

Original Research Article

Nutritional Factors Associated With Breast Cancer at Gaza Strip: A Hospital Based Study

Abstract

Aim: To reveal the relationship between nutritional factors and dietary behavior and the occurrence of breast cancer in Gaza Strip. **Materials and methods:** A retrospective case-control study was consisted of 150 participants, conducted in Al-shifa hospital at Gaza Strip. Food frequency questionnaire, Anthropometric, Lipid profile (Cholesterol, HDL, LDL, Triglyceride) and CBC were detected for cases and controls. SPSS software was used to analyze the obtained data. **Results:** The study revealed that 72% of Breast cancer were >45 years old compare with 53.3% of controls with the same age. 20% of Breast cancer have family history compare with 3% of control. The mean of menarche and marital age for Breast cancer was higher than control. Fertility among cases was lower than contro. The mean of parity for breast cancer was 6.83 compare with 6.01 of control. Breastfeeding and duration among controls was significantly higher than Breast cancer. Pills intake and injection hormones among Breast cancer was significantly higher than controls. There are significant differences in diet behavior among cases and control; 32.0% of case eat overcooked meat compare with 21.3% of controls; 69.3% of case eat skinned chicken compare with 44.0% controls; 78.7% of Breast cancer were eating whole fat dairy product compare with 45.3% of controls. 58.7% of Breast cancer who have eaten vegetable and fruit daily compare with 88% of controls; about 56% of Breast cancer drink less than one liter per day compare with 29.3% of controls. Breast cancer consuming more serving size per day of red meat, grains, soft drinks than the control. Licorice, Ginger, Basil Cloves and Turmeric intake by cases lower than control. Corn oil, Sunflower oil, Butter and Chocolate intake by cases was higher than control. Breast cancer more exposed to stress than control. Breast cancer have more weight, BMI, waist circumference, triglyceride, cholesterol, HDL-c, LDL-c than control. **Conclusion:** The study concluded that breast cancer are less physically active, more obese, Consume more oil and fat, more eating red meat, Consume fruit and vegetable less frequently, more exposure to stress.

Key words: breast cancer, nutritional factors, dietary behavior

Introduction

Breast cancer was the first leading cause of death among Palestinian woman in 2012. Good nutrition and healthy life style are important for prevention of breast cancer. Bad dietary habits and unhealthy life style has great impact on health, so nutritional assessment and follow up are essential for reduction risk of breast cancer. Unfortunately, nutritional assessment for the risk factors of breast cancer are not adequately investigated in Palestine, therefore, this study could provide valid and credible information about the relationship between them.

Breast cancer is a cancer that starts in the cells of the breast in women and men. Worldwide, in 2013 according to the World Health Organization International Agency for Research on Cancer (IARC); breast cancer is the second most common type of cancer after lung cancer, 1.7 million women were diagnosed with breast cancer and there were 6.3 million women alive who had been diagnosed with breast cancer in the previous five years. Since the 2008 estimates, breast cancer incidence has increased by more than 20%, while mortality has increased by 14%. Breast cancer is also the most common cause of cancer death among women (522 000 deaths in 2012) and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide. It now represents one in four of all cancers in women (World Health Organization [WHO], 2013). Latest estimates suggested that more than million of new breast cancer cases occurred worldwide annually, with nearly 580,000 cases occurring in developed countries and the remainder in developing countries (Ferlay *et al.*, 2000).

Nationally, according to the Palestinian Health Information Center (PHIC) and Ministry of Health (MoH) annual reports at 2005 in Palestine, breast cancer was the highest-leading cause of death among the woman in Palestinian. In 2005 breast cancer causes 21.1% of all deaths from cancer which is the highest cancer-related mortality in Palestinian women, and 5.2 deaths per 100,000 women (MoH, 2005). The breast cancer at the forefront of cancers that affect the Palestinians and by up to 19% of all new cancer cases recorded in Palestine. The proportion of new cases recorded for breast cancer annually in Palestine is increasing from 11% in 2000 to 19% in 2010, concentrated

incidence of breast cancer in women in Palestine (MoH, 2012a). While the proportion is about 35.4% of new breast cancer cases recorded among females in Palestine (MoH, 2014).

Breast cancer is a type of cancer originating from breast tissue, most commonly from the inner lining of milk ducts or the lobules that supply the ducts with milk. Cancers originating from ducts are known as ductal carcinomas, while those originating from lobules are known as lobular carcinomas (Sariego, 2010).

Breast cancer is a multi-factorial disease where genetic susceptibility, environment, nutrition and other lifestyle risk factors interact. Better identification of modifiable risk factors and risk reduction of breast cancer may allow implementation of useful strategies for prevention (Nkondjock & Ghadirian, 2005).

Nutrition can play an important role in the prevention of breast cancer. Good nutrition may reduce the incidence of breast cancer and the risk of breast cancer progression or recurrence, and also enhances overall quality of life (Kuhner, 2006). Eating diet that is rich in plant based foods such as fruits, vegetables, whole grains, legumes, nuts and seeds, choosing healthier fats, and eliminating alcohol from the diet can be important preventative steps to take (Dwyer, 2006). Ensuring that you are at a healthy body weight and engaging in regular physical activity also play an important role. Also nutrition is an important part of the healing process. Maintaining optimal nutrition during breast cancer treatment can help prevent malnutrition, support immune function, rebuild body tissue, decrease your risk of infection and enhance overall well-being (Dwyer, 2006).

Maternal and Methods

Study Design

A retrospective case control study was conducted at the oncology clinic to women with breast cancer at Al Shifa hospital in Gaza

Study setting and Population

The cases were interviewed at Al Shifa hospital in oncology clinic while the controls at orthopedic department. The target population was breast cancer patients attending Al Shifa hospital and the controls were without any suspicion of breast cancer at other departments. They were recruited according to the inclusion criteria of the study after getting their consent.

Sampling, Sample Size and Timeframe

A Purposeful, non-random sample included 150 participants divided into two groups according to the eligibility criteria. Participants were allocated into: group A (n = 75) patients with newly diagnosed breast cancer; group B (n = 75) patients without any suspicion of breast cancer and used as a control. The study was started at the beginning of September, 2012 after seeking ethical approval. Data collection was started at the 2nd of February, 2013 and continued until July 25th, 2013.

Selection Criteria

Subjects who were eligible to participate in the study were those who met the following criteria.

Inclusion Criteria

Case and Control

- Case were defined as women who were newly diagnosed with breast cancer.
- Control was defined as women free of breast cancer. Control were cross matched with age of cases ($\pm$ 5 years).

Exclusion Criteria

Patients with organ failure such as:

- Kidney disease
- Hepatic disease.
- Heart disease
- Other cancer

130

131 **Data Collection**

132 **Interview Questionnaire**

133 Semi-structured face to face interviews were conducted e.g., personal data such as
134 gender, age, marital status, residency, education level etc; family and present history of
135 disease; dietary behavior and lifestyle.

136

137 **Food Frequency Questionnaire**

138 Food frequency questionnaire was prepared (FFQ) . The FFQ investigate the patient food
139 intake and focus on specific groups of foods and their frequency of consumption (the
140 number of times per day the patient eats). The groups of food included meat, fish, eggs,
141 dietary products, fruits & vegetables, grains, nuts & seeds, beverages, herbs, spices, oils
142 and sweets.

143

144 **Anthropometric Measurements**

145 Standard techniques were adopted for obtaining anthropometric measurements. Seca
146 stadiometer was used to measure height. Weight was measured using Seca weighing
147 scale and waist circumference (WC) was measured using tape measure. Weighing scale
148 calibrated by constant weigh. Participants were weighed with essential clothing and
149 without shoes. Body Mass Index (BMI) was calculated according to equation $BMI = \frac{\text{weight (kg)}}{\text{height (m)}^2}$.
150

151

152 **Biochemical Investigations**

- 153 • The participants fasted 12 hours before blood analysis.
- 154 • Five ml blood samples were obtained by venipuncture and divided into two tubes,
155 one for lipid profile analysis and the other for complete blood count.
- 156 • For CBC analysis the blood was drawn in tube with anticoagulant and analyzed
157 using Cell-Dyn 1800 (made in Germany)
- 158 • For analysis Blood lipid profile included: total cholesterol, LDL-C, HDL-C, and
159 TG. The serum was obtained by centrifugation (Centurion Scientific, C2 Series)
160 at 3000 rpm (5 min.) and the serum was left at room temperature for 30 min.

- Lipid profile was determined using cholesterol Kit, HDL Kit, TG Kit and analyzed using Response 910 Diagnostic system (made in Germany).

Pilot Study and Ethical Consideration

A pilot study had been conducted before starting real data collection and all required approvals and consent forms of participants were filled.

Statistical Analysis

Statistical analysis was performed using SPSS program version 19.

