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A Study on Dietary Patterns, Dietary Behaviors and Life Styles before and after Breast Cancer Surgery

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ABSTRACT

The purpose of this study was to compare dietary patterns, dietary behaviors and life styles before and after breast cancer surgery in Korea. The subjects were 220 females who underwent surgery for stage I-III breast cancer at general hospitals. Food intake, eating habits, snacks, eating-out, use of nutritional supplements and healthy foods, and drinking and smoking habits were studied using a questionnaire. SAS program was used for statistical analysis of the data.

The results are as follows :

1) Most subjects were housewives aged more than 40 years.

2) After breast cancer surgery, intakes of fruits and vegetables were increased and those of meat, salty and spicy foods were decreased.

3) There was a significant difference in intakes of caffeine beverages, snacks, fast foods and instant foods before and after breast cancer surgery.

4) There was a significant difference in meal regularity and skipping breakfast before and after breast cancer surgery.

5) The frequency of eating-out was decreased and low-fat foods, such as Japanese foods, were preferred after breast cancer surgery.

6) Nutritional supplements and natural healthy foods were used more after breast cancer surgery.

7) Most subjects were non-smokers and drank little alcohol and the rate of regular drinking significantly decreased after breast cancer surgery. Therefore, there was a significant difference in dietary patterns and behaviors resulting from breast cancer. Further more, dietary factors may be a contributing factor in the incidence at breast cancer in Korea. (*Korean J Community Nutrition* 3(5) : 722~728, 1998)

KEY WORDS : breast cancer · dietary patterns · dietary behaviors · life styles.

Introduction

Recently the incidence rate of breast cancer has been increased in Korea which, thirty years ago, had been one of the countries with the lowest mortality rate due to breast cancer (Public Health Newspaper Co. 1998 ; Choi et al. 1988). The rapid rise in breast cancer incidence is presumably caused by the westernization of food and life styles during the recent socio-economic development in Korea(Choi et al. 1998).

Epidemiologic and experimental evidence supports

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the concept that diet influences the risk of breast cancer(Ewertz & Duffy 1994 ; Goodman et al. 1992 ; Harlan et al. 1993 ; Ingram 1994 ; Ingram et al. 1992 ; Kodama et al. 1991 ; La Veccia et al. 1995 ; Lee et al. 1991 ; Longnecker et al. 1997 ; McConnell et al. 1980 ; Mezzetti et al. 1998 ; Richardson et al. 1991 ; Rose et al. 1997 ; Smith-Warner et al. 1998 ; Stoll 1997 ; van den Brandt et al. 1995 ; Viel et al. 1997 ; Zaridze et al. 1991). The high intake of fat and animal protein especially has been associated with increased breast cancer risk by inducing hormonal changes and obesity(Goodman et al. 1992 ; Harlan et al. 1993 ; Kim et al. 1994 ; Kodama et al. 1991 ; Richardson et al. 1991).

It has been suggested that breast cancer recurrence may be related to modifiable nutrition factors : a high-fruit and vegetable, reduced fat, and increased fiber diet may reduce the risk of recurrence among breast cancer survivors(Doll 1992 ; Nordevang et al. 1992 ; Pierce et al. 1997). Also strict control of risk factors in lifestyles, such as smoking and drinking, exercise, and weight control may reduce the risk of recurring in postsurgical breast cancer(Mezzetti et al. 1998 ; Smith-Warner et al. 1998).

Therefore, dietary patterns, dietary behaviors and life styles before and after breast cancer surgery were compared in this study, in order to investigate the possible risk factor of breast cancer incidence and recurrence in Korea.

Subjects and Methods

1. Subjects and periods

The subjects were 220 Korean females who underwent stage I-III breast cancer operations at general hospitals. This survey was carried out using a self-administered questionnaire from September 2 to October 16 of 1997. For statistical analysis, 161 well-completed questionnaires were used from 210 collected questionnaires(collection rate ; 95.5%).

2. Questionnaire

The originally designed questionnaire was prepared and modified according to the results of a pilot study. The questionnaire sought information about the general characteristics of the subjects, food intake, eating habits, snack, eating-out, use of nutritional supplements and healthy foods, and life style factors related to cancer, such as drinking and smoking habits.

