student's site, Faculty of Applied Medical Science, Umm Al-Qura University, Makkah, Saudi Arabia. Face-to-face interviews were performed for participants. Personal information was obtained by closed-ended question questionnaire.

The study involved 100 volunteers (19 – 25 years) females, including 50 single, while the other half were married and have a child, and there were missing data because some subjects didn't answer all the questions of the questionnaire.

Data Collection

The structured questionnaire was consisted of 3 sections:

- Section A: personal information (questions 1-4)

This section asks about the participants' personal information (first name, last name and age)

- Section B: Anthropometric measurements (questions 5-7)

This section concerned with the baseline measurements including weight, height to calculate the body mass index (BMI)

- Section C: Lifestyle habits (questions 8 –34)

In questions (8-10) we ask about information that includes: participant's place of living, marital status and family size.

While in questions (11-34) we ask the volunteers about their daily consumption of certain products that effect on bone density such as (dairy products, salt, caffeinated drinks and nicotine) and how many servings/packs do they get/smoke per week. We also ask whether they consume vitamin D fortified food or not, do they take supplements (Calcium and Vitamin D), do they take oral contraceptives, level of physical activity, how many times exposed to sunlight and for how long, family history of osteoporosis.

Assessment of anthropometric

Weight was measured by electronic scale. Height was taken by stadiometer to obtain BMI.

BMI was calculated by dividing (weight in kg)/ (height in meters^2) the grades of body mass index were classified according to Quetelet's index (QI) by (Garrow and Webster, 1985; WHO, 1990).

Figure 1. (SOS)

Table 1. Mean ± SD of age, weight, height and BMI

	Age	Weight	Height	BMI
Mean ±	22.7653±2.4	56.1956±	157.9910±	22.4626±
St. Deviation	2326	12.48416	5.60762	4.78780
N	100	100	100	100

Table 2. Frequency distribution of BMI categories

BMI categories	Frequency	Percent
UNDER WEIGHT	18	18.0
NORMAL WEIGHT	49	49.0
OVER WEIGHT	11	11.0
OBESE	10	10.0
Total	88	88.0
System	12	12.0
Total	100	100.0

Bone density measurement

Bone density was measured by a portable Ultra-Bone Sonometer called Sunlight Omni Sense (SOS). Figure 1

Statistical analysis

Statistical analysis was performed by using computer program (SPSS 16) using chi squaretest. All obtained results were tabulated.

RESULTS

As shown in Table 1 the mean ± SD of age**,** weight, height and BMI were 22.7653±, 56.1956, 157.9910 and 22.4626 respectively.

According to Table 2, 49% of subjects have normal weight while 18% had underweight and 10% had obesity. Data in Table 3 show insignificant differences between subjects in their bone status depend on their social status.34 single have normal bone, 11 were at risk of osteoporosis and 2 had osteoporosis while 29 married have normal bone, 12 were at risk of osteoporosis and 5 had osteoporosis with insignificant difference between them, and 33 of women have children have normal bone with insignificant difference with other who did not have child which represented 35.

According to Table 4 subjects who take Ca and vit. D supplements or taking fortified cereal and dairy products with vit. D show insignificant difference in their bone density. However, subjects who did not take contraception have normal bone more than who take it with a significant difference ($P \leq 0.05$) represented (74.7 % vs. 40 %) while 40% and 20%of subjects who take contraception were at risk of osteoporosis and already have osteoporosis with a significant difference ($P \leq 0.05$) with them who did not take contraception represented

Table 3. Effect of social data on frequency distribution of subjects according to their bone status or (category of osteoporosis)

	Risk Factors	Bone Density Classification			Total	P.Value
		Normal	At risk for osteoporosis	Osteoporosis		
BMI classification	Underweight	11	6	1	18	.271
	Normal	38	7	3	48	
	Overweight	7	2	2	11	
	Obese	6	4	0	10	
Total		62	19	6	87	
Place of residence	Makkah	67	23	7	97	.642
	Other	2	0	0	2	
Total		69	23	7	99	
Social status	Single	34	11	2	47	.334
	Married	29	12	5	46	
	Divorced	6	0	0	6	
Total		69	23	7	99	
Having children	Yes	33	12	5	50	.510
	No	35	11	2	48	
Total		68	23	7	98	