Results and Discussion

Socioeconomic characteristics of the study sample

Table 4.1 showed distribution of the participants according to their personal characteristics as age, marital status, residency, education level, patient occupation, and income

Age

Descriptive analysis showed that the average age of cases (51.03 ± 7.84) is older than controls (46.33 ± 8.87). Participants' age were divided into two categories less than or equal to 45 years old and the other is 45 years or more. Most of the participants were >45 years (62.7%) and 72% of breast cancer patients were >45 years old while 53.3% of controls were >45 years (Table 4.1). Statistically significant difference was found between cases and controls regarding the age ($P = 0.014$) Our finding agrees with the study of Sweeney *et al.* (2004) which showed that the incidence of breast cancers increased in women aged over 45 years. This could be attributed, partially, to disturbance of hormones specially estrogen, weakness in immune system and malnutrition in older age.

Marital status

The marital status of participants was divided into four categories included: single, married, divorced and widowed state. (83.3%) of the participants were married.

breast cancer patients were single which represented (6.7%) and only one of the control was single which represented 1.3%. No statistically significant difference was found between the cases and controls regarding the marital status ($P = 0.23$). This agrees with Ebrahimi *et al.* (2002) and Babita *et al.* (2014) who suggest that marital status may have an impact on the incidence of breast cancer as married women had mobilized high levels of social support compare with unmarried. Their studies revealed that never married women were at higher risk for breast cancer. Furthermore, in most studies single and nulliparous married women were found to have a similar increased risk for breast cancer as compared with parous women of the same age.

Residency

The study sample involved participants from the five governorates of the Gaza Strip. The majority of the participants were from Gaza governorate represented (72.0%). About (90.7%) of the control were from Gaza governorate which was higher than the cases (53.3%). Nineteen participants which represented (12.7%) were from Middle zone, (24%) of them having breast cancer and only one which represented (1.3%) was without breast cancer. Four participants (2.7%) were from Khanyonis and Rafah Governorate, 3(4.0%) of them having breast cancer and only one (1.3%) was without breast cancer. Statistically significant difference was found between cases and controls regarding the residency ($P < 0.001$).

Education Level

The education level was divided into 4 categories: illiterate; basic education; secondary; university & higher. The rate of illiteracy among the study participants was 8.7%. The majority of cases (41.3%) have basic education level in comparison with 28.0% among controls. No statistically significant difference was found between cases and controls regarding the education level ($P = 0.33$). The result of the present study disagree with the findings of Hussain *et al.* (2008) study which showed a positive association between a high level of education and breast cancer risk. A large proportion of this association may be attributed to greater exposure to breast cancer risk factors such as later age at first live birth, having few or no children, and more frequent use of oral

contraceptives and hormone therapy. Low education level among breast cancer patients may be due to that most of the participants were above 45 years and this age group, in the past, has low chance to complete their education in our community. In addition to that low education could lead to low knowledge about healthy foods and good nutrition.

Patient Occupation

Most of the participants were Housewife which represented (88.0%). Among cases, the percentage of Housewife was 90.7% which was higher than controls (85.3%); however, the difference was not statistically significant ($P = 0.226$).

Income

Family income data was analyzed in a way to determine income per capita per day. Income per capita was grouped into two categories according to the poverty line endorsed by The World Bank: those with income of less than 2 American dollars (\$) per day and those with 2 \$ per day or more. The results in Table 4.1 showed that (52.7%) of participants have income of less than 2 \$ per day. The percentage of cases living under the poverty line (58.7%) was higher than controls (46.7%). However, no statistical difference was estimated between cases and controls regarding income ($P = 0.095$).

Table 4.1 Distribution of Participants according to their Socioeconomic Status

Personal Data	Cases Positive BC	Controls Negative BC	Total	<i>P value</i>
Age	No (%)	No (%)	No (%)	0.014*
≤ 45	21 (28.0)	35 (46.7)	56 (37.3)	
> 45	54 (72.0)	40 (53.3)	94 (62.7)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Marital Status	No (%)	No (%)	No (%)	0.230
Single	5 (6.7)	1 (1.3)	6 (4.0)	
Married	59 (78.7)	66 (88.0)	125 (83.3)	
Divorced	1 (1.3)	0 (0.0)	1 (0.7)	
Widow	10 (13.3)	8 (10.7)	18 (12.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

Residency(Governorate)	No (%)	No (%)	No (%)	
North	14 (18.7)	5 (6.7)	19 (12.7)	< 0.001*
Gaza	40 (53.3)	68 (90.7)	108 (72.0)	
Middle Zone	18 (24.0)	1 (1.3)	19 (12.7)	
Khanyonis and Rafah	3 (4.0)	1 (1.3)	4 (2.7)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Education Level	No (%)	No (%)	No (%)	
Illiterate	6 (8.0)	7 (9.3)	13 (8.7)	0.330
Basic education	31 (41.3)	21 (28.0)	52 (34.7)	
Secondary	26 (34.7)	29 (38.7)	55 (36.7)	
University or higher	12 (16.0)	18 (24.0)	30 (20.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Patient Occupation	No (%)	No (%)	No (%)	
Employed	7 (9.3)	11 (14.7)	18 (12.0)	0.226
Housewife	68 (90.7)	64 (85.3)	132 (88.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Income	No (%)	No (%)	No (%)	
< 2 \$	44 (58.7)	35 (46.7)	79 (52.7)	0.095
≥ 2 \$	31 (41.3)	40 (53.3)	71 (47.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

Distribution of participants by family history of breast cancer

A statistically significant difference was found between cases and controls regarding family history of breast cancer ($p < 0.001$) as shown in Table 4.2. Sixteen (10.7%) of the participants have family history of breast cancer of which 15 had breast cancer. This agrees with Vogel (2008) who indicated that genetic factors are thought to contribute to approximately 5% of all breast cancer cases, but to 25% of cases diagnosed before age 30 years. Another study by Key *et al.* (2001) agree with our study who indicated that hereditary factors contribute around a quarter of inter individual differences in susceptibility to breast cancer, while environmental and lifestyle factors contribute the remaining three-quarters.

Table 4.2 Distribution of Participants by Family History of Breast Cancer

Family History of Breast Cancer	Cases Positive BC	Controls Negative BC	Total	<i>P value</i>
	No (%)	No (%)	No (%)	
Yes	15 (20.0)	1 (1.3)	16 (10.7)	< 0.001*
No	60 (80.0)	74 (98.7)	134 (89.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

**Statistically Significant (Significant correlation at 0.05 level)*

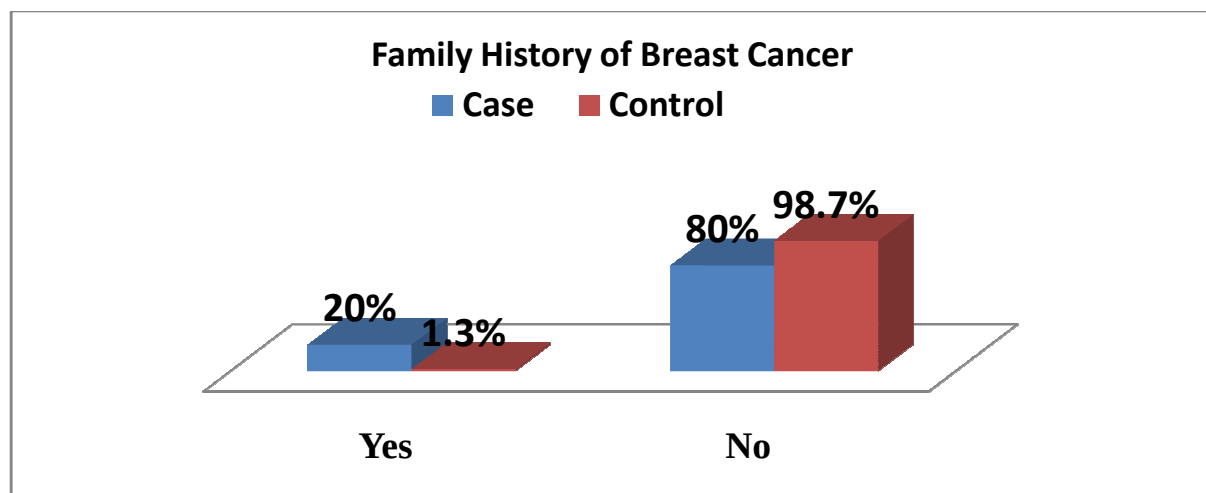


Figure 4.1. Distribution of participants by family history of breast cancer

Distribution of participants by menarche, marital and menopause age

Menarche age

The mean age of menarche among cases and controls was found to be 13.51 and 13.12 years, respectively. There is convincing evidence that the mean of menarche age for case was higher than the mean for control. This result indicates statistically significant ($p=0.039$ (Table 4.3).

Marital age

Table 4.3 showed that the mean marital age among cases (20.99 year) which was higher than controls (18.26 year) and this difference was statistically significant ($p < 0.001$).

Menopause age

The mean menopause age for cases and controls was 49.97 and 50.18 years, respectively as shown in (Table 4.3). However, this difference was not statistically significant ($p = 0.842$).