3. Statistical analysis

The statistical analysis was conducted using SAS program for PC(Chang et al. 1993). Frequency counts(%), mean and standard deviation were calculated for all variables and the Chi-square test was used to determine statistical significance.

Results and Discussion

1. General characteristics of subjects

Table 1 presents general characteristics of the subjects. It was shown that 31.7% of the subjects were 30-39 years old, 32.9% were 40-49 years old, 29.2% were 50-59 years old, 5% were 60 years or older, and 1.2% were 20-29 years old. Also 90.1% of the subjects were married, 5% were single, 3.1% were widowed, and 1.9% were divorced. As for their education level, 44.1% of the subjects received a high-

Table 1. General characteristic of subjects

Characteristics	Groups	N(%)
Age(years)	20-29	2(1.2)
	30-39	51(31.7)
	40-49	53(32.9)
	50-59	47(29.2)
	60 or older	8(5.0)
Marital status	Single	8(5.0)
	Married	145(90.0)
	Divorced	3(1.9)
	Widowed	5(3.1)
Education level	Elementary school	12(7.5)
	Middle school	32(19.9)
	High school	71(44.1)
	College	39(24.2)
	Graduate school	7(4.3)
Household income (10,000 won/month)	less than 100	7(4.3)
	100-149	20(12.4)
	150-199	34(21.1)
	200-299	56(34.8)
	300 or more	43(26.7)

school education, 24.0% received a college education, 19.9% received a middle-school education, 7.5% received an elementary school education, and 4.3% received a graduate-school education. The monthly family income of subjects was as follows : less than 100 million won 4.3%, 1 – 1.49 million won 12.4%, 1.5 – 1.99 million won 21.1%, 2 – 2.99 million won 34.8%, and 3 million won or more 26.7%.

2. Dietary patterns

After breast cancer surgery, the dietary patterns of subjects changed significantly compared to those of subjects before breast cancer surgery(Table 2). After breast cancer surgery, the frequency of eating fruits and vegetables was significantly increased and the frequency of meat consumption was significantly decreased compared to those before breast cancer surgery. Also there was a significant difference in the intake of salty and spicy foods between before and after breast cancer surgery. As for the intake of sweet and caffeinated foods, the frequency of eating these foods after breast cancer surgery was significantly decreased compared to that before breast cancer surgery. Also, the frequency of eating deep-fried, and instant or processed foods after breast cancer surgery was significantly decreased compared to that before breast cancer surgery. Our results agree with previous results showing that breast cancer survivors can adopt and maintain high-vegetable, reduced-fat dietary patterns(Nordevang et al. 1992 ; Pierce et al. 1997). Breast cancer recurrence may be related to modifiable nutrition factors. It has been reported that increased consumption of β-carotene and vitamin C is associated with favorable prognostic indices in patients with breast cancer(Ingram 1994). From a combined analysis of 12 case-control studies of diet factors and risk of breast cancer, it has been demonstrated that vitamin A, vitamin C and β-carotene had a protective effect against breast cancer(Howe et al. 1990). Also it has been suggested that there is an inverse association between a fiber-rich diet and breast cancer(Shanker & Lanza 1991). However, these studies focused on dietary patterns of a complex mixture with other foods and food components rather than a specific nutrient. Therefore, it is difficult to assess if the protection is clearly from each component per se or from some other dietary component such as low fat. A large-scale clinical trial is necessary for determining the effectiveness of β-carotene, vitamin C or fiber in reducing the chance of recurrence of breast cancer. In addition, this should be recommended on a dietary pattern rather than on an isolated dietary component for the prevention of breast cancer.

Table 2. Dietary patterns of subjects before and after breast cancer surgery N(%)

Variables	Groups	Before surgery	After surgery
Fruits***	Frequent	90(55.9)	134(83.2)
	Occasional	67(41.6)	24(14.9)
	Rare	4(2.5)	3(1.9)
Vegetables***	Frequent	103(64.0)	139(86.3)
	Occasional	51(31.7)	19(11.8)
	Rare	7(4.3)	3(1.9)
Meat***	Frequent	65(40.4)	18(11.2)
	Occasional	90(55.9)	110(68.3)
	Rare	6(3.7)	33(20.5)
Salty foods***	Frequent	32(19.9)	6(3.7)
	Occasional	109(67.7)	109(67.7)
	Rare	20(12.4)	46(28.6)
Spicy foods***	Frequent	51(31.7)	20(12.4)
	Occasional	95(59.0)	101(62.7)
	Rare	15(9.3)	40(24.9)
Sweet foods***	Frequent	64(39.8)	21(13.0)
	Rare	97(60.2)	140(87.0)
Caffeinated food***	Frequent	85(52.8)	29(18.0)
	Rare	76(47.2)	132(82.0)
Deep-fried food***	Frequent	48(29.8)	51(3.1)
	Occasional	84(52.2)	76(47.2)
	Rare	29(18.0)	80(49.7)
Instant or processed food***	Frequent	19(11.8)	0(0.0)
	Occasional	103(64.0)	63(39.1)
	Rare	39(24.2)	98(60.9)

