RESEARCH COMMUNICATION

Lifestyle Factors and Breast Cancer: a Case-control Study in Kuala Lumpur, Malaysia

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Abstract

Breast cancer is the most common female cancer and the commonest cause of death due to cancer for women in Malaysia. This study was performed to identify the relationship with lifestyle factors. A case-control study was conducted among females with breast cancer who came for treatment to the Breast Clinic Hospital Kuala Lumpur in July until September 2004. A total of 203 female patients were recruited as cases along with 203 patients who attended the Outpatient Clinic, Hospital Kuala Lumpur during the study period as the controls. The study showed women who did not exercise regularly to have four times higher risk (adjusted odds ratio is 3.49, 95% CI is 1.84 to 6.62) compared to those who exercised regularly. Women with a high fat diet were also at elevated risk (adjusted odds ratio 3.84, 95% CI is 1.20 to 12.34) compared to those consuming a low fat diet. Woman without breast cancer generally had a longer duration of lifetime lactation with a median of thirty-three months compared to woman with breast cancer (twenty months, $p<0.05$). Women who did not take oral contraceptive pills but had breast-fed their child have a 56.0% lower risk (crude odds ratio 0.44, CI is 0.22 to 0.87) compared to women who did not take oral contraceptive pill and also did not breast-fed their child. If they had breast fed for thirteen months and above, they faced a 61.0% lower risk (crude odds ratio 0.39, 95% CI is 0.17 to 0.87). There was a significant inverse trend for lifetime lactation and breast cancer risk. In conclusion certain life styles of women are associated with a higher risk of breast cancer development. Therefore, the promotion of a healthy life style should be emphasized.

Key Words: Lifestyle - breast cancer - regular exercise - fat diet - breastfeeding

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Introduction

In Malaysia, breast cancer is the most common cancer among women, in whom it constitutes the main cause of death due to neoplasia (National Cancer Registry Malaysia 2002). There is a possibility that the cancer burden will increase due to changes in lifestyle and environment and also due to ageing of the population (Lim 1991, Ministry of Health Malaysia 1995). Certain lifestyles are related to breast cancer risk (McPherson et al., 2000). Therefore it is prudent to assess the risk factors in breast cancer in order that appropriate preventive measures can be advised. Therefore the present study was carried out at Kuala Lumpur Hospital (HKL), with a particular focus on oral contraceptive pill exposure, breast feeding, fat intake and physical exercise.

Materials and Methods

This case control study was conducted in the Breast Clinic, of Kuala Lumpur Hospital. The target population was all women who came for breast cancer treatment at the clinic from July until September 2004. Inclusion criteria for cases were woman patients who were histologically confirmed primary breast cancer, irrespective of duration of diagnosis and treatment, cancer staging and frequency of the visit. The medical records in the clinic was used for identification. They were excluded if they were terminally ill, had secondary breast cancer or were non-Malaysian citizens. The controls was selected from outpatient clinic patients based on convenient sampling proportionate to the number of cases. The inclusion criteria for controls are women who were eighteen years old and above, that came for treatment at Outpatient Clinic HKL during the study period, and had never been diagnosed for breast or other cancer. The exclusion criteria for controls were if they were in pain so that the interview was unable to be conducted, they were not present after they were called three times within half an hour or they refuse to be interviewed.

A total of 406 respondents could be interviewed and were included in this study with ratio of cases to controls of 1:1. A guided questionnaire was used as a tool of the study. The data were analysed using SPSS software version 10 and EPI-

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Table 1. Socio-demographic Distribution of Cases and Controls

Variable	Cases n (%)	Controls n (%)	Chi-Square	p value
Race				
Malay	102 (50.2)	107 (52.7)	1.075	0.783
Chinese	47 (23.2)	39 (19.2)		
Indian	45 (22.2)	46 (22.7)		
Others	9 (4.4)	11 (5.4)		
Marital status				
Single	23 (11.3)	20 (9.9)	2.290	0.318
Married	180 (88.7)	183 (90.2)		
Educational status				
No formal	19 (9.4)	23 (11.3)	1.941	0.585
Primary	66 (32.5)	58 (28.6)		
Secondary	96 (47.3)	105 (51.7)		
College/Univ	22 (10.8)	17 (8.4)		
Menstrual status				
Premenopausal	122 (60.0)	113 (55.7)	0.818	0.366
Postmenopausal	81 (40.0)	90 (44.3)		
Parity				
Nulliparous	18 (10.0)	11 (6.0)	1.964	0.161
Parous	162 (90.0)	172 (94.0)		
Median income	400.00	380.00	Z=0.811*	0.418