Table 4.3 Two Independent t test of study participants and menarche, marital and menopause age

Variable	Subject	Number	Mean	SD	t –test	P value
Menarche age (years)	Positive BC	75	13.51	1.545	1.784	0.039*
	Negative BC	75	13.12	1.065		
Marital age¹ (years)	Positive BC	70	20.99	6.222	3.309	< 0.001*
	Negative BC	74	18.26	3.066		
Menopause² age (years)	Positive BC	33	49.97	3.157	-0.200	0.842
	Negative BC	11	50.18	2.639		

*Statistically Significant (*Significant correlation at 0.05 level*)

¹Six participants was single (unmarried)

²only 44 participants are in menopause and 106 are still menstruating

Distribution of participants by menstrual history and fertility

Menstrual history

The percentage of the participants who had regular menstrual history was 93.3%. 92.0% of the cases have regular menstrual history which is lower than controls (94.7%). However, the difference was not statistically significant ($p = 0.373$) (Table 4.4).

Fertility

The results shown in Table 4.4 revealed that the percentage of the fertile participants was 96.5%. Among the cases, the fertility was (92.9%) where is lower than the control (100%). This difference was statistically significant ($p = 0.025$).

Table 4.4 Distribution of Participants by Menstrual History and Fertility

Variable	Cases Positive BC	Controls Negative BC	Total	P value
Menstrual History	No (%)	No (%)	No (%)	0.373
Regular	69 (92.0)	71 (94.7)	140 (93.3)	
Irregular	6 (8.0)	4 (5.3)	10 (6.7)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Fertility	No (%)	No (%)	No (%)	0.025*
Fertile	65 (92.9)	74 (100.0)	139 (96.5)	
Infertile	5 (7.1)	0 (0.0)	5 (3.5)	
Total	70 (100.0)	74 (100.0)	144 (100.0)	

**Statistically Significant (Significant correlation at 0.05 level)*

Six participants was single (unmarried)

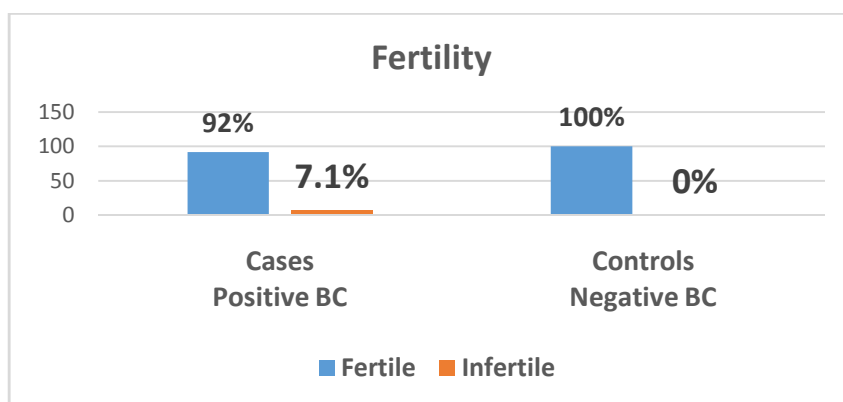


Figure 4.2 Distribution of participants by fertility

Obstetric history of the current pregnancy

First baby

The mean number of years for waiting the first baby for both cases and controls was 1.32 and 1.35, respectively. This difference was not statistically significant as shown in (Table 4.5).

Parity

The mean number of parity for cases and controls was found to be 6.83 and 6.01, respectively. There is convincing evidence that the mean of parity for cases was higher than the mean of parity for the control. This result indicates statistically significant ($p=0.036$).

Table 4.5 Two Independent t test of study participants and their waiting years of first baby, gravid and parity

Variable	Subject	Number	Mean	SD	t	P value
Waited years for first baby	Positive BC	65	1.32	0.954	-0.146	0.884
	Negative BC	74	1.35	1.276		
Parity	Positive BC	65	6.83	2.913	1.793	0.036*
	Negative BC	74	6.01	2.390		

*Statistically Significant (Significant correlation at 0.05 level)

Distribution of participants according to their pregnancy outcomes

Abortion

Seventy nine (56.8%) of the participants had a history of abortion (Table 4.6). The percentage of abortion history was higher among cases (58.5%) than controls (55.4%). However, this difference was statistically insignificant ($p= 0.424$).

Stillbirth

A statistically significant difference was found between cases and controls regarding stillbirth ($p =0.022$) as shown in Table 4.6. The percent of stillbirth among case (15.4%) was higher than control (4.1%).

Low body weight (LBW) Infant

Forty (28.8%) of participants had LBW infant ($LBW<25$). (23.1%) of cases had LBW infant compared to 25 (33.8%) of controls. However, the difference was non statistically significant as shown in (Table 4.6).

Congenital anomalies

The results in table 4.6 showed that 30 (9.4%) of participants have baby with congenital anomalies. No significant differences was found between cases (9.2%) and controls (9.5%) regarding having baby with congenital malformation.

Postpartum hemorrhage

As shown in Table 4.6 the percentage of postpartum hemorrhage among cases (27.7%) which is significantly higher than the controls (10.8%) ($p= 0.010$).

Caesarian section

As shown in Table 4.6 the percent of Caesarian section among cases (33.8%) was higher than controls (10.8%) and this disparity was statistically significant ($p<0.001$).

Table 4.6 Distribution of participants according to their pregnancy outcomes

Variable	Cases Positive BC	Controls Negative BC	Total	<i>P value</i>
Abortion	No (%)	No (%)	No (%)	0.424
Yes	38 (58.5)	41 (55.4)	79 (56.8)	
No	27 (41.5)	33 (44.6)	60 (43.2)	
Total	65 (100.0)	74 (100.0)	139 (100.0)	
Stillbirth	No (%)	No (%)	No (%)	0.022*
Yes	10 (15.4)	3 (4.1)	13 (9.4)	
No	55 (84.6)	71 (95.9)	126 (90.6)	
Total	65 (100)	74 (100.0)	139 (100.0)	
LBW Infant*	No (%)	No (%)	No (%)	0.114
Yes	15 (23.1)	25 (33.8)	40 (28.8)	
No	50 (76.9)	49 (66.2)	99 (71.2)	
Total	65 (100.0)	74 (100.0)	139 (100.0)	
Congenital Anomalies	No (%)	No (%)	No (%)	0.598
Yes	6 (9.2)	7 (9.5)	13 (9.4)	
No	59 (90.8)	67 (90.5)	126 (90.6)	
Total	65 (100.0)	74 (100.0)	139 (100.0)	

Postpartum Hemorrhage	No (%)	No (%)	No (%)	0.010*
Yes	18 (27.7)	8 (10.8)	26 (18.7)	
No	47 (72.3)	66 (89.2)	113 (81.3)	
Total	65 (100.0)	74 (100.0)	139 (100.0)	
Caesarian Section	No (%)	No (%)	No (%)	<0.001*
Yes	22 (33.8)	8 (10.8)	30 (21.6)	
No	43 (66.2)	66 (89.2)	109 (78.4)	
Total	65 (100.0)	74 (100.0)	139 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

*LBW: Low Birth Weight

Distribution of participants according to their breastfeeding

The percentage of the study participants who practice breastfeeding was found to be 88.7%. The results in Table 4.7 showed that the percentage of breastfeeding among controls (97.3%) was more than cases (80.0%) and this difference was statistically significant ($p < 0.001$). Similarly, exclusive breastfeeding among controls (71.2%) was higher than cases (68.3%). However, the difference was not statistically significant.

The mean number of meals if not exclusive breastfeeding for cases and control equal was 2.26 and 2.19 respectively. This result indicates statistically insignificant difference between cases and control as shown in (Table 4.8).

The mean of duration of breast feeding in month for cases and control equals (14.15 and 17.25 month) respectively. There is convincing evidence that the mean of duration of breast feeding in month for cases is smaller than control. This result indicates statistically significant difference between the cases and control ($p < 0.001$) (Table 4.8).

Table 4.7 Relationship between cases and controls regarding breastfeeding

Variable	Cases Positive BC	Controls Negative BC	Total	P value
Breastfeeding	No (%)	No (%)	No (%)	<0.001*
Yes	60 (80.0)	73 (97.3)	133 (88.7)	
No	15 (20.0)	2 (2.7)	17 (11.3)	

Total	75 (100.0)	75 (100.0)	150 (100.0)	
Breastfeeding (if yes)	No (%)	No (%)	No (%)	0.431
Exclusive	41 (68.3)	52 (71.2)	93 (69.9)	
Not Exclusive	19 (31.7)	21 (28.8)	40 (30.1)	
Total	60 (100.0)	73 (100.0)	133 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

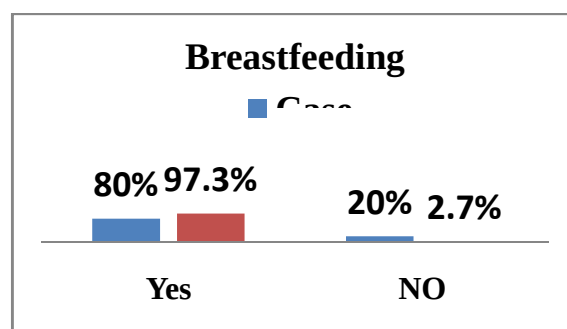


Figure 4.3. Relationship between cases and controls regarding breastfeeding

Table 4.8 Two Independent t test between Study Participants and Breastfeeding

Variable	Subject	Number	Mean	SD	T- test	P value
No. of Meals (not exclusive breastfeeding)	Positive BC	19	2.26	0.872	0.254	0.801
	Negative BC	21	2.19	0.928		
Duration of Breastfeeding (month)	Positive BC	60	14.15	4.210	-3.754	<0.001*
	Negative BC	73	17.25	5.123		

*Statistically Significant (Significant correlation at 0.05 level)

Distribution of participants according to contraceptive use

The results in Table 4.9 revealed that 54.7% of the participants were taken contraception. Contraception intake among cases was (42.7%) which is less than the controls (66.7%). This difference was statistically significant ($p=0.003$).