***p<0.001

3. Dietary behaviors

1) Eating habits

Before breast cancer surgery, 55.9% of the subjects ate regularly and 43.5% ate irregularly(Table 3).

However, after breast cancer surgery, 88.2% of the subjects ate regularly and only 11.2% ate irregularly. Therefore, there was a significant difference in meal regularity between before and after breast cancer surgery.

More than 60% of the subjects answered that dinner was their largest meal before breast cancer surgery. After breast cancer surgery, the percentage of subjects who answered that the largest meal was dinner, was significantly decreased compared to that before breast cancer surgery.

After breast cancer surgery, most subjects(87.0%) rarely skipped breakfast, which showed a significant difference compared to the percentage of subjects before breast cancer surgery. In addition, most subjects rarely overate and ate unconsciously after breast cancer surgery(86.3% and 82.4%, respectively), which was significantly different from the result before breast cancer surgery(45.3% and 67.7%, respectively).

Table 3. Dietary behavior of subjects before and after breast cancer surgery N(%)

Variables	Groups	Before surgery	After surgery
Mealtime***	Regular	90(55.9)	142(88.2)
	Irregular	70(43.5)	18(11.2)
Largest meal***	Breakfast	5(3.0)	16(9.9)
	Lunch	45(28.0)	61(37.9)
	Dinner	108(67.1)	80(49.7)
	Snack	3(1.9)	4(2.5)
Breakfast-skipping***	Frequent	67(41.6)	21(13.0)
	Rare	94(58.4)	140(87.0)
Overeating***	Frequent	88(54.7)	22(13.7)
	Rare	73(45.3)	139(86.3)
Unconscious eating***	Frequent	52(32.3)	28(17.4)
	Rare	109(67.7)	133(82.6)
Snack-eating*	Frequent	51(61.7)	71(44.1)
	Occasional	110(68.3)	87(54.0)
	Rare	0(0.0)	3(1.9)
Eating-out**	Frequent	26(16.1)	12(7.5)
	Occasional	111(68.9)	116(72.0)
	Rare	24(14.9)	33(20.5)
Dietary supplement use**	Yes	68(42.2)	100(62.1)
	No	93(57.8)	61(37.9)

*p<0.05 **p<0.01 ***p<0.001

Table 4. Smoking and drinking habits of subjects before and after breast cancer surgery N(%)

Variables	Groups	Before surgery	After surgery
Smoking	Non-smoker	154(95.7)	154(95.7)
	Smoker	7(4.3)	1(0.6)
	Non-smoker after surgery		6(3.7)
Drinking***	Non-drinker	114(70.8)	137(85.1)
	Drinker	44(27.3)	23(14.3)
	Regular drinker (almost everyday)	3(1.9)	1(0.6)

***p<0.001

2) Snack

There was a significant difference in the frequency of snacking between before and after breast cancer surgery(Table 3). After breast cancer surgery, the percentage of subjects who frequently had snacks was significantly increased and the percentage of subjects who rarely had snacks was significantly increased compared to those before breast cancer surgery ; before breast cancer surgery, no one rarely had snacks.

After breast cancer surgery, the intakes of cookies and chips, instant foods, and fast foods as snacks were significantly reduced compared to those before breast cancer surgery(Fig. 1). However, the intakes of fruits and vegetables were significantly increased after breast cancer surgery compared to those before breast cancer surgery. These results agree with the previous results of a breast cancer intervention group showing a significant decrease in the intake of high fat and significant increase in the intake of fruits and vegetables(Nordevang et al. 1992).