Table 4. Effect of taking (oral) supplement and contraceptives on frequency distribution of subjects according to their bone status or (category of osteoporosis)

Risk Factors		Bone Density Classification						Total	P. Value
		Normal		At risk for osteoporosis		Osteoporosis			
		No.	%	No.	%	No.	%		
Taking ca supplement	Yes	10	76.9	3	23.07	0	0	13	.557
	No	59	68.6	20	23.25	7	8.13	86	
Total		69		23		7		99	
Taking vit. D supplement	Yes	12	75	4	25	0	0	16	.523
	No	57	68.6	19	22.9	7	8.4	83	
Total		69		23		7		99	
Taking fortified cereal with vit. D	Yes	18	78	4	17.39	1	4.34	23	.565
	No	50	66.7	19	25.4	6	8	75	
Total		68		23		7		98	
Taking fortified dairy products with vit. D	Yes	23	76.7	4	13.4	3	10	30	.267
	No	46	66.7	19	27.5	4	5.8	69	
Total		69		23		7		99	
Contraception	Yes	6	40	6	40	3	20	15	.015
	No	62	74.7	17	20.4	4	4.82	83	
Total		68		23		7		98	

Table 5. Effect of practice of PA and exposure to sun light on frequency distribution of subjects according to their bone status or (category of osteoporosis)

	Risk Factors	Bone Density Classification			Total	P.Value
		Normal	At risk for osteoporosis	Osteoporosis		
Physical activity practicing	Yes	25	11	5	41	.153
	No	44	12	2	58	
Total		69	23	7	99	
Frequency in the week	Every day	6	0	1	7	.503
	One a week	6	1	1	8	
	2-3 a week	9	7	2	18	
	4-5 a week	4	3	1	8	
Total		25	11	5	41	
Duration	30 min	8	8	0	16	.009

Table 5. eContinu

	<30 min	6	1	4	11	
	>30 min	12	3	1	16	
Total		26	12	5	43	
Exposure to sun	Yes	58	12	4	74	.005
	No	11	11	3	25	
Total		69	23	7	99	
Frequency in the week	Every day	20	3	2	25	.827
	One a week	7	3	0	10	
	2-3 a week	12	4	1	17	
	4-5 a week	17	3	1	21	
Total		56	13	4	73	
Duration	30 min	9	1	0	10	.898
	10 min	23	6	2	31	
	15 min	18	5	1	24	
	other	7	1	1	9	
Total		57	13	4	74	

Table 6. Effect of smoking, anorexia nervosa and fraction on frequency distribution of subjects according to their bone status or (category of osteoporosis)

		Bone Density Classification			Total	P. Value
	Risk Factors	**Normal**	**At risk of osteoporosis**	**Osteoporosis**		
Smoking	Yes	7	7	1	15	.063
	No	62	16	6	84	
Total		69	23	7	99	
Frequency	Daily	1	3	0	4	.396
	Sometimes	6	4	1	11	
Total		7	7	1	15	
Exposing to passive smoke	Yes	35	14	3	52	.512
	No	33	8	4	45	
Total		68	22	7	97	
Family History of osteoporosis	Yes	22	9	5	36	.111
	No	47	14	2	63	
Total		69	23	7	99	
Suffering from anorexia nervosa	Yes	7	1	1	9	.612
	No	60	22	6	88	
Total		67	23	7	97	
History of Bone Fractures	Yes	7	1	1	9	.623
	No	62	22	6	90	
Total		69	23	7	99	

20.4% and 4.82% respectively.

Data in Table 5 show that practice of PA has insignificant differences between subjects on their bone status while duration of practice of PA has significant differences (P≤0.05) on bone status, subjects who do PA more than 30 mints have normal bone higher than who do it 30 mints or less than 30 mints represented 12, 8 and 6 respectively. In the same table exposure to sun light has a significant effect (P≤0.05) on bone status, subject's exposure to sun light has normal bone than them who did not exposure to it with a significant difference (P≤0.05) between them represented (58 vs. 11). While the duration of exposure to sun light was insignificant.

As shown in Table 6 smoking, anorexia nervosa and fraction had insignificant effect on frequency distribution of subjects according to their bone status or (category of osteoporosis).