Regarding contraception method, 58.5% of participants were using intrauterine device (IUD) followed by 36.6% used pills. The data represented in Table 4.9 clearly showed

that contraceptive pills intake among cases was 59.4% which is higher than controls (22.0%). Furthermore, similar pattern was found among contraceptive injection users (cases: 6.3% and controls: 4.0%). On the other hand, IUD use among cases was (34.4%) compare with the controls (74.0%), this result indicates statistically significant difference between the cases and control regarding contraceptive methods ($p=0.002$).

Table 4.9 Distribution of participants according to contraceptive use

Variable	Cases Positive BC	Controls Negative BC	Total	P value
Contraception Use	No (%)	No (%)	No (%)	0.003*
Yes	32 (42.7)	50 (66.7)	82 (54.7)	
No	43 (57.3)	25 (33.3)	68 (45.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Contraception Method	No (%)	No (%)	No (%)	0.002*
Pills	19 (59.4)	11 (22.0)	30 (36.6)	
Hormone Injection	2 (6.3)	2 (4.0)	4 (4.9)	
IUD	11 (34.4)	37 (74.0)	48 (58.5)	
Total	32 (100.0)	50 (100.0)	82 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

Relationship between cases and controls and Nutrient Supplementation

Iron and Folic Acid Intake

The percentage of the participants who took iron and folic acid was 47.3%. Among cases, the percentage was 36.0% which is smaller than control (58.7%). This difference was statistically significant ($p=0.004$) (Table 4.10).

Vitamin B12 Intake

The percentage of the participants who took vitamin B12 was (10.0%). 6.7% among cases, and 13.3% among control. This result indicates statistically insignificant difference between cases and control ($p=0.138$) as shown in (Table 4.10).

Table 4.10 Relationship between Cases and Controls and Nutrient Supplementation

Variable	Cases Positive BC	Controls Negative BC	Total	P value
Iron & folic acid intake	No (%)	No (%)	No (%)	0.004*
Yes	27 (36.0)	44 (58.7)	71 (47.3)	
No	48 (64.0)	31 (41.3)	79 (52.7)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Vitamin B12 intake	No (%)	No (%)	No (%)	0.138
Yes	5 (6.7)	10 (13.3)	15 (10.0)	
No	70 (93.3)	65 (86.7)	135 (90.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

**Statistically Significant (Significant correlation at 0.05 level)*

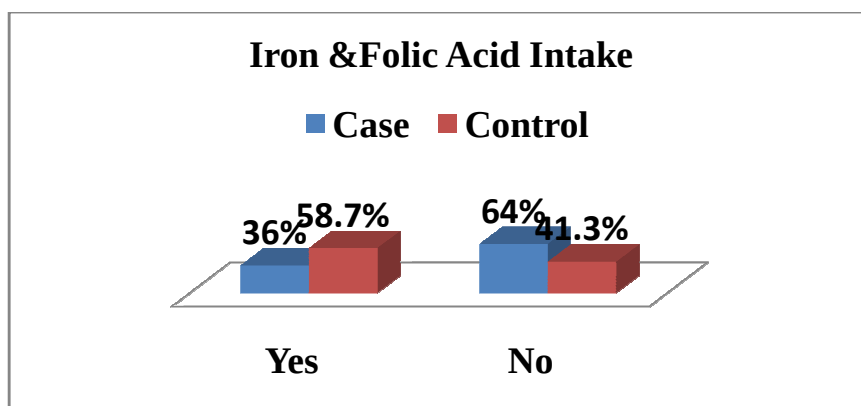


Figure 4.4 Relationship between cases and iron and folic acid intake

Dietary Behavior

Use of pressurized utensils (Overcooking meat)

The percent of overcooking meat intake use among cases (32.0%) was higher than controls (21.3%). This result indicates statistically significant difference ($p = 0.04$) as shown in (Table 4.11).

Cooking Chicken

The participants were divided into two categories according to their chicken cooking behavior: Skinned and un-skinned. The percentage of the participants who cook chicken with skin was found to be (56.7%). About 69.3% of the cases more cooking chicken with skin compare with 44.0% of the controls, this difference was statistically significant ($p < 0.001$) as shown in (Table 4.11).

Type of fish intake

Type fish was divided into two categories: tuna and sardine. The majority of the participants were eating Sardine (94%). Among cases, eating Sardine was (91.2%) lower than controls (96.9%). There was statistically non significant difference between the cases and controls regarding the type of fish intake ($p=0.019$) as shown in (Table 4.11).

Type of dairy product

A dairy product was divided into two categories: whole fat and Skimmed fat. The results in table 4.11 showed that the majority of the participants preferred to eat whole fat dairy products (62.0%), 78.7% among cases, and 45.3% among controls On the other hand, 21.3% of the cases intake skimmed fat dairy product compare with 54.7% of controls and this disparity was statistically significant ($P < 0.001$).

Table 4.11 Distribution of the study sample according to dietary behavior

Variable	Cases Positive BC	Controls Negative BC	Total	<i>P value</i>
Pressurized Utensils Use	No (%)	No (%)	No (%)	0.04*
Yes	24 (32.0)	16 (21.3)	40 (26.7)	
No	51 (68.0)	59 (78.7)	110 (73.3)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Cooking Chicken	No (%)	No (%)	No (%)	< 0.001*
Skinned	52 (69.3)	33 (44.0)	85 (56.7)	
Un-skinned	23 (30.7)	42 (56.0)	65 (43.3)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Type of Fish Intake	No (%)	No (%)	No (%)	0.152
Tuna	6 (8.8)	2 (3.1)	8 (6.0)	

Sardine	62 (91.2)	63 (96.9)	125 (94.0)	
Total	68 (100.0)	65 (100.0)	133 (100)	
Type Dairy Product	No (%)	No (%)	No (%)	
Whole fat	59 (78.7)	34 (45.3)	93 (62.0)	< 0.001*
Skimmed fat	16 (21.3)	41 (54.7)	57 (38.0)	
Total	75 (100.0)	75 (100.0)	150 (100)	

*Statistically Significant(Significant correlation at 0.05 level)

Frequency of Dietary Intake

Dairy product intake

Dairy product intake of participants was divided into three categories: daily, twice a week, and once a week or less. The collected data in Table 4.12 showed that (50.7%) of the participants have daily intake of Dairy products, 41.3 % among cases, and 60% among controls, and this result indicates statistically significant difference between the cases and control ($P = 0.026$).

Vegetable and fruit intake

Vegetable and fruit intake was divided into three categories: daily, twice a week, and once a week or less. (73.3%) of the participants who have eaten vegetable and fruit daily, 58.7% among cases, and 88% among controls. The difference between case and controls regarding vegetables and fruits intake was statistically significant ($P < 0.001$) as shown in (Table 4.12).

Canned food intake

Canned food intake was divided into 4 categories: daily, twice a week, once a week or less, and do not eat canned food. The results presented in table 4.12 showed that the majority of cases (53.3%) ate canned food once weekly or less. On the other hand, the majority of controls (44%) did not eat canned food. A statistical significant difference was found between cases and controls regarding canned food intake.

Junk Food Intake

Junk food intake was divided into three categories, daily, once or twice a week, once or twice a month. Among cases was found that 21.3% ate junk food daily compare with 8% among control. This result indicates statistically significant difference between the cases and control ($P = 0.03$) as shown in (Table 4.12).

Drinking water

Regarding water drinking habits, (42.7%) of the participants drink less than one liter daily; (56%) of cases drink less than one liter per day compare with 29.3% of controls. The association was statistically significant($p = 0.002$) as shown in (Table 4.12).

