Obesity and Food Frequency Intake among Female Breast Cancer Patients in Qatar

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Abstract: Introduction: Breast cancer is one of the most common forms of cancer that now strikes more women in the world. **Objective:** This study was conducted to assess the relationship between body weight and cancer breast, and to explore some of the possible associated factors in a sample of Qatar population. **Methods:** A randomized-controlled study was conducted. Data were obtained from a random sample of 138 women attending AL-Amal Hospital out-patient clinic in two months period. 69 patients were normal, and 69 were diagnosed as having cancer breast. The patients were interviewed using pre-tested questionnaire, and daily food intake was obtained using food frequency questionnaire. Body mass index (BMI) was used as a measure of adiposity. **Results:** Age of the sample included in the study ranged from 20 to 80 years. 66.7% were Qatari, 33.3% non-Qatari. 82.61% were married. 61.59% of all cases had college education or above. 69.6% of cancer patients were obese compared with 40.6% of no cancer. 37.7% of no cancer females had normal weight compared with 10.1% of cancer patients (p-value = 0.00). Breast cancer cases who had positive history of obesity were significantly higher (78.3%) compared with 55.1% of no cancer cases (p -value = 0.004). 39.13% of cancer patients had obesity during adult hood compared with 15.94% for no cancer patients (p -value = 0.00). 75.36% and 47.8% of cancer and non cancer patients respectively, had obesity for ≥ 3 years (p -value = 0.001). The results revealed that the highest rate of breast cancer (47.8%) was among patients aged 40-50 years. Cancer was higher among Qatari females (53.6%) than non-Qatari (46.4%) (p value = 0.001). Breast cancer was significantly higher among menopausal women (57.97%) than non menopausal (42.03%) (p value= 0.00). Breast cancer patients who never or rarely did exercise presented (71.01%) compared with 66.67% of non breast cancer. Daily food intake of cancer patients was significantly higher than no cancer patients in fruit, butter, margarine, eggs, legumes, and smoked food. **Conclusion:** cancer was higher among obese patients and patients who had a history of obesity especially obesity during adult hood and for long period of time.
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1. Introduction:

Breast cancer incidence rates in developed countries have stabilized or increased slightly in recent years; however, cancer mortality rate has been decreasing (1-3). In Middle Eastern countries, the incidence and mortality rates are rising (4-6), and cancer is diagnosed at more developed stages (7).

Qatar has experienced substantial development and lifestyle changes driven largely by oil and natural gas wealth (5).

Cancer is a major public health problem in Qatar, with increase in incidence with age. Incidence rates of all cancers are higher across all age groups of women compared to men. Lung cancer was the most frequent cancer diagnosed in men and breast cancer in women. There was a sharp rise in the total number of cancer cases during the period 2002-2006 of 57.1% compared to the period 1991-1996 (5).

Breast cancer is one of the most common forms of cancer that affect more women in the world resulting in increased morbidity and mortality (8). According to the American Cancer Society, in 2004, 217440 new cases were diagnosed as breast cancer patients in United States, 1450 were males, and 215,990 were females (8).

According to Qatar Cancer Registration, the incidence of breast cancer in Qatar in 2004 was 65 cases, 26 were female Qatari, 3 males, and 36 non Qatari females (9). This number was 20 in 1990, 32 in 1995, 60 in 2000, 45 in 2001, 60 in 2002, 67 in 2003, and 200 cases in 2013 (9).

Risk factors for breast cancer include genetic factors, positive family history of breast cancer (10,11), age over 50 years (8), early menarche (12), late age of menopause (13), use of hormone therapy (14), obesity (15), weight gain during adulthood (16), and physical inactivity (17). High intake of fat (18) and red meat, and low intake of fruits and vegetables were associated with increased risk of breast cancer (19).

Aims of the study:

This study was conducted to assess the relationship between body weight and cancer breast, to explore some of the possible associated factors, and the effect of dietary habits on the development of breast cancer in a sample of female Qatar population.

2. Methods:

Data of this controlled study were obtained from women attending Al-Amal hospital out- patient clinic in Doha, State of Qatar. All women aged 20 years and above who attended the out-patient clinic in two months period were interviewed and included in the study. The total sample was 138 (69 were previously diagnosed as cancer breast, and 69 as no cancer breast patients).

The women were interviewed using pre-tested questionnaire containing information about family history of cancer in general, and breast cancer in particular, history of obesity, parity, breast feeding, age of menarche and menopause, plastic surgery, exercises, self examination, mammography, use of contraceptives and hormonal therapy, and food frequency intake including intake of fat, cholesterol, soda, alcohol, fruits and vegetables was obtained.

