A cross-sectional study of the knowledge about the impact of food practices on breast cancer and lifestyle in female breast cancer patients in a tertiary hospital, Bangkok, Thailand

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Abstract

Background: Breast cancer is the most prevalent form of cancer among women in Thailand and worldwide. Although lifestyle is a significant risk factor for breast cancer, much of the attention in breast cancer prevention focuses on early detection and very little on lifestyle. This study was conducted to examine the knowledge and lifestyle of female breast cancer patients in a tertiary hospital.

Methods: A cross-sectional study was conducted at King Chulalongkorn Memorial Hospital (KCMH) between July to August, 2019. Using a questionnaire that had four parts, including the demographic data, clinical characteristics, medical history of family members, lifestyle practice of the patients and their knowledge score, was distributed to 250 adult female breast cancer patients in the outpatient department of KCMH.

Result: The mean knowledge score on the risk factors involving breast cancer was 11.14 out of 20, (standard deviation 3.38). Most participants had underlying diet-related diseases, which included hypertension (20.9%), dyslipidemia (18.1%), and diabetes (8.7%). The paticipants had family members witha medical history of diseases which included cancer (28.0%), diabetes (26.3%), hypertension (16.8%), and cardiovascular disease (9.1%).

Conclusion: The study revealed that the patients were not making the best choices to achieve a healthy lifestyle on preventing and managing breast cancer. Awareness, preventive measures, and lifestyle intervention need to be considered in dealing with this problem.

Keywords: breast cancer; diet; lifestyle

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การศึกษาภาคตัดขวางถึงความรู้เกี่ยวกับผลกระทบของการจัดการด้านอาหารต่อมะเร็งเต้านมและวิถีชีวิตของผู้ป่วยมะเร็งเต้านมในโรงพยาบาลตติยภูมิ กรุงเทพมหานคร ประเทศไทย

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บทคัดย่อ

ความเป็นมา: มะเร็งเต้านมเป็นมะเร็งรูปแบบที่แพร่หลายมากที่สุดในหมู่สตรีในประเทศไทยและทั่วโลก แม้ว่าวิถีชีวิตจะเป็นปัจจัยเสี่ยงที่สำคัญสำหรับมะเร็งเต้านม แต่ความสนใจส่วนใหญ่ในการป้องกันมะเร็งเต้านมมุ่งเน้นไปที่การตรวจหาตั้งแต่เนิ่น ๆ โดยไม่ได้มุ่งประเด็นการดำเนินชีวิตมากนัก การศึกษานี้ดำเนินการเพื่อศึกษาความรู้และรูปแบบการดำเนินชีวิตของผู้ป่วยมะเร็งเต้านมในโรงพยาบาลตติยภูมิ

วิธีการศึกษา: การศึกษาแบบภาคตัดขวางที่โรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย ระหว่างเดือนกรกฎาคมถึงสิงหาคม พ.ศ. 2562 โดยใช้แบบสอบถาม 4 ส่วน ประกอบด้วย ข้อมูลประชากร ลักษณะทางคลินิก ประวัติทางการแพทย์ของสมาชิกในครอบครัว แนวทางการใช้ชีวิตของผู้ป่วย และคะแนนความรู้ โดยผู้เข้าร่วมการศึกษาของการศึกษานี้คือผู้ป่วยมะเร็งเต้านมที่ตัดออกในแผนกผู้ป่วยนอกของโรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย จำนวน 250 คน

ผลลัพธ์: ผู้เข้าร่วมการศึกษามีคะแนนความรู้เฉลี่ยเกี่ยวกับปัจจัยเสี่ยงที่เกี่ยวข้องกับมะเร็งเต้านมเท่ากับ 11.14 คะแนน จาก 20 คะแนน (ส่วนเบี่ยงเบนมาตรฐาน 3.38 คะแนน) ส่วนใหญ่มีโรคที่เกี่ยวข้องกับการบริโภค ซึ่งรวมถึงความดันโลหิตสูง (20.9%) ไขมันในเลือดผิดปกติ (18.1%) และโรคเบาหวาน (8.7%) นอกจากนี้ยังพบว่ามีสมาชิกในครอบครัวที่มีประวัติทางการแพทย์เกี่ยวกับโรคต่าง ๆ ได้แก่ โรคมะเร็ง (28.0%) เบาหวาน (26.3%) ความดันโลหิตสูง (16.8%) และโรคหลอดเลือดหัวใจ (9.1%)

