



UNIVERSITI PUTRA MALAYSIA

**NUTRITIONAL AND LIFESTYLE RISK FACTORS FOR BREAST
CANCER AMONG MALAYSIAN WOMEN: A CASE-CONTROL STUDY**

JUSTINA TAN PIK CHOO

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By

JUSTINA TAN PIK CHOO

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
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of Science**

March 2004



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science.

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Chairman: Associate Professor Mirnalini a/p V.S. Kandiah, Ph.D.

Faculty: Medicine and Health Sciences

Breast cancer is the most common incident cancer in women worldwide, accounting for 9% of all new cancers. While the exact causes of breast cancer are unknown, the risks are higher among older women (50 years and above) than those less than 35 years. Dietary factors that have been linked to breast cancer include saturated fat, meat, vegetables and fruits. Other factors that have been linked to breast cancer include age at menarche, age at first and last birth, smoking, use of oral contraceptives and body mass index. This case-control study was carried out to determine the nutritional and lifestyle risk factors of breast cancer among Malaysian women. A total of 162 pre- and post-menopausal women (81 cases and 81 controls) was included in the study, which was carried out between 1 January to 31 December, 2000. Cases were selected from the Breast Cancer Clinics in Hospital Kuala Lumpur (HKL) and Universiti Malaya Medical Centre (UMMC). All cases were newly diagnosed and



have not undergone any treatment or surgery. Controls were women staff and wives of staff of Universiti Putra Malaysia (UPM). They were matched by age (± 5 years) and ethnicity with the cases. Additional Chinese controls (17 women) were selected from the Malaysian-Chinese Association (MCA) from Ampang Jaya by invitation to the group's leader. Data collection was carried out in four main parts: the interview (to obtain socio-demographic and lifestyle data); anthropometric measurements; dietary information, using semi-quantitative food frequency questionnaire; and biochemical data (to obtain serum lipid profile). Majority of the respondents were pre-menopausal women with the mean age of 46.63 in cases and 47.58 in controls. Half of the breast cancer patients were seen at UMMC while the other half in HKL, and most of them (43.1%) presented with a second stage of cancer. Smoking, exercise, breast-self examination and breastfeeding practices were not significantly different between the two study groups. However, there was a significant difference in the duration of exercise between cases and controls. Reproductive history like age at menarche, age at first marriage, age at first birth and parity were also not significantly different between cases and controls. Anthropometric indicators like height, weight, waist and hip measurements, as well as body mass index and waist-hip ratio did not show any association with breast cancer, and neither were they significantly different between case and control subjects. Intakes of micronutrient were not significantly different between the two study groups with the exception of sodium. Blood lipid profiles also did not show any difference between groups. Preliminary data showed that women who



have four to five children were 1.32 times more at risk for breast cancer as compared to those who never had any children (95% CI=1.32-1.47). Multiple logistic regression model showed that menarche at higher age and increased BMI decreased breast cancer risk while higher age at last birth increased breast cancer risk. The relatively small sample size of this study could have resulted in this results. Furthermore, there could have been recall bias and under-reporting of energy intake among case subjects due to the occurrence of the disease. Larger cohort and interventional studies should be carried out to further explore this factors with relation to breast cancer.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains.

**FAKTOR RISIKO PEMAKANAN DAN CARAGAYA HIDUP DALAM
KANSER PAYUDARA DI KALANGAN WANITA DI MALAYSIA: SATU
KAJIAN KES-KAWALAN**

Oleh

JUSTINA TAN PIK CHOO

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Kanser payudara adalah kanser yang paling kerap di kalangan wanita, sehingga mewakili 9% daripada jumlah kanser. Walaupun sebab-sebab kejadian kanser payudara tidak diketahui, namun risikonya adalah lebih tinggi di kalangan wanita yang lebih tua (50 tahun ke atas) dibandingkan dengan wanita yang lebih muda (kurang daripada 35 tahun). Faktor pemakanan yang dikaitkan dengan kanser payudara termasuk lemak tepu, daging, sayur-sayuran dan buah-buahan,. Faktor-faktor lain yang juga dikaitkan dengan kanser payudara termasuk umur baligh, umur semasa melahirkan anak yang pertama dan terakhir, merokok, penggunaan pil perancang keluarga dan indeks jisim tubuh. Kajian kes-kawalan ini telah dijalankan untuk mengenalpasti factor-faktor pemakanan dan caragaya hidup di kalangan wanita di Malaysia. Kajian ini melibatkan 162 wanita yang sudah mencapai dan belum mencapai tahap menopause (81 kes dan 81 kawalan), dan dijalankan di antara 1 Januari dan 31