Heights and weights were measured by trained nurse. The body mass index (BMI) which is defined as the body weight in kilogram divided by the height in squared meter) was calculated. Classification of the World Health Organization (WHO) was adopted, where BMI levels <18.5 Kg/m^2 were underweight, (18.5-24.9 Kg/m^2) normal, (25-29.9 Kg/m^2) overweight, and ≥ 30 Kg/m^2 as obese.

Data were processed and analyzed using Minitab software package, version 13.2. ANOVA was used to test statistical association between variables. Chi-square was used to compare differences between groups.

3. Results:

The sample included in the study was 138 females, 69 normal (no cancer), 69 were diagnosed as cancer breast patients. Age of the sample included ranged from 20 to 80 years. 66.7% were Qatari, 33.3% non-Qatari from different nationalities. 82.61% were married. 61.59% of all cases had college education or above. 53.67% of all patients were employed.

Table (1) depicts cancer breast by demographic variables. Data revealed that the highest rate of breast cancer (47.8%) was among patients aged 40-50 years, followed by higher age 50-80 year (34.8%). However, no breast cancer cases were detected among age 20-30 years.

Breast cancer was significantly higher among Qatari females (53.6%) than non-Qatari (46.4%) (p -value = 0.001).

89.9% of the cancer patients were married compared with 75.4% of the no cancer women (p -value = 0.025). Education (college and above) was significantly higher among patients who did not have cancer (73.9%), compared with 49.3% in cancer patients (p -value = 0.005). 52.2% of breast cancer patients were employed compared with 40.6% of the no cancer patients.

Table (1): Breast cancer by demographic data:

Demographic data	Cancer		No cancer		*P*-value
	No.	%	No.	%	
Age					
20-30	0	0	18	26.1	**0.00***
30-40	12	17.4	28	40.6	
40-50	33	47.8	18	26.1	
50-80	24	34.8	5	7.2	
Nationality					
Qatari	37	53.6	55	79.7	**0.001***
Non Qatari	32	46.4	14	20.3	
Marital status					
Single	7	10.1	17	24.6	**0.025***
Married	62	89.9	52	75.4	
Education					
Below college	35	50.7	18	26.1	**0.005***
College and above	34	49.3	51	73.9	
Employment					
Yes	33	47.8	41	59.4	**0.769**
No	36	52.2	28	40.6	

69.6% of cancer patients were obese compared with 40.6% of no cancer. 37.7% of no cancer females had normal weight compared with 10.1% of cancer patients (p -value = 0.00), (Table 2).

Positive history of obesity was significantly higher 78.3% in cancer patients compared with 55.1% for normal cases (p -value= 0.004) (Table 3).

39.13% of cancer patients had obesity during adult hood compared with 15.94% for normal cases (*p* -value 0.00) (Table 4).

75.36% and 47.8% of cancer and normal patients respectively, had obesity for ≥ 3 years (*p* -value = 0.001) (table 5). No underweight patients were detected in the tested sample.

Table (2): Breast cancer by BMI:

BMI	Breast cancer					
	Yes		No			
	No.	%	No.	%	Total	%
Normal weight	7	10.1	26	37.7	33	23.9
Over weight	14	20.3	15	21.7	29	21.0
Obese	48	69.6	28	40.6	76	55.1
Total	69	100	69	100	138	100

p value = 0.00

Table (3): Breast cancer and history of obesity:

History of obesity	Breast cancer			
	Yes		No	
	No.	%	No.	%
Yes	54	78.26	38	55.1
No	15	21.74	31	44.9
Total	69	100	69	100

P = 0.004

Table (4): Breast cancer and time of obesity:

Time of obesity	Breast cancer					
	Yes		NO			
	No.	%	No.	%	Total	%
No obesity	15	21.74	31	44.93	46	33.33
Childhood	12	17.39	14	20.29	26	18.84
Adolescence	15	21.74	13	18.84	28	20.29
Adulthood	27	39.13	11	15.94	38	27.54

P-value = 0.00

47.8% of cancer patients had positive family history of breast cancer compared with 27.5% of no cancer patients (*p* -value = 0.014).

57.98% and 55.07% of breast cancer and no breast cancer patients had menstruation started between age >11 to 13 years (*p* -value = 0.169), (Table 6).