สรุป: ผู้ที่เข้าร่วมการศึกษานั้นไม่ได้คำนึงถึงแนวทางด้านการป้องกันโรคมะเร็งเต้านม เช่น การดำเนินชีวิตในด้านการส่งเสริมสุขภาพที่ดี เป็นทางเลือกที่ดีที่สุด ดังนั้นความตระหนัก มาตรการป้องกัน และการปรับเปลี่ยนวิถีชีวิตจะเป็นแนวทางในการจัดการกับปัญหานี้

คำสำคัญ : มะเร็งเต้านม; อาหาร; การดำเนินชีวิต

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Background

Cancer, a multifactorial diseases that finds its origin within the body, is no stranger to anyone. It has made its mark on humanity since the earliest of man's civilization in ancient Egypt some 5000 years ago[1]. Hippocrates, the "Father of Medicine," who lived in the 3rd century BCE coined the Greek words *carcinos* and *carcinoma* to describe cancer tumors[1]. The term cancer is given to a collection of related diseases caused by an uncontrolled, abnormal cell growth that spreads and invades parts of the body, resulting in tumors[2].

Despite humanity having such a long history with cancer and despite having major cancer research and treatment developments, cancer still seems not to get the better of people in terms of incidence and mortality. More people are dying of cancer in every succeeding year[3]. Cancer is only second to the number one killer disease globally, claiming the lives of 9.6 million people in 2018[4]. Among the cancer types, breast cancer has the highest prevalence worldwide for women comprising 24.2% of all cancer types in women[5]. This is true for almost all regions of the world, including Europe and Asia[5]. Additionally, breast cancer is the leading form of cancer among females in Thailand[6].

A study demonstrated that breast cancer has a close connection to external factors which included lifestyle[7]. Approximately 90-95% of all cancer risk factors are attributed to environmental factors with 30-35% of those associated with diet[7]. Another study revelaed that women who consumed high intakes of vegetables and fruits had a decreased risk of breast cancer, and meat intake was associated with breast cancer[8]. An unhealthy diet is among the most preventable causes of cancer[9]. Some efforts have been put forth to promote early detection, but patients are usually diagnosed at an advanced stage of breast cancer[10]. More significant efforts are still needed if we wish to see a significant improvement in this area of health. There is still much that the health sectors are able to improve the statistics of breast cancer. This can be done by first understanding the root of the problem by exploring the population's demographics.Thus, this study was conducted to examine the knowledge and lifestyle of female breast cancer patients in a tertiary hospital.

Methods

Research Design

The cross-sectional descriptive study was carried out using a questionnaire based interview. It was conducted in King Chulalongkorn Memorial Hospital (KCMH). The participants were adult female breast cancer patients in the outpatient department of KCMH in coordination with the Oncology Department of KCMH between July 22nd and August 19 th, 2019.

Study Population, Sampling, and Recruitment

Ethics approval for this study was received from the Research Ethics Review Committee for Research Involving Human Research Participants, Faculty of Medicine, Chulalongkorn University (IRB No. 280/62). The sample size was calculated based on a previous study which found that 81% of participants did not have any knowledge about breast cancer[11] with 95% confidentiality and accepted error rate of 5%. We calculated that sample size needs to be 237. A total of 250 adult female breast cancer patients participating in the study were fully informed about the study process and objectives prior to signing the consent form. A total of 239 of the questionnaires were returned. Seven of the 239 were excluded due to missing data for the primary outcome (n=1) and concurrent diseases (n=6). A total of 232 questionnaires were utilized for the data analysis.

Observation and measurements

The questionnaire was developed based on related literature review and was evaluated and validated by experts. The questionnaire consisted of 4 parts, measuring both the independent and dependent variables. The independent variables included the demographic data, clinical characteristics, medical history of family members, and lifestyle practice of the patients. The dependent variable was the knowledge score of the patient regarding the risk factors of breast cancer. The four parts to the questionnaires were as follows:

Part 1. Personal Information, including age, nationality, city of residence, religion, number of children, number of meals a day, and diet type.