Disember, 2000. Kes telah dikenalpasti di Klinik Payudara di Hospital Kuala Lumpur (HKL) dan Pusat Perubatan Universiti Malaya (PPUM). Kesemua kes adalah baru didiagnosakan sebagai menghidapi kanser payudara, dan belum menjalani sebarang rawatan atau pembedahan. Kawalan merupakan staf wanita dan isteri staf Universiti Putra Malaysia (UPM). Mereka telah dipadankan mengikut umur (± 5 tahun) dan bangsa. 17 wanita Cina tambahan telah dipilih daripada kumpulan Pertubuhan Cina-Malaysia (MCA) dari Ampang Jaya setelah diberi jemputan daripada ketua pertubuhan. Data yang dikumpul merangkumi empat bahagian utama: temuramah (untuk mendapat data sosio-demografi dan caragaya hidup); ukuran antropometri; maklumat mengenai pemakanan menggunakan soal-selidik frekuensi makanan semi-kuantitatif; dan data biokimia (untuk mendapatkan profail lipid). Majoriti responden adalah wanita pra-menopausa dengan min umur 46.63 tahun bagi kes dan 46.63 tahun bagi kawalan. Setengah daripada pesakit kanser payudara ditemui di PPUM manakala setengah lagi di HKL, dan kebanyakan mereka (43.1%) adalah di peringkat kanser kedua. Merokok, bersenam, menguji payudara sendiri dan menyusu badan tidak menunjukkan perbezaan yang signifikan di antara dua kumpulan kajian. Namun, terdapat perbezaan signifikan dalam tempoh bersenam di antara kumpulan kes dan kawalan. Sejarah reproduktif seperti umur semasa baligh, umur pada perkahwinan pertama, umur pada kelahiran pertama dan jumlah anak kesemuanya tidak menunjukkan perbezaan signifikan di antara kumpulan kes dan kawalan. Indikator antropometrik seperti tinggi, berat, lilitan pinggang, lilitan punggung, serta indeks jisim tubuh dan

nisbah lilitan pinggang-punggung kesemuanya juga tidak menunjukkan sebarang perbezaan signifikan di antara kumpulan kes dan kawalan. Di antara kesemua micronutrien, hanya pengambilan natrium sahaja yang menunjukkan perbezaan yang signifikan di antara dua kumpulan kajian. Profail lipid juga tidak berbeza di antara kumpulan kajian. Keputusan awal telah menunjukkan bahawa wanita yang mempunyai empat hingga lima orang anak mempunyai risiko 1.32 kali lebih tinggi berbanding dengan mereka yang tidak mempunyai anak (95% CI=1.32-1.47). *Multiple logistic regression* menunjukkan bahawa umur kedatangan haid pertama yang lebih rendah, IJT yang lebih tinggi dan umur pada kelahiran terakhir yang lebih tinggi kesemuanya meningkatkan risiko mendapat kanser payudara. Kesemua factor caragaya hidup dan pemakanan tidak menunjukkan sebarang kaitan dengan kanser payudara, dan juga tidak menunjukkan sebarang perbezaan yang signifikan di antara kumpulan kes dan kawalan. Sampel saiz kajian yang kecil mungkin telah mempengaruhi keputusan keseluruhan kajian ini. Mungkin juga terdapat bias di dalam pengingatan kumpulan kes terhadap pemakanan mereka. Malah, kemungkinan juga terdapat laporan yang rendah terhadap pengambilan tenaga di kalangan kumpulan kes disebabkan oleh kejadian kanser. Kajian kohort dan intervensi yang lebih besar harus dijalankan untuk mengkaji dengan lebih mendalam faktor-faktor yang berkaitan dengan kanser payudara.