DISSCUSION

Corson (1993) observed that oral contraceptives are a safe and acceptable form of contraception in premenopausal women and may be effective in maintaining bone mass prior to menopause period. Studies showed properties of oral contraceptives are difficult to interpret because of confounding variables, such as age, smoking, duration of use, exercise,

menstrual function and endocrine diseases Nevertheless, the results of many studies suggest that premenopausal use of oral contraceptives is associated with higher bone mass density than is nonuse. Long-term premenopausal oral contraceptive use may be allowing women to enter menopause with bone density that is 2-3% higher than in nonusers. The optimal duration of use and dosage of estrogen and the clinical importance of this effect remain to be determined (Corson, 1993). On other hand in this study the subjects who did not take contraception have normal bone more than who take it, while 40% and 20%of subjects who take contraception were at risk of osteoporosis and already have osteoporosis with a significant difference.

Oral contraceptives may affect bone density adversely, according to a cross sectional study of 606 women aged 14-30 years, they found that 19- to 30-year-old women's mean BMD was lower with longer OCs use for spine and whole body (p=.004 and p=.02, respectively) and lowest for >12 months of low-dose OCs for the hip, spine and whole body (p=.02, .003 and .002, respectively). (Scholes et al., 2010)

Multiple studies demonstrate that the health benefits of exercise, including reduced risk of falls and fractures. Weight-bearing and muscle-strengthening exercise is recommended for osteoporosis prevention because it improves agility, position, balance, and strength to prevent falls (NOF, 2010). For some patients, exercise increases their risk of fracture and falls, and physicians must keep this in mind, making recommendations for type and degree of activity based on individual risk.

Howe's study included 43 randomized controlled trials investigating whether exercise could prevent bone loss and fractures in postmenopausal women. A small but statistically significant effect of exercise on BMD was observed. Specifically, non-weight-bearing, high-force exercise (e.g., lower-limb, progressive-resistance strength training) was the most effective exercise for femur neck BMD. Combination exercise programs were the most effective for the spine (Howe et al., 2011). So, this study is in agreement with our study. Because in our study we found that practice of physical activity demonstrated benefits, including muscle strengthening and balance retraining, increase force on bones caused by muscle action that's signal to build more bone.

Holick (1995) found that extent of sun exposure (*i.e.* fraction of BSA exposed to sunlight) was more closely related to serum 25(OH)D than was the duration (*i.e.* hours of sun exposure per week). This disparity may be a feature of our approach to measuring these variables. However, the data suggest a strategy for optimizing dermal production of vitamin D without prolonged sun exposure, *i.e.* by maximizing sun-exposed BSA while limiting unprotected time in direct sunlight to periods as short as 15 min/d (Holick, 1995). Even rather intensive sun exposure did not regularly protect against a winter deficit, defined as serum 25(OH)D levels below 75 nmol/liter. Based on the average rate of decline observed in our subjects, it can be estimated that in individuals for whom summer sun exposure is the major source of vitamin D, a late summer 25(OH)D level of approximately 127 nmol/liter is needed to avoid levels falling to less than 75 nmol/liter by late winter. Without another substantial source of vitamin D, it is unlikely that occasional sun exposure by persons who spend most of their daylight hours indoors can support vitamin D repletion, a conclusion congruent with that reached by (Glerup et al., 2000). So, this study is in agreement with our study while in our study we found that people have a dependence on dietary sources of vitamin D, if they have limited exposure to sunlight for cultural or medical reasons, or are dark skinned and living outside the tropics. Trials of calcium and vitamin D in combination have resulted in substantial decreases in incidence of non-vertebral fractures, but not consistently in the reduction of bone loss.

Krall and Dawson-Hughes (1994) found significantly increased whole body, leg, and trunk BMD in women who walked more than 7.5 miles per week compared with women who walked less than one mile per week. In this study, current walking activity reflected lifelong walking habit (Krall and Dawson-Hughes 1994). A similar association between BMD and physical activity was reported in the lumbar spine of postmenopausal women (Sinaki and Offord, 1988). BMD correlated significantly with back muscle strength and level of current physical activity. A physically active occupation has also been shown to be important.

In two-year randomized controlled trial 127 women aged 20–35 years were allocated to either a high impact aerobic exercise training program, or to maintain their current activity levels or participate in a program of light stretching (Friedlander et al., 1995). Only 63 women completed the study (31 controls) but those in the exercise group significantly increased their BMD at the spine, femoral neck, greater trochanter, and calcaneus compared with the control group.