Part 2. Medical History and clinical characteristics, including the stage of breast cancer, the patient's medical history of diseases, the type of treatment undergone for breast cancer, and the medical history of the patient's family members.

Part 3. Knowledge; A list of 20 items, including a mixture of associating and non-associating breast cancer factors, was listed. The respondents were to indicate if they agreed or disagreed with the factors. A score was given according to how many factors they correctly agreed and disagreed. This was defined as the knowledge score. The maximum knowledge score was 20.

Part 4. Lifestyle; the lifestyle practices of the respondents were briefly described. Data on the frequency of meat consumption and other lifestyle practices in the past two weeks were collected.

Statistical Analysis

The demographics and clinical characteristics, knowledge score, and lifestyle were described using descriptive statistics. Quantitative variables with normal distribution were presented as mean and standard deviation (SD) and those without a normal distribution were presented as median and interquartile range (IQR). Qualitative variables were presented with counts and percentages. Comparisons of the knowledge score according to lifestyle practice factors were made using the Kruskal-Wallis test while association between the patient's medical history of disease and breast cancer stages were compared with the Fisher's exact test. All the statistical analyses were conducted in STATA version 15.0 (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC) and significance was set at 0.05.

Results

Demographic characteristics of the sample

Out of the 232 females that participated in the study, age was available for 226. The respondents' ages ranged from 22-88, with a mean age of 57.92 years and a standard deviation of 11.68 years. A total of 225 (98.7%) of the respondents were Thai, and only 3 (1.3%) respondents were non-Thai. About half resided in Bangkok, and the other half were from other provinces outside of Bangkok. The majority of the participants were Buddhists (97.8%). Many participants ate a regular 3-meals per day diet (87.0%) and were non-vegan/non-vegetarians (98.7%). (Table 1)

Knowledge Score

Based on the questionnaire, the risk factors that have evidence to contribute to breast cancer includes, aging, barbeque, deep fried foods, alcohol drinking, fatty food, genes, high sodium foods, lack of exercise, obesity, pesticide contaminated

fruits and vegetables, processed foods, red meat, seafood, smoking and stress. Factors such as lack of sleep, monosodium giutamate (MSG) raw meat, steam/boil food and sugary food have lack or no evidence to contribute to breast cancer.

The risk factors of concern include those where respondents answered less than 50% correct. These include aging, barbeque, drinking alcohol, high sodium foods, lack of sleep, obesity and raw meat. Among these risk factors, most respondents misunderstand that the lack of sleep, raw meat and sugary foods as risk factors to breast cancer when there are no evidences to support this. At the same time, most respondents do not think that aging, barbeque, drinking alcohol and high sodium foods contribute to the risk of breast cancer when these risk factors have documented evidence to do so. Therefore, these are possible areas of concern that can be addressed in an effort to educated the population with regards to breast cancer risk factors. (Table 3)

The maximum knowledge score was 20. The mean score was 11.14, with a standard deviation of 3.38. The lowest score was 2, and the highest score was 18. A total of 95 (41.8%) had score less than mean that was considered inadequate. For each variable, the highest mean knowledge score and frequency of use were as follows. For meat consumption, pork, fish, and chicken were the most preferred with more than half of the participants consuming them at least once a week. The median score represented for pork had the highest number of samples in the category at 2-3 days per week and was 11.5 (IQR = 8.0, 12.0). It was in the 2-3 days per week category for fish, with a median score of 13.0 (IQR = 11.0, 15.0). Chicken, was also in the 2-3 days per week category, with a median score of 9.5 (IQR = 8.0, 12.0). The beef, prawn/shrimp, and shellfish frequencies of use were low. Most participants in this study included vegetables and fruits in their diet daily.

Table 4 shows the median knowledge score of the patients, according to the lifestyle practice factors. The variables were correlated with their knowledge scores. The food preparation category with the highest median score was the fried group at 13.0 (IQR = 11.0, 15.0). There was a statistically significant difference for at least one group in the median knowledge score of the food preparation category (p-value = 0.003). There were no statistically significant differences for the pork, chicken, and fish use categories. The highest median

knowledge score for the eating out category was the 4-7 days per week group at 13.0 (IQR = 12.0, 15.0). There was a statistically significant difference for at least one group in the median knowledge score of the eating out category (p-value = 0.050). The highest median knowledge score for the canned food use category was the 1 day per week group at 13.0 (IQR = 10.0, 15.0). There was a statistically significant difference for at least one group in the median knowledge score of the canned food use category (p-value = 0.024).