*Mann Whitney test

Table 2. Distribution of Cases and Controls According to Life-style Factors

Variable	Cases n (%)	Controls n (%)	OR	95% CI	p value
OCP					
Yes	62 (34.4)	78 (42.6)	0.707	0.463-1.082	0.109
No	118 (65.6)	105 (57.4)			
HRT					
Yes	9 (11.1)	13 (14.4)	0.740	0.298-1.837	0.516
No	72 (88.9)	77 (85.6)			
Smoking					
Yes	5 (2.4)	6 (3.0)	0.829	0.247-2.760	0.760
No	198 (97.6)	197 (97.0)			
Exercise					
No	177 (87.2)	150 (73.9)	2.405	1.434-4.035	0.001*
Yes	26 (12.8)	53 (26.1)			
Obesity					
Yes	32 (15.8)	35 (17.2)	0.888	0.525-1.500	0.656
No	171 (84.2)	166 (81.8)			
Fat intake					
High	16 (7.9)	6 (3.0)	2.809	1.076-7.332	0.028*
Low	187 (92.1)	197 (97.0)			

*significant

INFO 2000. the Students t test and Mann Whitney test were used for quantitative data and the Chi-Square test for qualitative data. Software Diet 4 was used to calculate the total daily fat intake. Multivariate analysis was used to control for confounding factors.

Results

The mean age for cases group was 48.73±9.49 years and for the control group was 47.83±12.79 years old. There was no significant difference between cases and controls regarding their age ($p>0.05$). Cases and controls were similar with respect to their socio-demography status, which include race, educational, marital status, income, parity and menopausal status as shown in Table 1.

Table 2 shows the lifestyle factors that are associated with breast cancer risk. Woman who did not exercise regularly were at risk three-times higher to get breast cancer compared to woman who exercise regularly. This study cannot identify the association between alcohol consumption and breast cancer. No respondent can be labelled as alcoholic according to operational definition. Other lifestyle factors, which are consumption of oral contraceptive pill (OCP), hormone replacement therapy (HRT), smoking and obesity, were not significantly associated with breast cancer risk. Women who consumed high fat diet had a three-fold higher risk of getting breast cancer compared to woman who took low or normal fat intake in their daily diet. Categorization of high and low fat was according to the Food and Drug Association (FDA) 2000.

Table 3 shows the distribution of parous cases and controls regarding their breast-feeding practice. Generally, the percentage of woman without breast cancer breast-fed their children is more than those who suffered from breast cancer. The same observation goes for exclusive breast-feeding. Though women without breast cancer have longer duration of lifetime lactation ($p<0.05$) compared to woman with breast cancer, there was no significant difference between them regarding their breast feeding practice. However, there was significant differences between cases and controls when breastfeeding exposure was further stratified with regard to OCP exposure as shown in Table 4. Woman who never took OCP but breastfed their child had a 56.5% lower risk of getting breast cancer compared to women who never take OCP and also who never breastfeed their child.

As described in Table 5, if the woman had breastfed for thirteen months and above, they faced 61.0% lower risk. There was also a significant trend between lifetime lactation duration with breast cancer risk (p trend <0.05). A significant inverse relationship between breast cancer risk with longer lifetime lactation was seen. However, there was no significant trend of total number of children breastfed with breast cancer risk as shown in Table 6.

Finally as shown in Table 7, woman who did not exercise regularly faced four-times higher risk (adjusted OR= 3.489, 95% CI = 1.840 to 6.617) than woman who did exercises regularly. Woman who consumed high fat diet was at risk four times higher (adjusted OR = 3.841, 95% CI = 1.195 to 12.341) than woman who consumed fat in the low or normal range.