This study is consistent with other side of our study. We found that practice of PA has insignificant differences between subjects on their bone status while duration of practice of PA has significant differences ($P \leq 0.05$)on bone status, subjects who do PA more than 30 mints have normal bone higher than who do it 30 mints or less than 30 mints represented 12, 8 and 6 respectively.

To achieve the maximal efficiency of vitamin D-induced intestinal calcium transport, the serum 25(OH)D concentrations must be at least 78 nmol/L (30 ng/mL) (Heaney et al.,2003).

The net effect is to enhance mobilization of calcium from the skeleton to maintain serum calcium concentrations in the normal range. Vitamin D deficiency results in decreased concentrations of ionized calcium, which are immediately recognized by the calcium sensor in the parathyroid glands (Brown et al., 1995).

Vitamin D-deficient adults with rickets and osteomalacia typically have normal serum calcium concentrations. it is not low serum calcium concentrations that cause osteomalacia among adults. Instead, vitamin D deficiency, which causes secondary hyperparathyroidism, results in PTH-induced loss of phosphorus into the urine and decreased intestinal phosphorus absorption. Result in an inadequate calcium-phosphate product, which is important for the mineralization process. This is what causes the mineralization defects that result in rickets among children and osteomalacia among adults (Holick 2003).

This study is parallel to our study because in our study we found that subjects exposure to sun light has normal bone than who did not exposure to it with a significant difference between them represented (58 vs. 11). Presented data show insignificant difference subjects on their bon status according to duration of exposure to sun light.

The results found that married women are more susceptible to osteoporosis than single women. Also in brazil, found from a sample of 54,369 individuals that the percentage of osteoporosis among 33,075 women was 2.4 % in single women and 7.0 % in married women (Martini et al., 2009).

Paniagua et al. (2006) conducted study about BMI and low bone mass in an elderly male nursing home population, the BMI of individuals in this study observed that 35.6% of patients had normal BMI, 3.4% were underweight, 47.5% overweight, and 13.6% obese. And our result showed that BMI, 49% of subjects have normal weight while 18% had underweight and 10% had obesity.

BMI of individuals in this study observed that 6.1% of subjects had normal BMI, while 93.9% of subjects were overweight or obese. On our study according to Table 2, 49% of subjects have normal weight while 18% had underweight and 10% had obesity (Oommen et al., 2014).

Bone health is primarily determined by peak bone mass achieved (usually around 30 years of age) and the rate of bone loss in the succeeding years (Wark 1996).

Among treatable causes of osteoporosis, smoking has long been established as a contributing risk factor (Wong et al.,2007) as it affects the balance of the naturally occurring processes of bone resorption and bone formation, resulting in low BMD as the amount reabsorbed is not fully replaced (Szulc et al., 2002 and Vogel et al., 1997).

Smoking is thought to cause low bone density through various pathways:

1. Smoking has been linked to changes in hormone household, leading to a decrease in parathyroid hormone (thus reducing calcium absorption) and oestrogen levels as well as to an increase in the level of cortisol and adrenal androgens, changes that have been linked to an increased risk of osteoporosis (Kapoor and Jones, 2005).
2. Smoking reduces body mass, which is postulated to provide an osteogenic stimulus and is linked to higher BMD (Daniel et al., 1992).
3. Smoking reduces the level of Vitamin D in the body, which is required for good bone health (Brot et al., 1999).
4. Smoking increases free radicals and oxidative stress which affects bone resorption (Duthie et al., 1991).
5. Smokers are more likely to suffer from peripheral vascular disease, reducing blood supply to the bones (Vestergaard and Mosekilde, 2003).
6. As smokers are weaker, have poorer balance and impaired neuromuscular performance, smoking may also increase the risk of falls (Nelson et al., 1994).
7. Finally, there may also exist direct toxic effects of many of the constituents in tobacco smoke on bone cells (Broulikand Jarab, 1993). Meta-analyses have attempted to estimate the effect of smoking on bone health. While estimates vary, there is a significant effect of smoking on overall fracture risk – in particular for the hip, spine and heel bone. Overall, risk of any fracture is increased by about 25% in current smokers and for hip fractures risk is increased between 40–84% and there is an increase in risk to over a 100% in those over 85 years of age (Vestergaard and Mosekilde, 2003; Wardand Klesges, 2001; Kanis et al., 2005 and Law and Hackshaw, 1997).