Clinical characteristics of the sample

227 respondents from 232 had breast cancer stage in formation available, ranging from Stage I - Stage IV. The number of participants was the lowest for the Stage I group (16.7%), and the highest was Stage IV (31.7%). Among 232 participants, 89 (38.4%) of the respondents had a medical history of at least one type of chronic disease, hypertension (20.9%), dyslipidemia (18.1%), diabetes (8.7%), hepatitis B virus (3.9%), cancer (3.0%), and stroke (1.3%). Chemotherapy was the most common treatment, with 54.6% of the participants. Other treatments included hormone therapy (30.6%) and radiotherapy (0.5%). Sixty-five (28.0%) respondents had family members with a history of cancer. Other diseases in the medical history of the family included diabetes (26.3%), hypertension (16.8%), cardiovascular disease (9.0%), cirrhosis (2.6%), and pulmonary disease (1.3%). (Table 2)

Discussion

These results did not portray how knowledge and lifestyle practices affect each other but revealed how the sample was distributed and the representation in each category of the sample. Based on the results of the knowledge and lifestyle of female breast cancer patients in the tertiary hospital, the investigator deemed that the participants' knowledge was inadequate. The results and conclusion of the inadequacy of the participants are in line with the findings of a study done by Peacey, Steptoe[12] using an international sample. However, the study held the association of alcohol use as one of the major factors influencing breast cancer, which was not reflected in this study and was done in a local setting. The consumption of alcohol by participants in this study was close to none. The reason for this could be because drinking among females is culturally looked down upon[13]. Pork, fish, and chicken were amongst the

most preferred meats, with more than half of the participants consuming these meats at least once a week. Beef, prawn/shrimp, and shellfish consumption were low; conversely, vegetable and fruit consumption was high in this study. However, we could not measure if the participants were meeting the recommended daily intake of fruits and vegetables. A previous study showed that only 9.9% of women who reported eating healthy met the minimum recommendation of fruits and vegetables[14]. Therefore, it can be suggested that the data presented in this study did not fully reflect the actual lifestyle practice of the participants in meeting the minimum recommended intake of fruits and vegetables. Therefore, the assumption regarding the typical diet practiced by the sample was one of a low intake of plant-based food.

A previous study at Ramathibodi showed mean age of the breast cancer patients was 54.98 years, representing the postmenopausal age as a high-risk group in breast cancer[15]. The high number of patients who suffer from hypertension in this study was an indicator of a high intake of salt in the diet of the participants[16]. Park, Kim showed that high salt intake is positively correlated with a higher breast cancer prevalence[17]. The medical history of diseases among the respondents comprised hypertension, dyslipidemia, diabetes, hepatitis B virus, cancer, and stroke. The high numbers for hypertension, dyslipidemia, and diabetes were found in poor choice of diet group.[18] In addition, the medical history of family members indicated that unhealthy lifestyle practices were passed from generation to generation. This is in line with the findings of Romani, Pistillo[19], who suggested the influence of lifestyle in cancer prevention.

Possible limitations of the study include the limitations of a cross-sectional study, which does not show a causal relationship between variables. In addition, the study design in which respondents fill the questionnaire themselves gives room to recall bias and cannot accurately represent the reality of the lifestyle practices of the participants. The data collected is subject to personal bias, opinion, and perception of their lifestyle practice.

Conclusions

Our study contributed to evaluating and understanding the contemporary setting of the population concerning breast cancer and allowed for a meaningful, constructive approach in the preventive measure for breast cancer.