Table (5): Breast cancer by duration of obesity:

Duration of obesity	Breast cancer			
	Yes		NO	
	No.	%	No.	%
No obesity	15	21.74	31	44.9
1 year	2	2.9	3	4.4
2 years	0	0	2	2.9
≥ 3 years	52	75.36	33	47.8

P-value = 0.001

Breast cancer was significantly higher among menopausal women (57.97%) than non menopausal (42.03%) (*p* -value = 0.00) (Table 6).

Statistical significant difference was detected between breast cancer and no breast cancer patients by duration of menopause with highest percentage 36.23% among patients with menopause for ≥ 4 years (*p* -value=0.00) (Table 6).

Table (6): Breast cancer and menstruation:

	Cancer		No cancer		*p* -value
	No.	%	No.	%	
Age at menarche					
≤10	3	4.34	0	0	**0.169**
>10-11	11	15.94	11	15.94	
>11-12	20	28.99	16	23.19	
>12-<13	20	28.99	22	31.88	
≥13	15	21.74	20	28.99	
Menstruation					
Present	29	42.03	60	86.96	**0.00***
Stopped	40	57.97	9	13.04	
Menopause					
Menstruation present	29	42.03	60	86.96	**0.00***
1 year ago	8	11.59	3	4.35	
2 years	6	8.7	1	1.45	
3 years	1	1.45	0	0	
≥ 4 years	25	36.23	5	7.24	

Breast cancer was significantly higher 55.07% among females who had ≥ 4 children compared with 44.93% for normal patients. Only 10.14% of cancer patients had no children compared with 33.34% for normal cases (*p* -value =0.008) (Table 7).

(86.96%) of cancer patients breast fed their babies compared with 63.77% of the no cancer patients (*p* -value = 0.001).

10.14% of cancer patients had plastic surgery of breast while non of the normal patients had it (*p* -value = 0.006).

Breast cancer patients who never or rarely did exercise represented (71.01%) compared with 66.67% of normal. 20.29 % of the no cancer patients compared with 5.81% did exercise for 1-2 times weekly (*p* -value = 0.476).

Self examination of breast was done by 59.42% of both cancer and no cancer patients (*p* -value= 0.408).

89.96% of cancer patients had mammography compared with 52.17% for normal patients (*p* -value = 0.00). 43.48% of cancer patients and 28.99% of normal patients had mammography one time in their lives (*p* -value = 0.00). 40.6% of breast cancer patients were using contraceptive pills compared with 34.8% for normal patients, while 59.4% of cancer patents, and 55.1% for normal patients were not using any contraceptives (*p* -value = 0.052).

7.25% of breast cancer patients used hormone therapy compared to 4.35% of normal cases (p-value = 0.470) (table 7).

Table (7): Breast cancer by other factors:

Factor	Cancer		No cancer		*p* -value
	No.	%	No.	%	
Number of children					
0	7	10.14	23	33.34	**0.008***
1	4	5.81	5	7.24	
2	9	13.04	3	4.35	
3	11	15.94	7	10.14	
≥4	38	55.07	31	44.93	
Breast feeding					
Yes	60	86.96	44	63.77	**0.001***
No	9	13.04	25	36.23	
Plastic surgery of breast					
Yes	7	10.14	0	0	**0.006***
No	62	89.86	69	100	
Exercise					
Never or rarely	49	71.01	46	66.67	**0.476**
1-2 times/week	4	5.81	14	20.29	
3-4 times/week	9	13.04	6	8.69	

More	7	10.14	3	4.35	
Self-test					
Yes	41	59.42	41	59.42	**0.408**
No	28	40.58	28	40.58	
Mammography					
Yes	60	86.96	36	52.17	**0.00***
No	9	13.04	33	47.83	
Mammography frequency					
No examination	9	13.04	33	47.8	
Yearly	10	14.49	2	2.9	
Every 2 years	12	17.39	6	8.7	**0.00***
Every 3 years	4	5.8	6	8.7	
one time	30	43.48	20	28.99	
≥ 4years	4	5.8	2	2.9	
Contraceptives					
Not used	41	59.4	38	55.1	**0.052**
Pills	28	40.6	24	34.8	
Others	0	0	7	10.14	
Hormonal replacement					
Yes	5	7.25	3	4.35	**0.470**
No	64	92.75	66	95.65	

Table (8): Food frequency intake by breast cancer:

