Relationship between Breastfeeding History and Osteoporosis among Women Attending Baghdad Teaching Hospitals.

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Abstract
Objective: To find out the relationship between breastfeeding and osteoporosis.
Methods: A purposive sampling consist of one hundred women whose aged ≥ 40 years who had breastfeeding history and diagnostic osteoporosis attending Baghdad Teaching Hospitals /Rheumatology Department from 14th Feb. to 16th March 2016. Determined validity and reliability of questionnaire through pilot study. Analyze data by using descriptive and inferential statistical procedures.
Results: The study show that the highest percentage (40%) of the study sample is within age group (50-59) years, (40%) of them had 6 or more children of breastfeeding, more than half (58%) of them were ≥ 13 months the duration of breastfeeding, (53%) of them was 4 times/ day breastfed.
There are statistically significant relationship between (Age at first breastfeeding, Type of feeding) and Low Bone Mineral density, and Cause of breastfeeding stopped and Osteoporosis family history.
Conclusion: There are statistically significant relationship between (Age at first breastfeeding, Type of feeding) and Low Bone Mineral density and Cause of breastfeeding stopped and Osteoporosis Family History . The study recommended : Encouraging women at ≥ 40 years age for early detection osteoporosis through DEXA examination and all women should be aware to take adequate calcium and vitamin D during pregnancy and breastfeeding to avoid risk of osteoporosis during menopausal age.
Keywords: Breastfeeding History, Relationship, Osteoporosis.

I. Introduction

Osteoporosis has become a global public health problem that is estimated to affect more than 200 million people worldwide. The disease affects 1 in 3 postmenopausal women and 1 in 5 men aged above 65 (1). In Iraq, high prevalence (22.8%) of osteoporosis in postmenopausal women has been reported in 2008 (2). The Canadian Multicenter Osteoporosis Study (CaMos) estimated the prevalence of osteoporosis in those over age 50 to be 21.3% in women and 5.5% in men (3). Pregnancy and breastfeeding may decrease bone mineral density and in turn, increase the risk of osteoporosis in women , because of the major hormonal changes and the large transfer of calcium from the mother to fetus and infant that occurs during these periods (4). Many studies have shown the association between breastfeeding and osteoporosis . However, the results are conflicting , some studies found no association between breastfeeding and osteoporosis later in life (5,6), in contrast, some studies show that breastfeeding history is associated with an increased Bone Mineral Density. (7). Study reported that an extended breast-feeding period (> 1 year per child) is the highest risk factor for osteoporosis independent of age at first breast feeding (8) .

II. Methodology

A purposive (non-probability) sample consisted of one hundred married women whose aged 40 year and above ,had breastfeeding history , had been diagnostic osteoporosis and attending different Teaching Hospitals / Rheumatology Department, in Baghdad city. The data were collected by questionnaire form through face to face interview and woman's report which included measurement of the bone mineral density level .The approximate time interviewing for each women was (15-20) minutes during 14th Feb. to 16th March 2016. Determined validity and reliability of the questionnaire through of pilot study. The study instrument consisted of three parts Part One: demographic data: It includes the following variables (age, social status, educational level for woman, monthly income (From woman's point of view). Part Two: Breastfeeding Information: It include : age at first breastfeeding, No. of breastfeeding Children , type of feeding, duration of breastfeeding \ monthly, frequency of breastfeeding \ day , child age of weaning , cause of breastfeeding stopped). Part Three: Osteoporosis Information It include (woman age at diagnosis , BMD (T-score) ,previous fracture history for woman, osteoporosis family history) . Statistical data analysis approach by using (SPSS 20) is used in order to analyze and apply of Statistical procedures (descriptive and inferential) .

Ethical consideration:

Verbal consent from each women of the study samples was obtained and the participation was confidential and voluntary , the information was for research purposes only.