Table 4.12 Distribution of the participants according to their dietary intake

Variable	Cases Positive BC	Controls Negative BC	Total	<i>P value</i>
Diary Product Intake	No (%)	No (%)	No (%)	0.026*
Daily	31 (41.3)	45 (60.0)	76 (50.7)	
Twice a week	30 (40.0)	25 (33.3)	55 (36.7)	
Once a week or less	14 (18.7)	5 (6.7)	19 (12.7)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Vegetables Fruits Intake	No (%)	No (%)	No (%)	<0.001*
Daily	44 (58.7)	66 (88.0)	110 (73.3)	
Twice a week	24 (32.0)	9 (12.0)	33 (22.0)	
Once a week or less	7 (9.3)	0 (0.0)	7 (4.7)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Canned Food Intake	No (%)	No (%)	No (%)	0.030*
Daily	0 (0.0)	2 (2.7)	2 (1.3)	
Twice a week	6 (8.0)	13 (17.3)	19 (12.7)	
Once a week or less	40 (53.3)	27 (36.0)	67 (44.7)	
Do not eat canned food	29 (38.7)	33 (44.0)	62 (41.3)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Junk Food Intake	No (%)	No (%)	No (%)	0.03*
Daily	16 (21.3)	6 (8.0)	22 (14.7)	

Once or twice a week	23 (30.7)	34 (45.3)	57 (38.0)	
Once or twice a month	36 (48.0)	35 (46.7)	71 (47.3)	
Total	75 (100.0)	75 (100.0)	150 (100)	
Drinking Water/day	No (%)	No (%)	No (%)	0.002*
Less than 1L	42 (56.0)	22(29.3)	64(42.7)	
1L-2L	26 (34.7)	47(62.7)	73(48.7)	
More than2L	7 (9.3)	6(8.0)	13(8.7)	
Total	75 (100.0)	75 (100.0)	150 (100)	

*Statistically Significant (Significant correlation at 0.05 level)

Servings of Dietary Intake

Dairy Products Intake

Table 4.13 showed the means of daily dairy products intake among participants.

- Daily yogurt intake by cases was lower than the controls and the difference was statistically significant.
- Cheese intake per day by case was lower than the control and the difference was statistically significant.

Table 4.13 Independent t test Comparing the Means of Daily Number of Dairy Products Servings among Study Participant

Variable	Subject	Number	Mean	SD	t -test	P value
Yogurt	Positive BC	34	0.268	0.181	-2.535	< 0.001*
	Negative BC	53	0.409	0.291		
Cheese	Positive BC	68	0.353	0.275	-1.965	0.02*
	Negative BC	72	0.444	0.273		

*Statistically Significant (Significant correlation at 0.05 level)

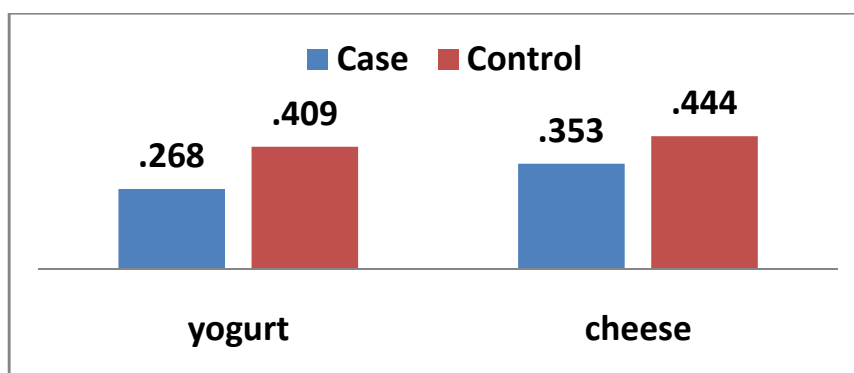


Figure 4.5 The means of daily number of dairy products servings among study participant

Protein Intake

Table 4.14 showed the means of daily number of eggs, red meat, Turkey and fishes serving among participant.

- Cases consuming more serving size per day of red meat in comparison with the control and this difference was found to be statistically significant ($P < 0.031$).
- Turkey and fishes intake by control higher than cases and this difference was found to be statistically significant.
- Egg intake per day by case have higher than by control and the difference was statistically not significant.

Table 4.14 Independent t test comparing the means of Daily Number of Meat, Fishes, Eggs Serving among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Red meat	Positive BC	75	0.264	0.288	2.175	0.031*
	Negative BC	72	0.184	0.126		
Turkey	Positive BC	75	0.190	0.111	-3.015	0.003*
	Negative BC	75	0.257	0.157		
Fish	Positive BC	75	0.220	0.154	-2.142	0.034*
	Negative BC	75	0.281	0.193		

Eggs	Positive BC	65	0.576	0.506	1.632	0.105
	Negative BC	72	0.445	0.435		

**Statistically Significant (Significant correlation at 0.05 level)*

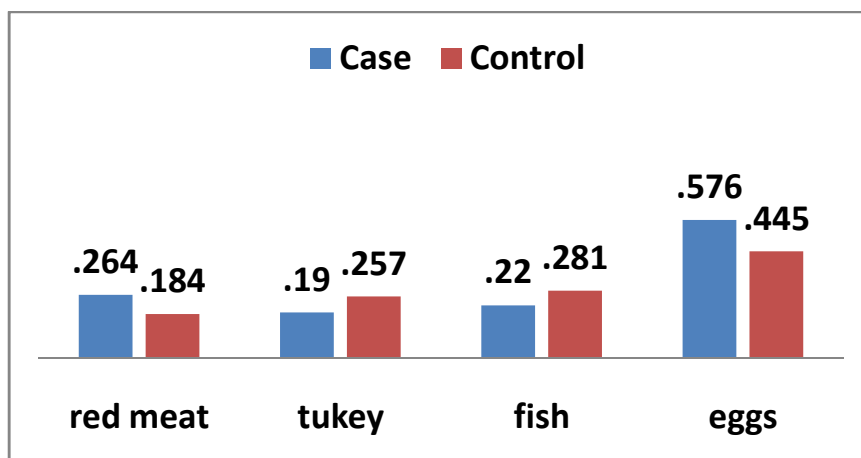


Figure 4.6 The means of daily number of meat, fishes, eggs serving among participant

Vegetable Intake

Table 4.15 showed the means of different types of vegetables servings among participant.

- The table showed that, Onion, Scallion, Tomato and Green Peppers, Red Peppers intake by cases is smaller than the control and this difference was found to be statistically significant.
- Potatoes intake by cases was higher than the control and this difference was statistically significant.
- Spinach, Cabbage intake by case was lower mean than control and this difference was non statistically significant.
- Garlic, Carrots intake by case was higher than the control and this difference was statistically significant.

Table 4.15 Independent t test comparing the means of Daily Number of Different Types of Vegetable Serving among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Spinach	Positive BC	52	0.158	0.139	-1.876	0.06
	Negative BC	67	0.199	0.088		
Potatoes	Positive BC	65	0.849	0.706	4.408	< 0.00*
	Negative BC	70	0.431	0.302		
Onion	Positive BC	59	0.393	0.353	-4.352	< 0.00*
	Negative BC	71	0.642	0.297		
Garlic	Positive BC	21	0.456	0.350	0.064	0.95
	Negative BC	34	0.447	0.602		
Scallion	Positive BC	31	0.210	0.142	-3.523	< 0.00*
	Negative BC	41	0.411	0.326		
Tomato	Positive BC	68	0.815	0.579	-3.173	< 0.00*
	Negative BC	75	1.145	0.657		
Cabbage	Positive BC	58	0.184	0.134	-1.604	0.11
	Negative BC	74	0.227	0.167		
Green Peppers	Positive BC	38	0.190	0.139	-2.754	< 0.001*
	Negative BC	56	0.312	0.285		
Red Peppers	Positive BC	33	0.234	0.363	-1.118	0.267
	Negative BC	56	0.312	0.285		
Carrots	Positive BC	56	0.606	0.610	0.909	0.36
	Negative BC	63	0.516	0.469		

**Statistically Significant (Significant correlation at 0.05 level)*

Fruits Intake

Table 4.16 showed the means of different types of Fruits servings among participants.

- Guava, Citrus, Strawberries, Grapes intake by cases was smaller than control and this difference was found to be statistically significant.
- Apple and banana intake by cases have not significant higher mean than control.

Table 4.16 Independent t test comparing the means of Daily Number of Different Types of Fruits Serving among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Apple	Positive BC	66	0.718	0.583	1.022	0.30
	Negative BC	70	0.620	0.531		
Guava	Positive BC	68	0.207	0.179	-5.470	< 0.001*
	Negative BC	69	0.562	0.509		
Citrus	Positive BC	63	0.192	0.157	-7.800	< 0.001*
	Negative BC	73	0.785	0.628		
Banana	Positive BC	61	0.454	0.499	0.906	0.36
	Negative BC	67	0.384	0.377		
Strawberries	Positive BC	28	0.066	0.094	-5.372	< 0.001*
	Negative BC	48	0.252	0.205		
Grapes	Positive BC	69	0.219	0.189	-4.116	< 0.001*
	Negative BC	71	0.427	0.380		

**Statistically Significant (Significant correlation at 0.05 level)*

Grains Intake

Table 4.17 showed the mean of carbohydrate daily intake of different types of grains daily among participant.

- Cases consuming more serving size per day of bread, Pasta, Rice, Cocos, and Biscuits which was statistically significant.
- Crackers, Pizza, and Pancakes intake by cases have not significant higher mean than control.