The study laid out the big picture of the food in which the population sample consumed. This study showed that the sample population might not be making the best choices for a healthy lifestyle in preventing and managing breast cancer. Awareness and preventive measures are steps to be considered when approaching this problem. Regarding a healthy diet as a preventive measure for breast cancer, there seems to be no question of its significant potential. There were strong evidences that a healthy diet was contriduted to breast cancer prevention[20-21]. Efforts can be made to cultivate a healthy culture in the younger generation. Not only in the knowledge of the risk factors of breast cancer and breast self-examination but also on how to practice a healthy lifestyle, including a healthy diet. Educational prevention among the population regarding a healthy lifestyle and its relation to breast cancer risk factors can be regarded as a valuable means to decrease the incidence of breast cancer. Social media is an excellent tool for getting this message to the forefront of this disease. Materials and guidelines on a healthy lifestyle that are readily available, accessible, concise, and contemporary to each age group or generation will be a great benefit. Throughout this study, the participants received health leaflets and booklets to guide them to practice a healthy lifestyle. This could be a common practice at the institutional level of the healthcare system to provide guidelines and measures to supplement breast cancer patients with information that will help them cope and understand the measures they can take to improve their condition. This study also aims to encourage future breast cancer studies to approach breast cancer by analysis at root cause level and environmental factors. The future campaigns on breast cancer awareness should include an emphasis on the importance of practicing a healthy lifestyle.

Table 1 Demographic characteristics of the sample (n=232)

Variable	Number	Percentage
Age , years (n = 231)		
Under 30	2	0.9%
30-39	10	4.4%
40-49	45	19.9%
50-69	137	60.6%
70 or older	32	14.2%
City of Residence (n = 221)		
Bangkok	115	52.0%
Other	106	48.0%
Religion (n = 228)		
Buddhism	223	97.8%
Christian	3	1.3%
Islam	2	0.9%
Number of Children (n = 232)		
0	76	32.8%
1	46	19.8%
2	78	33.6%
3	19	8.2%
More than 4-7	13	5.6%
Number of meals per day (n = 231)		
1	2	0.9%
2	18	7.8%
3	201	87.0%
More than 3	10	4.3%
Diet Type (n = 231)		
Non-Vegetarian	211	91.3%
Pescatarian	17	7.4%
Vegetarian	0	0.0%
Vegan	3	1.3%

Table 2 Clinical characteristics of the sample (n=232)

Variable	Number	Percentage
Breast Cancer Stage (n = 227)		
Stage I	38	16.7%
Stage II	63	27.8%
Stage III	54	23.8%
Stage IV	72	31.7%
Medical History of Disease (n = 129)		
Hypertension (HT)	48	20.9%
Dyslipidemia (DLP)	42	18.1%
Diabetes (DM)	20	8.7%
Hepatitis B (HBV)	9	3.9%
Cancer (CA)	7	3.0%
Stroke (CVA)	3	1.3%
Treatment (n = 216)		
No Treatment/Awaiting	31	14.4%
Chemotherapy	118	54.6%
Hormone Therapy	66	30.6%
Radiotherapy	1	0.5%
Medical History of Family Members (n = 195)		
Cancer (CA)	65	28.0%
Diabetes (DM)	61	26.3%
Hypertension (HT)	39	16.8%
Cardio Vascular Disease (CVD)	21	9.1%
Cirrhosis	6	2.6%
Pulmonary Disease	3	1.3%

Table 3 Percentage of correct versus incorrect answers for breast cancer risk factor

Risk Factors	Disagree/Neutral (n)	Agree (n)	*Correct (%)	Incorrect (%)
Aging	158	*80	34	66
Barbeque	122	*115	48	51
Deep Fried Food	95	*144	60	40
Drinking Alcohol	121	*112	48	51
Fatty Food	86	*148	63	37
Genes	73	*163	69	31
High Sodium Foods	146	*89	38	62
Lack of exercise	119	*120	50	50
Lack of sleep	*93	146	39	61
Mono sodium glutamate (MSG)	*119	118	50	50
Obesity	130	*109	46	54
Pesticide contaminated fruits and vegetables	70	*167	70	30
Processed food	87	*150	63	37
Raw meat	*98	140	41	59
Red meat	94	*144	61	39
Seafood	*135	104	56	44
Smoking	53	*185	78	22
Steamed/boiled food	*175	64	73	27
Stress	47	*192	80	20
Sugary foods	*99	141	41	59