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TABLE OF CONTENTS

	Page
ABSTRACT	2
ABSTRAK	4
ACKNOWLEDGEMENTS	8
APPROVAL	10
DECLARATION	12
LIST OF TABLES	16
LIST OF FIGURES	20
CHAPTER	
I INTRODUCTION	21
Statement of problem	27
Significance of study	29
Objectives of study	30
Hypothesis	32
II LITERATURE REVIEW	34
Dietary Risk Factors	34
Dietary Fat and Breast Cancer Risk	34
Fruits, Vegetables and Vitamins and Breast Cancer Risk	39
Micronutrients and Breast Cancer Risk	45
Phytonutrients and Breast Cancer Risk	47
Body size, Body Mass Index and Breast Cancer Risk	50
Non-nutritional Risk Factors	54
Socio-demographic Factors and Breast Cancer Risk	54
Reproductive Factors and Breast Cancer Risk	56
Age	57
Age at Menarche	57
Age at Menopause	58
Age at First Pregnancy	59
Family history	59
Use of Oral Contraceptives and Breast Cancer Risk	60
Physical Activity and Breast Cancer Risk	62
Hormone-replacement Therapy and Breast Cancer Risk	63
Environmental Factors and Breast Cancer Risk	64
Smoking and Breast Cancer Risk	64
III METHODS AND MATERIALS	66
Study Design and Location	66
Selection of Subjects and Sampling	66
Cases	66
Controls	67
Exclusion Criteria (for cases and controls)	68
Consent from Study Subjects	69
	13



Instruments and Techniques	69
Anthropometry	71
Diet	71
Biochemical	72
Pre-testing	73
Data Analysis	73
Study Limitations	75
IV RESULTS AND DISCUSSION	77
Introduction	77
Socio-economic Characteristics of Subjects	78
Age and Ethnicity	78
Marital Status	79
Education	81
Respondents' Occupation	81
Husbands' Occupation	82
Personal Income	84
Husbands' Income	84
Other Sources of Income	86
Household Income	86
Matched Pair t-test on Socio-economic Factors Between Case and Control Groups	88
Distribution of Patients by Study Locations and Ethnicity	89
Stages of Cancer at Diagnosis	89
Lifestyle Characteristics	91
Association of Lifestyle Factors With Cases and Controls	97
Reproductive History	98
Matched Pair t-test on Reproductive Factors among Cases and Controls	106
Association of Reproductive Factors Between Cases and Controls	107
Anthropometric Measurement and Indicators	108
Total Lipid Profile	114
Matched Pair t-test of Lipid Profile Between Cases and Controls	117
Frequency of Food Intake	119
Food Consumption Frequency Scores	134
Nutrient Intakes	139
Crude Odds Ratio (OR) and 95% Confidence Intervals for Non-dietary Factors	145
Socio-economic and Demographic Factors	146
Lifestyle and Reproductive Factors	149
Anthropometric Indices	153
Crude Odds Ratio (OR) and 95% Confidence Intervals for Dietary Factors	155
Cereal and Legume Products	155



Common Cooked Dishes	156
Fish and Fish Products	158
Vegetables	158
Fruits	161
Miscellaneous Foods	163
Multiple Logistic Regression Models to Determine the Contribution of Dietary and Non-dietary Factors for Breast Cancer	164
Discussion	181
V CONCLUSIONS AND RECOMMENDATIONS	186
Conclusions	186
Recommendations	188
BIBLIOGRAPHY	191
APPENDICES	203
BIODATA OF THE AUTHOR	235



LIST OF TABLES

Table		Page
1	A Review of Case-control Studies Examining the Relationship Between Intake of Total Fat and Breast Cancer Risk	36
2	A Review of Cohort Studies Examining the Relationship Between Intake of Total Fat and Breast Cancer Risk	40
3	Established and Probable Risk Factors for Breast Cancer	57
4	Socio-economic Characteristics of Respondents	80
5	Matched Pair Independent t-test on Socio-economic Factors Between Cases and Controls	88
6	Lifestyle Characteristics of Respondents	93
7	Chi-square Test of Lifestyle Factors Between Case and Control Subjects	97
8	Menstrual and Reproductive History of Respondents	100
9	Matched Pair t-test on Selected Reproductive Factors Between Cases and Controls	106
10	Chi-square Test of Reproductive Factors Between Case and Control Subjects	108
11	Univariate (t-test) Analysis of Anthropometric Measurements between Case and Control Subjects	110
12	Distribution and T-test Values of Anthropometric Indicators among Cases and Controls	113
13	Comparison of Total Lipid Profile (mean \pm sd) of Case and Control Subjects	115
14	Distribution of Respondents According to Classification of Lipid Profile (n=81)	116
15	Univariate (t-test) Analysis of Lipid Profile between Case and Control Subjects	118
16	Frequency of Dietary Intakes of Respondents –Cereal Products [n(%)]	120