III. Results
Table 1: The Demographic data**.**

Variables	* F	** %
Age/ years		
40-49	16	61%
50-59	40	40%
60-69	34	34%
≥70	10	10%
$\overline{\chi}$ =57.8 ± 8.03		
Social status		
Married	65	65%
Divorce	5	5%
Widow	30	30%
Educational level for woman		
Illiterate	27	27%
Read and write	11	11%
Primary school	11	11%
Intermediate school	16	16%
Secondary school	9	9%
Institute	8	8%
College or above	18	18%
Monthly income (point of view for woman)		
Insufficient	44	44%
Barely sufficient	19	19%
Sufficient	37	37%

*F= Frequency **% = Percentages

Table (1) shows that the highest percentage (40%) of the study sample is within age group (50-59) years with mean and SD 57.8 ±8.03, while the lowest percentages (10%) with age 70 and more years.
Concerning social status: The highest percentage (65%) of the study sample were married , while the lowest percentages (5%) of them were divorce. According to educational level: The highest percentage (27%) of the study sample were illiterate , while the lowest percentages (8%) of them were graduated from institute. Concerning monthly income: The highest percentage (44%) of the study sample monthly income were insufficient, and (37%) of them consider monthly income sufficient ,while the lowest percentages (19%) of them barely sufficient monthly income from woman's point of view.

Table (2): History of Breastfeeding**.**

Variables	F	%
Age at first breastfeeding/ Years		
<15	5	5%
15-19	29	29%
20-24	30	30%
25-29	21	21%
≥30	15	15%
$\overline{\chi}$ = 23.17 ± 6.876		
No. of breastfeeding children		
One child	16	16%
2-3	18	18%
4-5	26	26%
6+	40	40%
Type of feeding		
Breastfeeding	40	40%
BF& Bottle feeding	60	60%
Duration of breastfeeding/month		
1-6	22	22%
7-12	20	20%
13 and more	58	58%
Number of breastfeeding /day		
4 times	53	53%
6 times	42	42%
As needed	5	5%
Child age at weaning/ month		
After 4	19	19%
After 6	66	66%
After 8	15	15%

Cause of breastfeeding stopped		
Complete 2 years	53	**53%**
Pregnancy	6	6%
Desire of child to stop BF	12	12%
Woman 's return to work	9	9%
Woman's milk insufficient	16	16%
Nipple's scare	4	4%
Total	**100**	**100**

Table (2) shows that the highest (30%) of the study sample their age were (20-24) year at first breastfeeding with mean and SD 23.17 ± 6.87, while the lowest percentage (%5) of them were at age less than 15 year. More than one third (40%) of the study sample had 6 or more children , while the lowest percentage (16%) of them had one child. Concerning Type of feeding: The highest percentage (60%) of the study sample was breast and bottle feeding, while the lowest percentage (40%) of them was breast feeding only. Regarding Duration of breastfeeding: More than half (58%) of the study sample were 13 months and more the duration of breastfeeding , while the lowest percentage (20%) of them were 7-12 months the duration of breastfeeding. Regarding Frequency of breastfeeding/day: More than half (53%) of the study sample breastfed 4 times/ day , while the lowest percentage (5%) of them were breastfed as needed. Concerning Child age at weaning: The highest percentage (66%) of the study sample was weaning their child at 6 months of age , while (15%) of them was weaning at 8 months of age. Regarding the cause of breastfeeding stopped: More than half (53%) of the study sample were complete 2 years breastfed, while the lowest percentage (4%) of them were because of nipple's scare

Table (3): The Osteoporosis Information.

Variables	F	%
Age at diagnosis/years		
<45	3	3%
45-54	37	37%
55-64	38	**38%**
65 and more	22	22%
$\bar{\chi}$ = 56.92 ± 8.39		
Osteoporosis family history		
Yes :-	23	23%
Father	2	
Mother	15	
Both	6	
No	77	**77%**
Previous fracture history for woman		
Yes :-	29	29%
Foot	13	13%
Hand	13	13%
Hip	1	1%
Leg	2	2%
No	71	**71%**
BMD (T-score)		
$\bar{\chi}$ = -3.4 ± .90		
Total	**100**	**100**

Table (3) shows that the highest percentage (38%) of study sample was at age (55-64) years when she diagnosis with osteoporosis with mean and SD 56.92 ±8.39, while the lowest percentage (3%) were at age less than 45 year. Regarding the osteoporosis family history: The highest percentage (77%) of the study sample had no osteoporosis family history , while the lowest percentage (23%) of them had previous osteoporosis family history (father2 , mother 15, both 6). Regarding the Previous fracture history for woman : The highest percentage (71%) of the study sample had no previous fracture , while lower percentage (29%) of them had previous fracture location in (13 foot, 13 hand, 1 hip , 2 leg). The Bone Mineral density (T-score) mean and SD of the study sample were (-3.4 ± .90) which considered sever osteoporosis.