*Correct answer

Table 4 shows knowledge score according to lifestyle practice factors

Variable	Number	Percentage	Median Score	(Q1, Q3)	p-value†
No. of meals per day					0.542
1	2	1%	8.5	(8.0, 9.0)	
2	18	8%	11.0	(8.0, 12.0)	
3	201	87%	11.0	(9.0, 14.0)	
4	8	3%	11.0	(6.0, 15.0)	
5	2	1%	11.5	(6.0, 17.0)	
Food Preparation					0.003
Not distinguished	85	37%	10.0	(8.0, 12.0)	
Boiled	122	53%	12.0	(9.0, 14.0)	
Fried	19	8%	13.0	(11.0, 15.0)	
Grilled/baked	4	2%	10.5	(8.0, 12.5)	
Pork use					0.157
None	30	13%	11.5	(8.0, 12.0)	
1 day per 2 weeks	17	7%	11.0	(9.0, 15.0)	
1 day per week	31	13%	12.0	(9.0, 15.0)	
2-3 days per week	124	54%	11.0	(9.0, 13.0)	
4-7 days per week	29	13%	12.0	(10.0, 15.0)	
Beef use					0.714
None	208	90%	11.0	(9.0, 14.0)	
1 day per 2 weeks	18	8%	11.5	(9.0, 14.0)	
1 day per week	2	1%	11.5	(10.0, 13.0)	
2-3 days per week	2	1%	13.0	(13.0, 13.0)	
4-7 days per week	1	0%	14.0	(14.0, 14.0)	
Chicken use					0.188
None	40	17%	9.5	(8.0, 12.0)	
1 day per 2 weeks	39	17%	11.0	(9.0, 14.0)	
1 day per week	58	25%	12.0	(9.0, 15.0)	
2-3 days per week	81	35%	11.0	(9.0, 14.0)	
4-7 days per week	13	6%	11.0	(8.0, 14.0)	
Fish use					0.174
None	11	5%	12.0	(11.0, 13.0)	
1 day per 2 weeks	10	4%	11.0	(10.0, 14.0)	

Table 4 shows knowledge score according to lifestyle practice factors

Variable	Number	Percentage	Median Score	(Q1, Q3)	p-value†
1 day per week	22	10%	10.5	(8.0, 14.0)	
2-3 days per week	105	45%	12.0	(9.0, 14.0)	
4-7 days per week	83	36%	10.0	(8.0, 13.0)	
Prawn/Shrimp use					0.128
None	99	43%	10.0	(9.0, 12.0)	
1 day per 2 weeks	52	23%	11.0	(8.5, 14.5)	
1 day per week	38	16%	12.0	(11.0, 14.0)	
2-3 days per week	37	16%	13.0	(9.0, 14.0)	
4-7 days per week	5	2%	14.0	(10.0, 15.0)	
Shellfish use					0.046
None	135	58%	11.0	(9.0, 13.0)	
1 day per 2 weeks	56	24%	11.0	(9.0, 14.0)	
1 day per week	24	10%	13.0	(12.0, 15.0)	
2-3 days per week	15	7%	11.0	(10.0, 15.0)	
4-7 days per week	1	1%	9.0	(9.0, 9.0)	
Fruits					0.882
None	0	0%	-	-	
1 day per 2 weeks	4	2%	9.5	(8.0, 13.0)	
1 day per week	6	3%	13.0	(9.0, 14.0)	
2-3 days per week	42	18%	12.0	(8.0, 14.0)	
4-7 days per week	179	77%	11.0	(9.0, 14.0)	
Vegetables					0.102
None	0	0%	-	-	
1 day per 2 weeks	3	1%	17.0	(7.0, 17.0)	
1 day per week	5	2%	16.0	(16.0, 17.0)	
2-3 days per week	41	18%	11.0	(8.0, 13.0)	
4-7 days per week	182	78%	11.0	(9.0, 14.0)	
Eating Out					0.050
None	70	30%	10.0	(8.0, 13.0)	
1 day per 2 weeks	66	29%	11.0	(9.0, 14.0)	
1 day per week	32	14%	11.5	(9.5, 13.0)	
2-3 days per week	48	21%	12.0	(9.0, 14.0)	
4-7 days per week	14	6%	13.0	(12.0, 15.0)	