Discussion

Certain lifestyle of a woman will make them at a higher risk of getting breast cancer. This study on lifestyle had

Table 3. Distribution of Cases and Controls According to Breast-feeding Categories

Variable	Cases n (%)	Controls n (%)	Chi	p	OR	95% CI
Breast-fed						
Yes	122 (75.3)	140 (81.4)	1.828	0.176	0.70	0.40-1.22
No	40 (24.7)	32 (18.6)				
Breast-fed						
Exclusive	54 (57.4)	67 (67.7)	2.157	0.142	0.64	0.36-1.16
Not	40 (42.6)	32 (32.3)				
Breast-fed						
Exclusive	54 (44.3)	67 (47.9)	0.339	0.560	0.87	0.69-1.94
Partial	68 (55.7)	73 (52.1)				

Table 4. Distribution of Cases and Controls According to Breastfeeding Exposure after Stratification by OCP Consumption

Consumption	Cases n (%)	Controls n (%)	Chi	p-value	OR	95% CI
Yes						
Breast-fed	51 (85)	61 (78)	1.024	0.312	1.56	0.649-3.843
Not fed	9 (15)	17 (22)				
No						
Breast-fed	71 (70)	79 (84)	5.675	0.017*	0.44	0.217-0.871
Not fed	31 (30)	15 (16)				

*significant

Table 5. Distribution of Cases and Controls According to Total Duration of Lifetime Lactation after Stratification for OCP Consumption

Consumption	Cases n (%)	Controls n (%)	OR	95% CI	p#
Yes Lifetime lactation duration (months)					
0	9 (15.0)	17 (21.8)	1.00		0.45
1 – 3	3 (5.0)	6 (7.7)	0.94	0.14-5.96	
4 – 12	18 (30.0)	15 (19.2)	2.27	0.69-7.54	
≥ 13	30 (50.0)	40 (51.7)	1.42	0.51-4.02	
No Lifetime lactation duration (months)					
0	31 (30.1)	15 (16.0)	1.00		0.01*
1 – 3	10 (9.7)	8 (8.5)	0.60	0.17-2.12	
4 – 12	22 (21.3)	21 (22.3)	0.51	0.20-1.30	
≥ 13	40 (38.9)	50 (53.2)	0.39	0.17-0.87	

for trend *significant

identified that irregular exercise and high fat intake increased the breast cancer risk. Woman who did not exercise regularly are at four-times higher risk (adjusted OR = 3.489; 95% CI =1.840-6.617) of getting breast cancer compared to those who exercise regularly. This finding is consistent with study done by Albanes et al (1989). He found that there was an association between inactive individual with the increase risk of breast cancer. A few other similarly studies on the relationship of physical activity and breast cancer risk has discovered that by practicing regular exercise, the risk of breast cancer can be reduced (Thune et al., 1997, Verloop et al., 2000, Friedenreich, 2001).

Physical activity and exercise may affect hormonal concentration and energy balance, thus they can affect the occurrence of diseases especially chronic diseases such as cancer. Vigorous physical training and even moderate exercise can interrupt the menstrual cycle, perhaps by suppressing the pulsatile release of gonadotropin-releasing hormone. Besides, exercise was said being able to reduce fat tissue in the body and indirectly will reduce the exposure to oestrogen hormone that is secreted by the fat tissue (Mc Tiernam 2003). Finally, this effect of physical activity may lower a woman's cumulative exposure to oestrogen and progesterone, thereby inhibiting carcinogenesis process in the breast. Energy balance might also influence the risk of breast cancer. An experimental study to a rodent revealed that by caloric restriction, proliferate activity of the mammary glands is reduced and carcinogenesis is inhibited. (Thune et al., 1997).