Table (4): Relationship Between Breastfeeding History and Osteoporosis.

Osteoporosis Breastfeeding	Woman's Age at Diagnosis OP			Low BMD			OP Family History		
	χ^2	Df	P.V	χ^2	df	P.V	χ^2	df	P.V
Age at First BF	17.017	12	.149	19.333	12	**.041**	7.947	4	.104
Type of feeding	2.882	3	.410	6.811	3	**.038**	1.845	1	.174
Duration of BF	6.058	6	.417	6.473	6	.372	1.242	2	.537
Frequency of BF	8.142	6	.228	3.948	6	.684	.418	2	.812
Child age of weaning	6.293	6	.391	1.351	6	.969	2.067	2	.356
Cause of BF stopped	22.154	15	.104	13.362	15	.574	11.293	5	**.046**

☐ ☐ **OP**: Osteoporosis ****BMD**: Bone Mineral density

Table (4) shows that there are statistically significant relationship between (Age at first breastfeeding and Type of feeding) and Low Bone Mineral density, there are statistically significant relationship between (Cause of breastfeeding stopped and Osteoporosis Family History),while there are no statistically significant relationship between variables of breastfeeding and Woman's age at diagnosis OP. there are no statistically significant relationship between (Duration of breastfeeding, Frequency of breastfeeding , Child age at weaning and Cause of breastfeeding stopped) and Low Bone Mineral Density, also there are no statistically significant relationship between Age at first breastfeeding , Type of feeding, Duration of breastfeeding, Frequency of breastfeeding and Child age at weaning) and Osteoporosis Family History.

IV. Discussion

The findings of the present study have indicated that the highest percentage (40%) of the study sample were at age (50-59) year as shown in table (1). The World Health Organization has been estimated that 13–18% of women aged 50 year and over have osteoporosis (9). Other Study show that women aged (50-59) year have increased incidence of osteoporosis (10). Study reported that18 million woman have low bone mass and risk for osteoporosis , half of them aged 50 years and older will have at least one osteoporosis-related fracture in their lifetime (11). Regarded marital status the highest percentage (65%) of the study sample were married as shown in Table (1).Higher risk for low bone mineral density among married women, marriage is associated with pregnancy and breastfeeding of the newborns which are both factors that decrease the bone mineral density Therefore, a higher risk of osteoporosis among married women compared with women who are single (12 , 13, 14). According to educational level: The highest percentage (27%) of the study sample were illiterate as shown in Table (1), low educated women are more prone to low density bone and lower chance of exposure to information regarding prevention of osteoporosis (15, 16, 17). Concerning monthly income: The highest percentage (44%) of the study sample monthly income were insufficient as shown in Table (1), studies have shown that lower income is associated with osteoporosis , income levels and housing types are closely related to bone mineral density status. Low monthly income and unemployment women have been associated with a greater risk of hip fracture (18, 19, 20).