Table 4.17 Independent t test comparing the means of Grains Serving among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Bread	Positive BC	75	1.920	0.273	4.375	< 0.001*
	Negative BC	75	1.628	0.508		

Crackers	Positive BC	32	0.421	0.503	0.263	0.79
	Negative BC	26	0.389	0.386		
Pasta	Positive BC	50	0.153	0.126	3.363	< 0.001*
	Negative BC	42	0.087	0.054		
Pizza	Positive BC	40	0.107	0.105	0.741	0.46
	Negative BC	35	0.092	0.066		
Rice	Positive BC	64	0.576	0.486	4.469	< 0.001*
	Negative BC	70	0.295	0.138		
Coscos	Positive BC	44	0.082	0.049	2.659	0.01*
	Negative BC	20	0.055	0.033		
Biscuits	Positive BC	41	0.827	0.695	4.211	< 0.001*
	Negative BC	53	0.347	0.251		
Pancakes	Positive BC	45	0.135	0.142	0.443	0.65
	Negative BC	25	0.121	0.097		

*Statistically Significant (Significant correlation at 0.05 level)

4.12.6 Nuts & Seeds Intake

Table 4.18 showed means of Nuts & Seeds serving among participant.

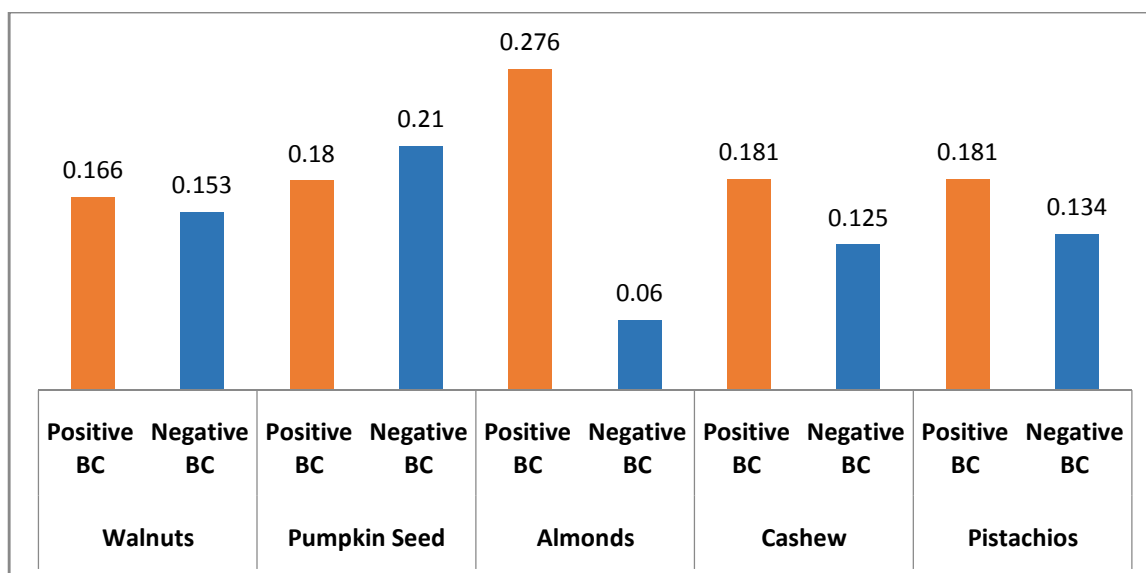
- Almonds intake by cases was higher than control and this difference was found to be statistically significant.
- Walnuts, Pistachios, and Cashew intake by cases have non significant higher mean than control.
- Pumpkin Seed intake by cases lower than control.

Table 4.18 Independent t test comparing the means of Nuts & Seeds Serving among Participant

Variable	Subject	Number	Mean	SD	t -test	P value
Walnuts	Positive BC	27	0.166	0.209	0.293	0.771
	Negative BC	33	0.153	0.125		
Pumpkin Seed	Positive BC	27	0.180	0.237	-0.374	0.710
	Negative BC	18	0.210	0.305		

Almonds	Positive BC	6	0.276	0.228	2.316	0.034*
	Negative BC	6	0.060	0.000		
Cashew	Positive BC	24	0.181	0.223	1.147	0.261
	Negative BC	42	0.125	0.101		
Pistachios	Positive BC	31	0.181	0.203	1.194	0.237
	Negative BC	38	0.134	0.115		

558 *Statistically Significant(Significant correlation at 0.05 level)



559

560 **Figure 4.7 The means of nuts & seeds serving among participant**

561

562 **Beverages Intake**

563 Table 4.19 showed the means of different beverages among participant.

564 ▪ Drinking of soft drinks, Juices and Fresh juices by cases have significant high
565 mean than that by control.

566 ▪ The coffee intake by cases have lower mean than that by control

567 **Table 4.19. Independent t test comparing the means of different Beverages among**
568 **Participant**

Variable	Subject	Number	Mean	SD	t- test	P value
Soft drinks	Positive BC	47	0.607	0.669	1.870	0.03*
	Negative BC	59	0.402	0.386		
Coffee	Positive BC	36	0.602	0.475	-1.485	0.14
	Negative BC	50	0.758	0.487		

Juices	Positive BC	21	0.578	0.509	2.784	0.01*
	Negative BC	19	0.249	0.173		
Fresh juices	Positive BC	51	0.469	0.404	1.953	0.02*
	Negative BC	32	0.325	0.265		

**Statistically Significant(Significant correlation at 0.05 level)*

Herbs Intake

The table 4.20 showed means of different Herbs Intake among Participant.

- Chamomile and Rosemary intake by cases was higher than control and this difference was found to be statistically significant.
- Licorice, Ginger and intake by cases was smaller than control and this difference was found to be statistically significant.
- Black tea intake by cases was higher than control.
- Green tea and Thyme intake by cases was lower than control.

Table 4.20 Independent t test comparing the means of different Herbs Intake among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Black tea	Positive BC	62	1.560	0.661	0.954	0.34
	Negative BC	61	1.452	0.591		
Green tea	Positive BC	1	1.000	-	-0.481	0.63
	Negative BC	13	1.373	0.748		
Licorice	Positive BC	8	0.195	0.126	-18.02	< 0.001*
	Negative BC	6	1.000	0.000		
Chamomile	Positive BC	18	0.573	0.491	3.814	< 0.001*
	Negative BC	11	0.131	0.027		
Ginger	Positive BC	4	0.142	0.000	-5.423	< 0.001*
	Negative BC	18	0.658	0.404		
Rosemary	Positive BC	66	1.550	0.636	1.779	0.03*
	Negative BC	64	1.355	0.612		
Thyme	Positive BC	68	0.381	0.214	-0.965	0.33
	Negative BC	69	2.378	17.057		

**Statistically Significant (Significant correlation at 0.05 level)*

Spices Intake

The Table 4.21 showed means of different Spices among Participant

- Basil, Cloves and Turmeric intake by cases was smaller than control and this difference was found to be statistically significant.
- Cinnamon intake by cases was lower than control.

Table 4.21 Independent t test comparing the means of different Spices among Participant

Variable	Subject	Number	Mean	SD	t- test	P value
Basil	Positive BC	32	0.188	0.109	-2.022	0.047*
	Negative BC	45	0.250	0.149		
Cloves	Positive BC	27	0.122	0.103	-1.738	0.044*
	Negative BC	32	0.169	0.102		
Turmeric	Positive BC	21	0.158	0.091	-2.562	0.013*
	Negative BC	41	0.228	0.107		
Cinnamon	Positive BC	32	0.185	0.211	-1.383	0.171
	Negative BC	39	0.248	0.172		

**Statistically Significant (Significant correlation at 0.05 level)*

Oils Intake

Table 4.22 showed means of different Oils among Participant.

- Corn oil, Sunflower oil, and Butter intake by cases was higher than that by control and this difference was found to be statistically significant.
- Olive oil intake by cases was higher control.