Table 4 shows knowledge score according to lifestyle practice factors

Variable	Number	Percentage	Median Score	(Q1, Q3)	p-value†
Instant food use					0.289
None	151	65%	11.0	(9.0, 13.0)	
1 day per 2 weeks	49	21%	12.0	(9.0, 14.0)	
1 day per week	20	9%	13.0	(9.5, 14.0)	
2-3 days per week	8	3%	11.5	(8.5, 12.5)	
4-7 days per week	3	1%	10.0	(9.0, 12.0)	
Canned food use					0.024
None	176	76%	11.0	(9.0, 13.0)	
1 day per 2 weeks	37	16%	12.0	(9.0, 15.0)	
1 day per week	14	6%	13.0	(10.0, 15.0)	
2-3 days per week	3	1%	7.0	(3.0, 9.0)	
4-7 days per week	1	0%	14.0	(14.0, 14.0)	
Alcohol					0.355
None	223	97%	11.0	(9.0, 14.0)	
1 day per 2 weeks	4	2%	11.0	(10.0, 14.5)	
1 day per week	2	1%	9.5	(7.0, 12.0)	
2-3 days per week	0	0%	-	-	
4-7 days per week	2	1%	15.0	(13.0, 17.0)	

† Kruskal-Wallis test

Table 5 Association between food practices and breast cancer stage

Variables	Breast Cancer Staging				p-value[†]
	Stage I (%)	Stage II (%)	Stage III (%)	Stage IV (%)	
No. of meals per day					0.798
1	0 (0.0)	0 (0.0)	1 (1.9)	1 (1.4)	
2	4 (10.5)	6 (9.5)	2 (3.7)	5 (7.0)	
3	33 (86.8)	54 (85.7)	49 (90.7)	61 (85.9)	
4	0 (0.0)	3 (4.8)	2 (3.7)	3 (4.2)	
5	1 (2.6)	0 (0.0)	0 (0.0)	1 (1.4)	
Food Preparation					0.078
Not distinguished	16 (43.2)	27 (42.9)	16 (29.6)	23 (31.9)	
Boiled	15 (40.5)	33 (52.4)	35 (64.8)	37 (51.4)	
Fried	5 (13.5)	3 (4.8)	3 (5.6)	8 (11.1)	
Grilled/baked	1 (2.7)	0 (0.0)	0 (0.0)	4 (5.6)	
Pork use					0.309
None	6 (15.8)	6 (9.7)	4 (7.4)	14 (19.4)	
1 day per 2 weeks	2 (5.3)	6 (9.7)	4 (7.4)	4 (5.6)	
1 day per week	6 (15.8)	5 (8.1)	11 (20.4)	9 (12.5)	
2-3 days per week	18 (47.4)	41 (66.1)	27 (50.0)	35 (48.6)	
4-7 days per week	6 (15.8)	4 (6.5)	8 (14.8)	10 (13.9)	
Beef use					0.040
None	31 (81.6)	60 (96.8)	47 (87.0)	67 (93.1)	
1 day per 2 weeks	7 (18.4)	2 (3.2)	3 (5.6)	4 (5.6)	
1 day per week	0 (0.0)	0 (0.0)	2 (3.7)	0 (0.0)	
2-3 days per week	0 (0.0)	0 (0.0)	1 (1.9)	1 (1.4)	
4-7 days per week	0 (0.0)	0 (0.0)	1 (1.9)	0 (0.0)	
Fish use					0.947
None	2 (5.3)	2 (3.2)	1 (1.9)	5 (6.9)	
1 day per 2 weeks	2 (5.3)	4 (6.5)	2 (3.7)	2 (2.8)	
1 day per week	2 (5.3)	7 (11.3)	6 (11.1)	7 (9.7)	
2-3 days per week	19 (50.0)	29 (46.8)	25 (46.3)	29 (40.3)	
4-7 days per week	13 (34.2)	20 (32.3)	20 (37.0)	29 (40.3)	
Prawn/Shrimp use					0.036
None	9 (23.7)	25 (40.3)	28 (51.9)	37 (51.4)	
1 day per 2 weeks	15 (39.5)	15 (24.2)	10 (18.5)	11 (15.3)	
1 day per week	8 (21.1)	10 (16.1)	8 (14.8)	9 (12.5)	