17	Frequency of Dietary Intakes of Respondents – Legume Products [n(%)]	120
18	Frequency of Dietary Intakes of Respondents – Fruits [n(%)]	121
19	Frequency of Dietary Intakes of Respondents – Common Cooked Dishes [n(%)]	122
20	Frequency of Dietary Intakes of Respondents – Vegetables [n(%)]	124
21	Frequency of Dietary Intakes of Respondents – Fish and Fish Products [n(%)]	125
22	Frequency of Dietary Intakes of Respondents – Milk Products and Beverages [n(%)]	126
23	Frequency of Dietary Intakes of Respondents – Other Food Items [n(%)]	127
24	Food Consumption Frequency Score of Respondents – Cooked Dishes and Milk Products	135
25	Food Consumption Frequency Score of Respondents – Vegetables	136
26	Food Consumption Frequency Score of Respondents – Fish and Fish Products	137
27	Food Consumption Frequency Score of Respondents – Miscellaneous Foods and Beverages	138
28	Respondents' Mean (\pm SD) Intakes of Selected Nutrients and Independent Sample T-test Between Cases and Controls	142
29	Crude Odds Ratio and 95% Confidence Intervals for Non-dietary Factors: Socio-economic and Demographic Factors	148
30	Crude Odds Ratio and 95% Confidence Intervals for Non-dietary Factors: Lifestyle and Reproductive Factors	150
31	Crude Odds Ratio and 95% Confidence Intervals for Non-dietary Factors: Anthropometric Indices	154
32	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Cereal and Legume Products	156



33	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Common Cooked Dishes	157
34	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Fish and Fish Products	158
35	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Vegetables	159
36	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Fruits	162
37	Crude Odds Ratio and 95% Confidence Intervals for Food Items Tested in the Food Frequency Questionnaire: Miscellaneous Foods	164
38	Multiple Logistic Regression Model for Reproductive Factors (Significance of Model: 0.044)	165
39	Multiple Logistic Regression Model for Reproductive Factors and Anthropometric Indices (Significance of Model: 0.004)	166
40	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices and High-fat Foods (Significance of Model: 0.006)	167
41	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods and Soybean Products (Significance of Model: 0.022)	168
42	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods, Soybean Products and Fish Products (Significance of Model: 0.001)	169
43	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods, Soybean Products, Fish Products and Eggs (Significance of Model: 0.002)	170
44	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods, Soybean Products, Fish Products, Eggs and Fruits (Significance of Model: 0.003)	171



45	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods, Soybean Products, Fish Products, Eggs, Fruits and Vegetables (Significance of Model: 0.026)	173
46	Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, High-fat Foods, Soybean Products, Fish Products, Eggs, Fruits, Vegetables and Beverages (Significance of Model: 0.004)	174
47	Reduced Multiple Logistic Regression Model for Reproductive Factors (Significance of model: 0.021)	175
48	Reduced Multiple Logistic Regression Model for Reproductive Factors and Anthropometric Indices (Significance of model: 0.002)	175
49	Reduced Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices and Fish and Fish Products (Significance of model: 0.000)	176
50	Reduced Multiple Logistic Regression Model for Reproductive Factors, Anthropometric Indices, Fish and Fish Products and Beverages (Significance of model: 0.000)	177
51	Final Multiple Logistic Regression Model for Reproductive Factors (Significance of model: 0.021)	178
52	Final Reduced Multiple Logistic Regression Model for Reproductive Factors and Anthropometric Indices (Significance of model: 0.002)	179



LIST OF FIGURES

Figure		Page
1	Cancer Incidence in Selected Registries in Asia, 1983-1987	25
2	Distribution of Breast Cancer Patients According to Hospitals and Ethnicity	83
3	Distribution of Breast Cancer Patients According to Stage at Presentation	90
4	Distribution of Respondents According to Frequency of Eating Out on a Weekly basis for breakfast (N=81)	129
5	Distribution of Respondents According to Frequency of Eating Out on a Weekly Basis for Lunch (N=81)	130
6	Distribution of Respondents According to Frequency of Eating Out on a Weekly Basis for Dinner (N=81)	131
7	Percent Distribution of Respondents According to Consumption of Fat When Eating Meat (N=81)	132
8	Percent Distribution of Respondents According to Consumption of Skin When Eating Chicken or Duck (N=81)	133



CHAPTER ONE

Introduction

The word "cancer" originated from Hippocrates (460-370 B.C.), considered the "Father of Medicine." He used the terms "carcinos" and "carcinoma" to describe non-ulcer forming and ulcer-forming tumours (American Cancer Society, 2001). Normal body cells grow, divide, and die in an orderly fashion. Cancer cells, however, continue to grow and divide, and can spread to other parts of the body. These cells are then accumulated to form tumours or lumps that may destroy normal tissues. Benign tumours are not cancer, in that they can be removed and often, they do not come back. Malignant tumours, on the other hand, become cancerous. They contain abnormal tumours in which cell division is not controlled, thus they can invade and damage nearby tissues and organs.