Table 4.22 Independent t test comparing the means of different Oils among Participant

Variable	Subject	Number	Mean	SD	t	P value
Olive oil	Positive BC	60	1.415	0.734	1.535	0.127
	Negative BC	62	1.219	0.679		

Corn oil	Positive BC	23	0.782	0.665	3.950	< 0.001*
	Negative BC	19	0.200	0.216		
Sunflower oil	Positive BC	48	1.052	0.711	7.676	< 0.001*
	Negative BC	54	0.222	0.250		
Butter	Positive BC	31	0.363	0.327	3.678	< 0.001*
	Negative BC	20	0.142	0.057		

*Statistically Significant (Significant correlation at 0.05 level)

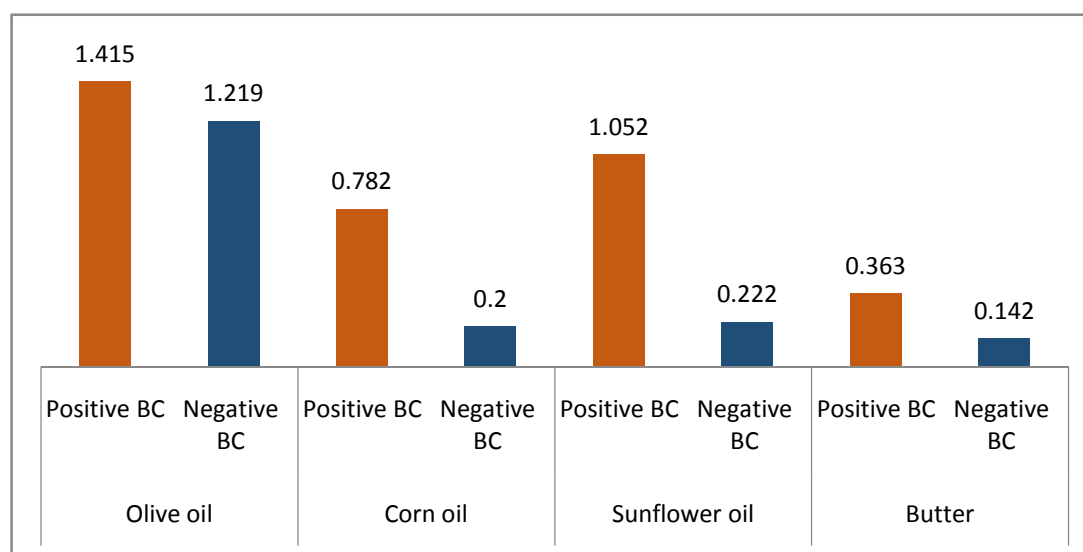


Figure 4.8 The means of different oils among participant

Sweets Intake

Table 4.23 showed means of different Sweets among Participant

- Chocolate intake by cases was higher than that by control and this difference was found to be statistically significant.
- Honey, jam and Kunafeh intake by cases was higher than that by control and this difference was found to be no statistically significant.

Table 4.23 Independent t test comparing the means of different Sweets among Participant

Variable	Subject	Number	Mean	SD	t	P value
Honey	Positive	12	0.750	0.376	1.315	0.198
	Negative	21	0.528	0.508		

Chocolate	Positive	39	0.652	0.544	2.624	0.012*
	Negative	42	0.413	0.171		
Kunafeh	Positive	38	0.131	0.169	0.980	0.332
	Negative	19	0.092	0.044		
Jam	Positive	18	0.714	0.710	1.764	0.094
	Negative	6	0.333	0.334		

*Statistically Significant (Significant correlation at 0.05 level)

Smoking Status

The percent of participants exposed to other's smokers (50.7%) was found to be higher than non-exposed persons (49.3%). This result was non statistically significant difference between cases and control regarding exposed to passive smoking as shown in (Table 4.24).

Table 4.24 Study Participants and their Smoking Status

Variable	Positive BC	Negative BC	Total	<i>P value</i>
Passive Smoking	No (%)	No (%)	No (%)	
Yes	41 (54.7)	35 (46.7)	76 (50.7)	0.207
No	34 (45.3)	40 (53.3)	74 (49.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

Physical Activity

Table 4.25 shown that percentage of the participants who had engaged in any physical activity is 29.3% and there is convincing evidence that the true percentage of engaged in any physical activity was 18.7% for cases and 40.0% for control. This result indicates statistically significant difference between cases and control regarding engagement in any physical activity ($p=0.003$).

The collected data in Table 4.25 showed that the majority of participants had done brisk walking (95.5%). Among cases, 85.7% had brisk walking who is smaller than the

control (100.0%). This result indicates statistically significant difference between cases and control regarding brisk walking ($p= 0.048$).

(50%) of breast cancer patients work out for 30 minutes and less and the other (50%) of them work out for more than 30 minutes while 8 (26.7%) of controls work out for more than 30 minutes as shown in (Table 4.25).

Table 4.25 Distribution of Participants by Physical Activity

Variable	Positive BC	Negative BC	Total	P value
Physical Activity	No (%)	No (%)	No (%)	0.003*
Yes	14 (18.7)	30 (40.0)	44 (29.3)	
No	61 (81.3)	45 (60.0)	106 (70.7)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Kind of Activity	No (%)	No (%)	No (%)	0.048*
Brisk walking	12 (85.7)	30 (100.0)	42 (95.5)	
Others	2 (14.3)	0 (0.0)	2 (4.5)	
Total	14 (100.0)	30 (100.0)	44 (100.0)	
Duration of Physical Activity	No (%)	No (%)	No (%)	0.12
≤ 30 minutes	7 (50.0)	22 (73.3)	29 (65.9)	
> 30 minutes	7 (50.0)	8 (26.7)	15 (34.1)	
Total	14 (100.0)	30 (100.0)	44 (100.0)	

*Statistically Significant (Significant correlation at 0.05 level)

Stress Exposure

52.0%. of the participants exposed to stress. Among cases, percentage of exposed to stress (61.3%) which was higher than the control (42.7%). This result indicates statistically significant difference between cases and control regarding exposed to stress ($p=0.017$) (Table 4.26).

Dramatic Events divided into four groups: death of close relative, diseased close relative, home demolished, and husband is not responsible. About 55.1% of participants suffered death of close relative; 36.5% from case and 42.7% from control; but this difference is statistical non-significant.

649

650 **Table 4.26 Distribution of Participants by Stress Exposure**

Variable	Positive BC	Negative BC	Total	P value
Stress Exposure	No (%)	No (%)	No (%)	0.017*
Yes	46 (61.3)	32 (42.7)	78 (52.0)	
No	29 (38.7)	43 (57.3)	72 (48.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	
Dramatic Events	No (%)	No (%)	No (%)	0.422
Death of Close Relative	26 (36.5)	17 (53.2)	43 (55.1)	
Diseased Close Relative	3 (6.5)	6 (18.8)	9 (11.5)	
Home Demolished	6 (13.0)	2 (6.3)	8 (10.3)	
Your husband is not responsible	11 (23.9)	7 (21.9)	18 (23.1)	
Total	46 (100.0)	32 (100.0)	78 (100.0)	

651 **Statistically Significant (Significant correlation at 0.05 level)*

652

653 **Distribution of Participants by Sleep**

654 The participants were divided according to sleeping hours into 2 categories: less than 7
 655 hours and more than 7 hours. (53.3%) of participants were sleeping more than 7 hours,
 656 the majority of cases slept less than 7 hours and the majority of controls slept more than
 657 7 hours. This factor indicated no statistical significance in correlation with sleeping hours
 658 (table 4.27).

659 78.0% of the participants were sleeping during night. The majority of cases and controls
 660 slept also during night. This result indicates non statistically significant difference
 661 between cases and control regarding sleeping during night as shown in (Table 4.27).

662

663 **Table 4.27 Distribution of Participants by Sleep**

Variable	Positive BC	Negative BC	Total	P value
Sleeping Hours/Day	No (%)	No (%)	No (%)	0.20
≤ 7	38 (50.7)	32 (42.7)	70 (46.7)	
> 7	37 (49.3)	43 (57.3)	80 (53.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

Sleep during	No (%)	No (%)	No (%)	0.34
Night	57 (76.0)	60 (80.0)	117 (78.0)	
Night & Napping	18 (24.0)	15 (20.0)	33 (22.0)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

**Statistically Significant(Significant correlation at 0.05 level)*

Distribution of Participants by Anthropometric Measurements

Table 4.28 showed anthropometric measurements (weight, height, BMI & waist circumference) and among study participant.

- The mean weight for cases was (85.933 kg) which is greater than the control (76.56 kg) and this difference was found to be statistically significant ($p < 0.001$). This agree with Previous studies have found a positive association between weight gain and increased breast cancer risk. Weight gain throughout adult life was associated with a relative risk ranging from 0.5 to 1.2 in premenopausal women and 1.4 to 2.5 in postmenopausal women and this due to the fact that weight gain reflects mainly an increase in body fat (McTiernan, 2003).
- The mean BMI for cases was (34.017kg/m^2) which is greater than the control (30.411kg/m^2). This result indicates statistically significant difference between cases and control regarding BMI.
- The mean of waist circumference for cases was (112.32cm) which is greater than control (96.45cm). This difference was found to be statistically significant ($p < 0.00$).
- The mean of height for cases and control equals (158.61cm) and (158.96 cm) respectively. This result indicates statistically insignificant difference between case and control regarding height.