Table 6. Distribution of Cases and Controls According to Total Number of Children Breast-fed

Number	Cases n (%)	Controls n (%)	Chi	p value#	OR
1	15 (12.3)	17 (12.1)	0.002	0.963	1.00
2	21 (17.2)	28 (20.0)	0.85		
3	28 (23.0)	25 (17.9)	1.27		
4	25 (20.5)	31 (22.1)	0.91		
≥5	33 (27.0)	39 (27.9)	0.96		

for trend

Table 7. Life-style Risk Factors for Breast Cancer#

Risk factor	Adjusted OR	95% CI	p value
Regular exercise			
Yes	3.489	1.840- 6.617	0.0001*
No			
Total fat in diet			
Low	3.841	1.195-12.341	0.024*
High			

*significant #multivariate analysis, taking into account the effects of age at the first pregnancy, age at the last pregnancy, parity, family history of breast cancer, previous history of benign breast lesion, breastfeeding and lifetime lactation

Woman with breast cancer consumed more fat in their diet compared to woman without breast cancer. Their median daily fat intake was 27 gram and 30 gram respectively. Study done by Lim (2002) also showed the same result in which the case group had mean of fat intake of 81.39±37.01 gram/ day meanwhile the mean of fat intake for the control group was 31.75±20.30 gram/day ($p<0.05$). This study identified that the consumption of fat in the diet, which is more than 65 gram per day, will increase the breast cancer risk to four-times higher (adjusted OR = 3.841, 95% CI = 1.195 to 12.341) compared to woman who take 65 gram or lesser fat per day. Dietary factors and dietary fat in particular have been hypothesized to explain the large variation in breast cancer incidence of breast cancer around the world. This is further evidence by the increasing incidence of breast cancer among population who migrates from low to high incidence country in which their per capita intake of dietary fat is higher. (Willett 2001, Philip and Francis 2002, Bosetti et al., 2002).

A relationship between breast-feeding and breast cancer can only be determined after the breastfeeding exposure was stratified into oral contraceptive consumption. Woman who never takes OCP but breastfed their child have 56.5% lower risk (crude OR = 0.435, 95% CI = 0.217 to 0.871) compared to woman who never take OCP and at the same time did not breast-feed their children. Woman starts taking OCP four to six weeks after delivery and it continues until she is ready for her next pregnancy. Meaning, during this period woman breastfeed their child and taking OCP simultaneously. By consuming OCP, the women are exposed to high level of oestrogen hormone that is due to existence of the exogenous oestrogen, therefore, most probably it cancels the protective effect of lactation. This will explained why the protective effect of breastfeeding cannot be seen if the woman breast-feed their child and at the same time taking OCP. Furthermore, the time that they consumed the pills as method of contraception is much longer than the time that they breastfeed their child. The high level of oestrogen hormone will reduce the flow and quantity of breast milk due to inhibitory effect of estrogen to prolactin; the hormone that promote the secretion of breast milk (Truitt et al. 2003). Besides that, other social factor influences the breast-feeding process. The woman was unable to breastfeed their child much longer because they have to return to their workplace once their maternity leave is over.

Woman without breast cancer has longer duration of lifetime lactation with a median of thirty-three months compared to woman with breast cancer in which their median lifetime lactation was twenty months. Women who never took OCP but had breastfed their child or children for thirteen months and above have 61.0% (crude odds ratio 0.39, 95% CI is 0.17 to 0.87) lower risk of getting breast cancer compare to woman who never took OCP and at the same time never breastfed their child. There was a significant trend between lifetime lactation and breast cancer, in which significant inverse relationship between total lifetime lactation duration and breast cancer risk was seen.

Though the control group has more numbers of lifetime child breastfed compared to the case, the different was not statistically significant. Consequently, it is unable to discover the relationship between lifetime numbers of child breastfed with breast cancer. Furthermore, it is also unable to see a significant trend between the above factors.

This study was unable to identify the relationship between exclusive breastfeeding and breast cancer. Probably it was because most of the respondents were in theirs forties and fifties; hence, the breast-feeding practice had been long elapsed. Therefore, the influence of recall bias was so obvious especially when it involved the quantity measurement. In this case, the respondent has to report precisely the duration they had fully breastfed their children. Failed to report precisely, it will lead to misclassification bias. Moreover, this study only measures the exposure to at least one child of exclusive breastfeeding. If the criteria exposure of exclusive breastfeeding is to all the children instead of ever exclusively breastfed may be the relationship between exclusive breastfeeding with breast cancer risk could be identified.

As for conclusion, a certain lifestyle of women will face a higher risk of getting breast cancer. Therefore, promotion of ahealthy lifestyle should be continuous and practiced.

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