The strongest evidence of the effects of smoking in decreasing bone mineral density comes from a landmark study which concluded that roughly one in eight hip fractures may result from cigarette smoking. The study showed that current smokers lose bone at faster rates than non-smokers, and by age 80 this can translate into 6% lower bone mineral density, and greater fracture risk. Hip fracture risk among smokers, as compared to non-smokers, was shown to be greater at all ages but rises from 17% greater at age 60 to 71% at age 80 (Lawand Hackshaw 1997).

Male smokers may be at even higher risk than women, with a recent study finding that male smokers had a small, but significantly greater risk of low bone density, and more vertebral fractures, than female smokers (Hollenbachet al., 1993).

Osteoporosis develops in women with chronic anorexia nervosa. To determine whether bone mass is reduced in younger patients as well, bone density was studied in a group of adolescent patients with anorexia nervosa. With single- and dual-photon absorptiometry, a comparison was made of bone mineral density of mid radius, lumbar spine, and whole body in 18 girls (12 to 20 years of age) with anorexia nervosa and 25 healthy control subjects of comparable age. Patients had significantly lower lumbar vertebral bone density than did control subjects (0.830 +/- 0.140 vs 1.054 +/- 0.139 g/cm2) and significantly lower whole-body bone mass (0.700 +/- 0.130 vs 0.955 +/- 0.130 g/cm2). Midradius bone density was not significantly reduced. Of 18 patients, 12 had bone density greater than 2 standard deviations less than normal values for age. The diagnosis

of anorexia nervosa had been made less than 1 year earlier for half of these girls. Body mass index correlated significantly with bone mass in girls who were not anorexic (P less than .05, .005, and .0001 for lumbar, radius, and whole body, respectively). Bone mineral correlated significantly with body mass index in patients with anorexia nervosa as well. In addition, age at onset and duration of anorexia nervosa, but not calcium intake, activity level, or duration of amenorrhea correlated significantly with bone mineral density. It was concluded that important deficits of bone mass occur as a frequent and often early complication of anorexia nervosa in adolescence. Whole body is considerably more sensitive than mid radius bone density as a measure of cortical bone loss in this illness (Bachrach et al., 1990).

So, all the previous studies conflict to ours. Because in our study we found that smoking, anorexia nervosa and fraction had insignificant effect on frequency distribution of subjects according to their bone status, while in a study done in 2007 by Wong, Christie and Wark they found that smoking affects the processes of bone resorption and bone formation, resulting in low BMD, as other pathways that affect the bone density mentioned in the study as well. There is also a significant effect of smoking on overall fracture risk. Another study was done in 1997 by Law and Hackshaw showed that roughly one in eight hip fractures may result from cigarette smoking. The study showed that current smokers lose bone at faster rates than non-smokers. In another study done in 1990 by Bachrach bone density was studied in a group of adolescent patients with anorexia nervosa, it showed that important deficits of bone mass occur as a frequent and often early complication of anorexia nervosa in adolescence (Bachrach et al., 1990).

CONCLUSIONS

From this study, we find out that there's a relation between social status and osteoporosis. in that, married women are more susceptible to osteoporosis than non-married. We figure out those women who take contraception, and who do PA in or less than 30- mins, and who didn't expose to sunlight are at risk of osteoporosis. These findings suggest that in general there should be awareness of osteoporosis risk factors at this age group and especially for married women.

RECOMMENDATIONS

From the results of this study it is beneficial to have these recommendations:

- Follow a general physical activity every day and some weight-bearing, strength-building, and balance-enhancing activities 2 or more times a week to provide a positive stimulus for bones, muscles, and other aspects of health.
- Women who take contraceptives should consider the costs and benefits of them and should follow the doctor's instructions, to prevent any consequences regarding bone and general health.
- Married women/mothers, should maintain a healthy diet that consists of enough vitamin D, calcium and all the other vitamins/minerals to prevent osteoporosis.
- Measure Bone Mineral Density and body composition regularly to notice any changes for it.
- Maintain a healthy body weight and BMI that protects you from the overweight and bone problems.

ACKNOWLEDGEMENT

We are grateful to Rawan Al-Amoudi, Reem Al-Hashmi, Shahad Al-Mehmadi, Dima Felemban, Hajer Abu Naji, Afrah Al-Refaei and Mroog Kalakatawi for their efforts through the research.

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