Table 4.28 Independent t test comparing the means of Anthropometric Measurements among Participants

Variable	Subject	Number	Mean	SD	t-test	P value
Weight	Positive BC	75	85.933	14.00	3.962	< 0.001*
	Negative BC	75	76.56	14.03		
Height	Positive BC	75	158.613	6.35	-0.374	0.709
	Negative BC	75	158.96	4.90		
BMI	Positive BC	75	34.017	5.24	3.832	< 0.001*
	Negative BC	75	30.411	6.23		
Waist Circumference	Positive BC	75	112.320	13.41	7.364	< 0.001*
	Negative BC	75	96.45	12.96		

*Statistically Significant (Significant correlation at 0.05 level)

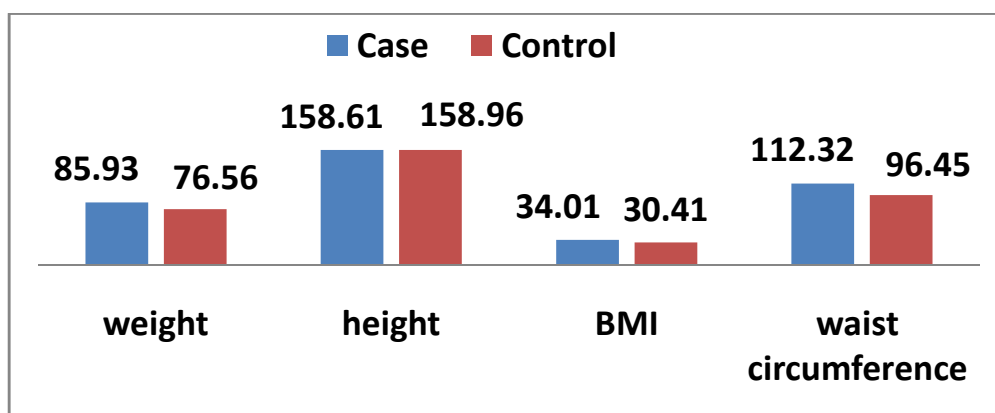


Figure 4.9 The means of anthropometric measurements among participants

Distribution of Participants by Blood Lipid Profile

Table 4.29 showed the result of blood lipid profile (triglyceride, cholesterol, HDL-c, LDL-c) among participant. The obtained results showed elevation of blood lipid profile (triglyceride, cholesterol, HDL-c, LDL-c) among cases compare with the control. The mean of triglyceride level for cases (166.80 mg/dL) was higher than controls (145.93 mg/dL) and the mean blood level of total cholesterol for cases (211.03 mg/dL) was higher than controls (188.92) and LDL-c level for cases (127.84) was also higher than controls (122.74) and the mean of HDL-c for cases (50.11) was higher than control (47.39). and this difference between case and control was found to be statistically

significant. Plasma lipids level reflects dietary lipid intake in individuals. There are several reports of elevated plasma lipid level such as total lipids, triglycerides (TG), total-cholesterol (T-CHO), low density lipoprotein-cholesterol (LDL-C) and free fatty acids in pre and post-menopausal breast cancer patients. It has been postulated that changes in the concentration of serum lipids in the breast cancer patients could result in an increase production of tumor necrosis factor and inhibit adipose lipoprotein lipase activity by the action of insulin. These changes impair the catabolism of very low density lipoprotein (VLDL), leading to an increase in high density lipoprotein-cholesterol (HDL-C) (Laisupasin *et al.*, 2013).

Table 4.29 Independent t test comparing the means of Blood lipid Profile among Participants

Blood lipid profile	Subject	Number	Mean	SD	t-test	<i>P value</i>
Triglyceride	Positive BC	75	166.80	72.46	2.320	0.02*
	Negative BC	75	145.933	28.61		
Total Cholesterol	Positive BC	75	211.027	39.31	3.360	< 0.001*
	Negative BC	75	188.920	41.23		
HDL-c	Positive BC	75	50.11	11.23	1.680	0.04*
	Negative BC	75	47.39	8.43		
LDL-c	Positive BC	75	127.837	39.02	2.345	0.02*
	Negative BC	75	122.739	39.82		

**Statistically Significant (Significant correlation at 0.05 level)*

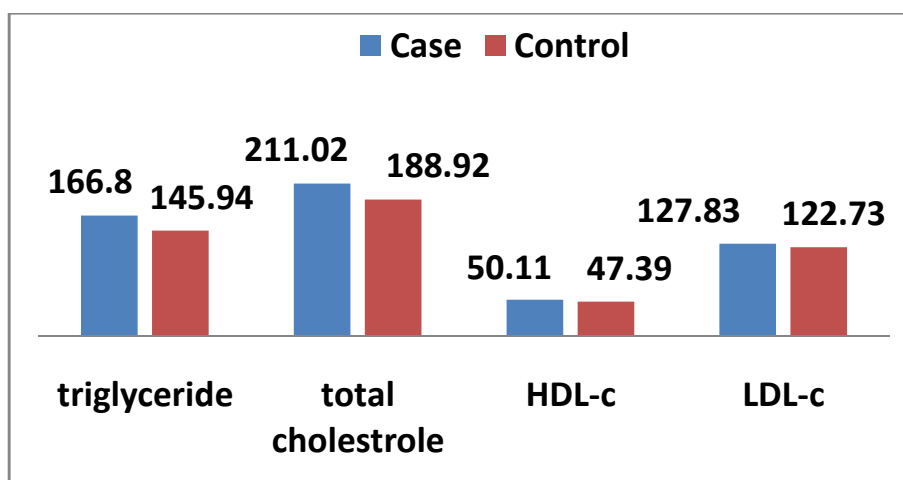


Figure 4.10 The means of blood lipid profile among participants

Distribution of Participants by CBC

Table 4.30 showed the result of CBC (WBC, RBC, HGB, PLT) among participant.

- The mean of WBC for cases was (5.788 mL) which is smaller than mean of control (6.557 mL). This result indicates statistically significant difference between cases and control regarding WBC ($p=0.03$).
- The mean of HGB for cases was (11.31g/dL) which is smaller than mean of control (11.92 g/dL). This result was found to be statistically significant($p < 0.001$).
- The mean of RBC for cases was (4.098 mL) which is smaller than mean of control (4.199 mL). This result indicates not statistically significant difference between cases and control regarding RBC.
- The mean PLT for cases was (277.14 mL) which is higher than mean of control (255.97 mL). This result indicates not statistically significant difference between cases and control regarding PLT.

Table 4.30 Independent t test comparing the means of CBC Participants

CBC	Subject	Number	Mean	SD	t	P value
White blood cells	Positive BC	75	5.788	2.76	-1.804	0.03*
	Negative BC	75	6.557	1.53		

Red blood cells	Positive BC	75	4.098	0.83	-0.914	0.36
	Negative BC	75	4.199	0.45		
HGB	Positive BC	75	11.31	1.21	-3.302	< 0.001*
	Negative BC	75	11.92	1.06		
PLT	Positive BC	75	277.14	81.78	1.575	0.117
	Negative BC	75	255.97	82.83		

*Statistically Significant (Significant correlation at 0.05 level)

Conclusion

The study concluded the following:

- Older age was associated with increased breast cancer risk.
- Women with family history of breast cancer are more likely to have breast cancer
- Women with breast cancer was higher in parity age than healthy woman
- Women with breast cancer was taking oral Contraceptive and hormonal therapy more than healthy woman
- Fertility, Breast feeding, and long duration of breast feeding have protective effect against breast cancer.
- There were direct relationship between stillbirth, post-partum hemorrhage, Caesarian section and increased breast cancer risk.
- There were inverse association between iron and folic acid and breast cancer risk.
- There were direct relationship between overcooking meat, skinned chicken and increased breast cancer risk.
- Women with breast cancer drink whole fat milk
- There was inverse association between frequently diary product and increased breast cancer risk.
- Women with breast cancer are less frequently eating Vegetables and Fruits than healthy woman.
- Women with breast cancer drink water are less frequently than healthy woman.
- There was protective effect of Vegetable such as Onion, Tomato, Green Peppers, Red Peppers against breast cancer risk.

- 763 • There was protective effect of Fruit such as Guava, Strawberries, Grapes and
- 764 Cirrus against breast cancer
- 765 • Women with breast cancer are less frequently of serving size yogurt and cheese
- 766 than healthy woman
- 767 • Women with breast cancer are more frequently of serving size eating red meat
- 768 than healthy woman
- 769 • Women with breast cancer are less frequently of serving size eating fish, Turkey
- 770 than healthy woman
- 771 • There was direct relationship between eating serving size of Grain such as bread,
- 772 Pasta, Rice, Cuscus, Biscuits and increased breast cancer risk.
- 773 • Women with breast cancer are more frequently of serving size eating almonds
- 774 than healthy woman.
- 775 • Women with breast cancer drink soft drinks, and Fresh juices more frequently of
- 776 serving size than healthy woman.
- 777 • Women with breast cancer are more frequently of serving size drinking
- 778 Chamomile and Rosemary than healthy woman
- 779 • There was protective effect of Licorice, ginger, against breast cancer risk.
- 780 • There was protective effect of Basil, Cloves, turmeric, against breast cancer risk.
- 781 • There was direct relationship between Corn oil, Sunflower oil, Butter and
- 782 increased breast cancer risk.
- 783 • There was direct relationship between Chocolate and increased breast cancer risk.
- 784 • Women with breast cancer are less physically active than the healthy women.
- 785 • Women with breast cancer are heavier and more obese than the healthy woman
- 786 • Women with breast cancer are larger waist circumference than the healthy
- 787 woman
- 788 • Women with breast cancer are greater exposure to stress than the healthy woman.
- 789 • Women with breast cancer are high triglyceride, cholesterol, HDL-c, LDL-c than
- 790 the healthy woman.
- 791 • There was inverse association between WBC, HGB and breast cancer risk.
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