Food	**Cancer**	**Daily**		**4-6/w**		**1-3/w**		**None**		**Others**		*p* - **value**
		No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
Vegetable	**Yes**	54	78.3	4	5.8	10	14.5	1	1.4	0	0	**0.372**
	No	49	71.0	7	10.1	11	15.9	1	1.5	1	1.5	
Fruits	**Yes**	54	78.3	2	2.9	13	18.8	0	0	0	0	**0.011***
	No	37	53.6	12	17.4	18	26.1	2	2.9	0	0	
Milk	**Yes**	46	66.7	3	4.3	10	14.5	10	14.5	0	0	**0.719**
	No	43	62.3	6	8.7	8	11.6	12	17.4	0	0	
Butter & margarine	**Yes**	5	7.2	3	4.4	22	31.9	30	43.5	9	13.0	**0.001***
	No	0	0	2	2.9	14	20.3	31	44.9	22	31.9	
Red meat	**Yes**	4	5.8	5	7.3	43	62.3	10	14.5	7	10.1	**0.638**
	No	3	4.4	8	11.6	45	65.2	6	8.7	7	10.1	
Organ meat	**Yes**	1	1.5	2	2.9	20	29.0	31	44.9	15	21.7	**0.145**
	No	0	0	1	1.5	16	23.2	32	46.3	20	29.0	
Chicken	**Yes**	22	31.9	16	23.2	26	37.6	4	5.8	1	1.5	**0.145**
	No	13	18.8	32	46.4	21	30.4	1	1.5	2	2.9	
Fish	**Yes**	7	10.1	11	15.9	34	49.3	14	20.3	3	4.4	**0.073**
	No	5	7.25	24	34.8	28	40.6	7	10.1	5	7.25	
Cheese	**Yes**	46	66.7	0	0	11	15.9	9	13.0	3	4.4	**0.077**
	No	51	73.9	8	11.6	5	7.2	2	2.9	3	4.4	
Egg	**Yes**	11	15.9	10	14.6	38	55.0	8	11.6	2	2.9	**0.036***
	No	4	5.8	9	13.0	43	62.3	5	7.3	8	11.6	
Legumes	**Yes**	11	15.9	11	15.9	31	44.9	6	8.7	10	14.5	**0.004***
	No	0	0	5	7.3	43	62.3	7	10.1	14	20.3	
Rice	**Yes**	45	65.2	4	5.8	14	20.3	6	8.7	0	0	**0.044***
	No	54	78.2	6	8.7	7	10.1	1	1.5	1	1.5	
Bread	**Yes**	62	89.8	0	0	4	5.8	3	4.4	0	0	**0.718**
	No	62	89.8	2	2.9	3	4.4	2	2.9	0	0	
Grains	**Yes**	8	11.6	5	7.3	35	50.7	11	15.9	10	14.5	**0.548**
	No	5	7.3	7	10.1	37	53.6	5	7.3	15	21.7	
Macaroni	**Yes**	3	4.4	4	5.8	39	56.5	8	11.6	15	21.7	**0.196**
	No	3	4.4	5	7.2	47	68.1	4	5.8	10	14.5	

Chocolate	**Yes**	20	29	5	7.2	14	20.3	24	34.8	6	8.7	**0.703**
	No	16	23.2	8	11.6	29	42.0	7	10.1	9	13.1	
Sweets	**Yes**	10	14.5	7	10.1	29	42.0	13	18.9	10	14.5	**0.627**
	No	8	11.6	7	10.1	34	49.3	4	5.8	16	23.2	
Fast food	**Yes**	2	2.9	3	4.4	26	37.7	27	39.1	11	15.9	**0.365**
	No	1	1.5	3	4.4	27	39.1	19	27.5	19	27.5	
Smoked food	**Yes**	0	0	0	0	15	21.7	50	72.5	4	5.8	**0.003***
	No	0	0	0	0	4	5.8	55	79.7	10	14.5	
Soy	**Yes**	2	2.9	0	0	5	7.2	58	84.1	4	5.8	**0.697**
	No	2	2.9	0	0	6	8.7	53	76.8	8	11.6	
Soda	**Yes**	5	7.3	11	15.9	19	27.5	32	46.4	2	2.9	**0.937**
	No	8	11.6	6	8.7	28	40.6	18	26.1	9	13.0	

Daily food intake of cancer patients was significantly higher than normal patients in fruit, butter and margarine, eggs, legumes, and smoked food (Table 8). 21.7% of cancer patients were taking smoked food 1-3 times/week compared with 5.8% for normal patients (p -value = 0.003).

4. Discussion:

Incidence rates of breast cancer are rising in Qatar (20).

Data of this study revealed that the highest rate of breast cancer was among patients aged 40-50 years, followed by age 50-80 years. This is in agreement with previous studies that indicate breast cancer was higher among women aged ≥ 50 than aged ≤ 40 (8, 21, 22).