Breast cancer is a malignant tumour that has developed from cells of the breast. There are many types of breast cancer such as adenocarcinoma, ductal carcinoma *in situ* and invasive ductal carcinoma (Appendix A). When a cancer has spread to other sites outside the breast, it is said to have metastasized. In this situation, the cancer cells are often found in the lymph nodes. If the cancer has reached these nodes, it means that cancer cells may have spread to other parts of the body, ie the bones, liver or lungs. If breast cancer has spread to the lung, the



cancer cells in the lung are actually breast cancer cells. This disease will then be called metastatic breast cancer (not lung cancer).

Breast cancer is the third most common cancer in the world, and the most common incident cancer in women worldwide (American Cancer Society, 2001), accounting for 9% of all new cancers (WCRF/AICR, 1997). In the United States, breast cancer ranks second among the leading causes of death after lung cancer, making up 23.3% of the total deaths in the country (American Cancer Society, 2001). In 1998, the World Health Organisation (WHO) reported that the incidence of breast cancer in developed countries is 505,000 women while the incidence in developing countries is 390,000 women (WHO, 1998).

The American Cancer Society (2001) reported that the worldwide incidence rate for breast cancer has been increasing by 4% per year since the 1980's and is at the level of 110.6 cases per 100,000 women. The Centre for Disease Control (CDC, 2001) estimated 192,200 new cases of invasive breast cancer to occur among women in the United States during the year of 2001 (CDC, 2001). Out of this total, an expected 40,600 deaths will occur (40,200 among women and 400 among men). Between 1973 and 1989, incidence rates increased nearly 40% for women aged above 65 years (Sondik, 1994). Between the 70's and the 90's, the incidence of breast cancer increased by 117% while mortality increased by 50%.



The increase in the detection rate of breast cancer has been very significant since the 80s with the introduction of the mammogram. With mammography, breast cancer can be detected at an earlier stage where treatment is likely to have significant effects resulting in the increase in average length of life as well as improvement in the quality of life.

Death rates due to breast cancer also significantly declined with this early detection and improved treatment (CDC, 2001). Kerlikowski *et al.* (1995) found that mammography screening could reduce deaths by 20 to 30% among women aged 50 to 74 years and about 17% among women aged between 40 and 49 years. The UK Trial of Early Detection of Breast Cancer (TEDBC) was carried out in 1979 to investigate the effect of screening and education about breast self-examination (BSE) on breast cancer mortality in eight centres in England and Scotland. Moss *et al.* (1999) carried out a follow-up study of 16 years, and compared the observed number of deaths from breast cancer in each centre with the expected number, calculated by Poisson regression model. Mortality due to breast cancer was 27% lower (RR=0.73, 95% CI 0.63-0.84) in the screening centres. This showed that a reduction in breast cancer mortality could be achieved from early detection by screening.

Incidence rates in countries like Japan and Singapore are also increasing due to the increase in the elderly population. The increase in breast cancer incidence in these two countries is more than two times in women born in the 1915 and 1940 birth cohorts (Lee, 1998). In 1980, the



incidence rate in Singapore was 27 per 100,000 women, but increased to 39.3 per 100,000 women in 1990, while the rate stood at 47.1 per 100,000 women in 1995 (Yip and Ng, 1996). This incidence rate, however, is most likely to increase even further in the future (Seow *et al.*, 1998).

Figure 1 shows the incidence rate of breast cancer in selected Asian countries as reported in the publication by the World Cancer Research Fund and American Institute for Cancer Research (1997). These rates were based on the years between 1983 and 1987. Women in Manila, the urban city of Philippines, were reported to have an incidence of up to more than three times higher than that of Thailand. Meanwhile, Figure 1 also shows that breast cancer incidence is highest among Indian Singaporeans (34.0 per 100,000 women) as compared to Chinese (31.6 per 100,000 women) and Malays (23.2 per 100,000).