Table 5 Association between food practices and breast cancer stage

Variables	Breast Cancer Staging				p-value[†]
	Stage I (%)	Stage II (%)	Stage III (%)	Stage IV (%)	
2-3 days per week	4 (10.5)	9 (14.5)	8 (14.8)	15 (20.8)	
4-7 days per week	2 (5.3)	3 (4.8)	0 (0.0)	0 (0.0)	
Shellfish use					0.069
None	19 (50.0)	29 (46.8)	33 (61.1)	52 (72.2)	
1 day per 2 weeks	13 (34.2)	21 (33.9)	11 (20.4)	10 (13.9)	
1 day per week	3 (7.9)	7 (11.3)	4 (7.4)	8 (11.1)	
2-3 days per week	3 (7.9)	5 (8.1)	5 (9.3)	2 (2.8)	
4-7 days per week	0 (0.0)	0 (0.0)	1 (1.9)	0 (0.0)	
Fruits					0.156
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
1 day per 2 weeks	2 (5.3)	1 (1.6)	0 (0.0)	1 (1.4)	
1 day per week	1 (2.6)	0 (0.0)	0 (0.0)	4 (5.6)	
2-3 days per week	7 (18.4)	8 (12.9)	14 (25.9)	12 (16.7)	
4-7 days per week	28 (73.7)	53 (85.5)	40 (74.1)	55 (76.4)	
Vegetables					0.560
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
1 day per 2 weeks	1 (2.6)	2 (3.2)	0 (0.0)	0 (0.0)	
1 day per week	0 (0.0)	2 (3.2)	0 (0.0)	3 (4.2)	
2-3 days per week	6 (15.8)	9 (14.5)	12 (22.2)	12 (16.7)	
4-7 days per week	31 (81.6)	49 (79.0)	42 (77.8)	57 (79.2)	
Eating Out					0.727
None	12 (31. 6)	14 (23.0)	18 (33.3)	26 (36.1)	
1 day per 2 weeks	11 (29.0)	22 (36.1)	11 (20.4)	21 (29.2)	
1 day per week	7 (18.4)	8 (13.1)	9 (16.7)	8 (11.1)	
2-3 days per week	5 (13.2)	13 (21.3)	14 (25.9)	13 (18.1)	
4-7 days per week	3 (7.9)	4 (6.6)	2 (3.7)	4 (5.6)	
Instant food use					0.144
None	21 (55.3)	42 (67.7)	39 (72.2)	49 (68.1)	
1 day per 2 weeks	13 (34.2)	12 (19.4)	6 (11.1)	14 (19.4)	
1 day per week	1 (2.6)	5 (8.1)	8 (14.8)	6 (8.3)	
2-3 days per week	2 (5.3)	1 (1.6)	1 (1.9)	3 (4.2)	
4-7 days per week	1 (2.6)	2 (3.2)	0 (0.0)	0 (0.0)	

Table 5 Association between food practices and breast cancer stage

Variables	Breast Cancer Staging				p-value[†]
	Stage I (%)	Stage II (%)	Stage III (%)	Stage IV (%)	
Canned food use					0.786
None	31 (81.6)	46 (74.2)	41 (75.9)	57 (79.2)	
1 day per 2 weeks	4 (10.5)	12 (19.4)	10 (18.5)	8 (11.1)	
1 day per week	2 (5.3)	3 (4.8)	2 (3.7)	6 (8.3)	
2-3 days per week	0 (0.0)	1 (1.6)	1 (1.9)	1 (1.4)	
4-7 days per week	1 (2.6)	0 (0.0)	0 (0.0)	0 (0.0)	
Alcohol					0.695
None	37 (97.4)	59 (95.2)	51 (94.4)	72 (100.0)	
1 day per 2 weeks	1 (2.6)	1 (1.61)	1 (1.85)	0 (0.0)	
1 day per week	0 (0.0)	1 (1.61)	1 (1.85)	0 (0.0)	
2-3 days per week	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
4-7 days per week	0 (0.0)	1 (1.61)	1 (1.85)	0 (0.0)	

[†]Fisher's exact test

Declarations

Ethics approval and consent to participate:

This study was approved by the institutional review board (IRD), Faculty of Medicine, Chulalongkorn University (IRB No. 280/62). Informed consent was acquired from participants. The adherence to the ethical principles and guidelines for the protection of human subjects of research are practiced in this study.

Availability of data and materials:

All data generated or analyzed during this study are included in this published article.

Consent for publication:

Not applicable

Competing interests:

The authors declared that they have no competing interests

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