Cancer is a known disease of aging. With the exception of pediatric malignancies, the risk of cancer increases with age (23). While breast cancer incidence progressively increases with age in the western countries, a different pattern is observed in Japanese women. The breast cancer incidence rate seems to plateau after the age of 50 in Japanese women (24).

Education (college and above) was significantly higher among patients who did not have cancer. Higher education among no cancer patients might have changed women's dietary habits and physical exercises which affect cancer breast (20, 25).

Breast cancer screening (BCS) was practiced at a low rate in Qatar (26). A study indicated that less than one-third of the cancer patients practiced (BCS) appropriately, whereas less than half of the participants were familiar with recent BCS guidelines. Married women and women with higher education and income levels were significantly more likely to be aware of and to practice BCS than women who had lower education and income levels (20).

Employment was higher among no cancer patients in this study. This might have contributed to the decreased risk of cancer among them. Other studies revealed that women who had been most active during their lifetime (household and occupational) had an almost 40 % lower risk of breast cancer than did less active women (21).

Prevalence of obesity especially in adulthood was high among cancer breast patients, which was linked to high prevalence of cancer breast in previous studies. More over, obesity increases the risk of breast cancer among postmenopausal women (15, 16).

Social factors like smoking, alcohol, and obesity are becoming more common in the developing countries and are increasingly accepted (27).

Positive family history of cancer, especially cancer breast was found among cancer patients, which is in agreement with several other studies (10, 11).

Breast cancer was higher among patient who breast fed their babies. Studies linked positively breast feeding with decreased risk of cancer breast, however, a study pointed out a negative association between breast feeding and breast cancer. In this study however, only 9 women did not breast feed, which is a small number to make major correlations based on it, previously, breast feeding was prevailing among women than formula (22).

No statistical significant difference for presence and absence of breast cancer by age of menarche in this study. However, almost all patients had their menarche before age 13. Most of studies established the positive relation of early menarche (before age 14) and increase risk of breast cancer in western countries (12).

Breast cancer was significantly higher among menopausal women especially who had menopause for ≥ 4 years. Other studies also reported that breast cancer risk increased with a late age of menopause (13).

Low physical activity reported by cancer patient in this study might have contributed to the increased prevalence of cancer (17). Significant evidence is available that suggests a role for exercise in bolstering immune function (28) decreasing circulating estrogen (29) and lowering C-reactive protein (30) in breast cancer survivors. Inverse correlations have been shown between increased physical activity and decreased all-cause mortality (31) as well as lower

breast cancer recurrence (31, 32). The best survivorship trends have been observed in patients who practice exercise and have high serum carotenoid levels, regardless of tumor-receptor status (33).

Studies indicated that oral contraceptives had weak association with increased risk of breast cancer, as shown by this study were 59.4% of breast cancer patients did not use contraceptive pills compared with 55.1% of no cancer patients (23).

Studies indicated that the risk of breast cancer increases among postmenopausal women on hormone replacement therapy (14), however small numbers of cancer patients (5) in this study were on hormonal therapy. Hormonal risk factors like early menarche, delayed parity, and reduced breast feeding are now being observed in low- and middle-income countries (25).

89.96% of cancer patients in this study had mammography compared with 52.17% for normal patients. Cancer prevalence patterns have changed along with environmental and social changes in Qatar (5-7). Although controversies exist regarding the effectiveness of (BCS), early detection of breast cancer through regular screening activities such as breast self-examination (BSE), clinical breast examination (CBE), mammography and improvement of screening quality and treatment have been found to decrease mortality rates of breast cancer (3, 34).

Significant predictors for CBE and mammography in Qatar and the United Arab Emirates (UAE) are education, urban or semi urban residence, employment and higher socioeconomic status (26, 35).

Daily food intake was significantly higher among cancer than no cancer breast patients in fruits, butter and margarine, legumes and eggs. The 1-3 times per week food intake was higher among cancer patients in rice and smoked food. Studies indicate that there was no association between intake of dairy products and breast cancer in post-menopausal women, other studies indicated that high intake of animal fat was associated with increase in breast cancer risk (18). Several studies revealed that there is no significant association between intakes of total meat, red meat, white meat or total dairy solids and breast cancer risk (18,19).

Conclusion:

Cancer was higher among Qatari, less educated patients who had menopause for long time, obese especially during adulthood for long duration, and among patients with positive family history of cancer. Proper knowledge regarding contributing factors to cancer breast was higher among no cancer patients. Daily dietary intake was higher among cancer patients in fruit, legumes, butter and margarine, eggs, and smoked food.

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