The highest percentage (30%) of the study sample their age were (20-24) year at first breastfeeding with mean and SD 23.17 ± 6.87as shown in Table (2). In cross-sectional study performed in postmenopausal women reported that there was a significantly lower incidence of osteoporosis among women who first breastfed at age after 27 years (21). The highest percentage (40%) of the study sample had 6 or more children, this agree with a study of Sri Lankan women with ≥5 breastfeeding of children had low bone mineral density at lumbar spine (LS) and femoral neck (FN) that comparative of women with lesser parity and fewer months of breastfeeding (22). Concerning type of feeding: The highest percentage (60%) of the study sample was breast & bottle feeding as shown in table (2). Studies reported that history of breastfeeding affects bone mineral density and fracture risk later in life (23, 24). While other study show that postmenopausal women with a history of breastfeeding had higher bone mineral density in the lumbar spine (25). Regarding duration of breastfeeding: More than half (58%) of the study sample were 13 months and more the duration of breastfeeding as shown in table (2). Study was found that low bone mineral density in women whose breastfeeding was 12 months or less, while in women who breastfed over 12 months the rate of osteoporosis decreased in Femoral Neck and increased in Lumbar Vertebra (26; 27). Study reported that postmenopausal women who breast fed more than one year per child have an increased risk for bone mineral density in the lumbar spine and femoral neck and it is a risk factor for osteoporosis (21). Study observed that women who had an average breastfeeding period of more than one year per child showed a strong positive correlation with osteoporosis (28). Regarding frequency of breastfeeding/day: More than half (53%) of the study sample was 4 times/ day breastfeeding as shown in table (2) , study indicated breastfeeding its frequency (4 times or more) and duration (1-6 months) as significant affected elements of bone density(29). The highest percentage (66%) of the study sample was weaning their child at 6 months of age as shown in table (2). Study reported that mothers with up to 6 months breastfeeding bone loss stops 6 months after delivery it reaches baseline level, while if breastfeeding continues for 12 months or more bone mass does not reach baseline level and increase risk of osteoporosis in later life (30). The impaired postweaning BMD followed by inadequate calcium and vitamin D intake in subsequent years may result in low BMD in postmenopausal period (31). Regarding cause of breastfeeding stopped: More than half (53%) of the study sample were complete 2 years as shown in table (2). (32) demonstrated that a significant association between breastfeeding and bone mineral density when women had breastfeeding increased 24 months up to 36 months. Women be breastfed infants exclusively for six months with a further recommendation of continuing breastfeeding until at least 2 years of age with the addition of appropriate complementary foods, due to long-term benefit of breastfeeding that reduces risk of osteoporosis (33,1)

The highest percentage (38%) of study sample was at age (55-64) years when she diagnosis with osteoporosis with mean and SD 56.92 ±8.39 as shown in table (3). Study showed that woman with the

advanced age more prone to risk of having osteoporosis (34). The U.S. Preventive Services Task Force (USPSTF) recommends bone mineral density screening for women 65 years and older to diagnostic osteoporosis. Screening should begin at 60 years in women who are at increased risk for osteoporotic fractures (35). The Bone Mineral density (T-score) mean and SD of the study sample were (-3.4 ± .90) which considered sever osteoporosis. The classification of osteoporosis is given to those whose BMD score is greater than or equal to - 2.5 SDs below the mean (36). T scores represent the number of SDs from the mean bone density values, used to make a diagnosis of normal bone density and important way to identify a woman with an increased risk for fracture (37, 38, 39, 40). Previous fracture history for woman: The highest percentage (71%) of the study sample had no previous fracture as shown in table (3), history woman of hip fracture and fractures at other sites were significantly associated with osteoporosis in later life (37). Study reported that maternal history of fracture was clinical indicator of risk for osteoporosis(40) . Study reported that a history of previous fracture was associated with an increased risk of any fracture considering history of previous fracture as a prognostic factor for risk of future fracture (21). Regarding the osteoporosis family history: The highest percentage (77%) of the study sample had no osteoporosis family history as shown in table (3). Study reported that no association between family history and bone mineral loss. Family history of osteoporosis is an independent risk factor for osteoporosis and this risk increases if two or more first degree relatives gave a positive history (42) . The low reporting of osteoporosis in family members by women could be due to lack of knowledge and awareness of osteoporosis, impaired memory or an insufficient availability of screening methods for the detection of osteoporosis among family members (43, 44)

There are statistically significant relationship between (Age's woman at first breastfeeding and Type of feeding) and low bone mineral density, and between the cause of breastfeeding stopped and Osteoporosis family history as shown in table (4), study reported in a prospective study that women who breastfed during adolescence age had a positive effects in hip bone mineral density than those who did not breast-feed (45). The risk of osteoporosis is significantly increased for women who first breastfed at the age between 24- 29 years(46). Case-control study found a positive association between breastfeeding history and bone mineral density in the femoral neck, total hip, and lumbar spine (Kreiger et al , 2002).

V. Conclusion

The study 's results concluded that the highest percentages of the study sample were peri menopausal age , low education level and monthly income insufficient with high parity and breastfeeding their baby for more than one year and they had osteoporosis. Therefore , there are statistically significant relationship between (Age at first breastfeeding, Type of feeding) and Low Bone Mineral density at later in life, there are statistically significant relationship between Cause of breastfeeding stopped and Osteoporosis family history. The study recommended: Encourage women 40 years age and above for early detection for osteoporosis through DEXA examination ,all women should be aware to take adequate calcium and vitamin D during pregnancy and breastfeeding to avoid risk of osteoporosis during menopausal age.

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