3) Eating-out

In frequency of eating-out, there was a significant difference between before and after breast cancer surgery(Table 3). After breast cancer surgery, only 7.5% of the subjects ate out frequently and 20.5% rarely ate out, which was significantly different from the percentage of subjects before breast cancer surgery (16.1% and 14.9%, respectively).

Before breast cancer surgery, subjects preferred Korean, Chinese, Western, and Japanese Foods in order(Fig. 2). However, after breast cancer surgery, subjects preferred Korean, Japanese, Chinese, and

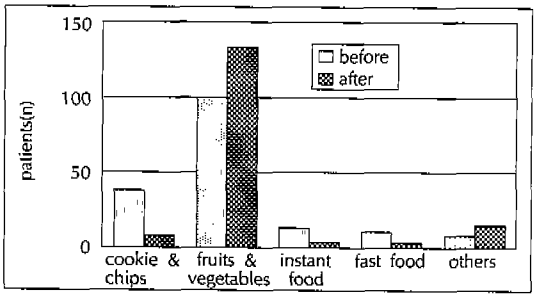

Fig. 1. Snack preference of subjects before and after breast cancer surgery.

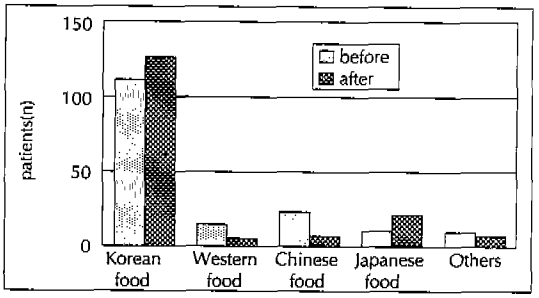

Fig. 2. Eating-out preference of subjects before and after breast cancer surgery.

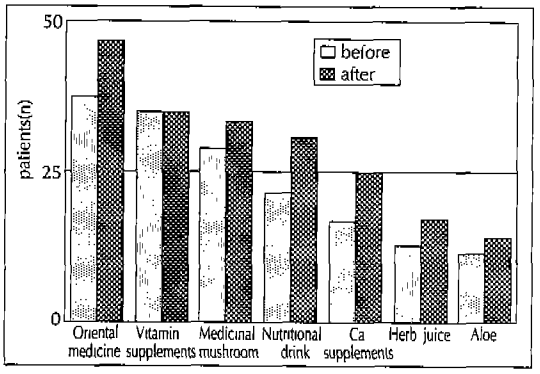

Fig. 3. Dietary supplement preference of subjects before and after breast cancer surgery.

western foods in order. Therefore, low-fat foods such as Japanese foods may be preferred by breast cancer patients after breast cancer surgery for the purpose of preventing breast cancer recurrence.

4) Dietary supplement use

There was a significant difference in dietary supplement use between before and after breast cancer surgery(Table 3). After breast cancer surgery, 62.1% of the subjects used dietary supplements, while 42.2% of subjects used dietary supplements before the surgery. Our dietary supplement usage rates are higher than the overall use in national surveys of the general population(Ministry of Health and Welfare, 1996). It has been reported that 80.9% of the women living in the western United States at risk of breast cancer recurrence used a nutrient and non-nutrient dietary supplement(Rock et al. 1997). This dietary supplement usage rate is higher compared to our results from Korean women at risk for breast cancer recurrence.

Before breast cancer surgery, subjects used, as dietary supplements, oriental medicine, vitamin supplements, medicinal mushrooms, nutritional drinks, Ca supplements, herb juices, and aloe in order(Fig. 3). However, after breast cancer surgery, subjects used, medicinal mushroom ; herb juice, graph extracts, vitamin supplements, oriental medicine, squalene and aloe in order.

4. Smoking and drinking habits

Table 4 shows the results of smoking and drinking habits of subjects before and after breast cancer surgery. Most subjects were non-smokers ; only 4.3% of the subjects were smokers before breast cancer surgery and among them, all subjects except one woman quitted smoking after breast cancer surgery.

In drinking habit, there was a significant difference between before and after breast cancer surgery. Before breast cancer surgery, 70.8% of the subjects did not drink alcohol at all, 27.3% drank occasionally, and 1.9% drank almost everyday. However, after breast cancer surgery, 84.5% of the subjects did not drink alcohol at all, 14.3% drank occasionally and only 0.6% drank almost everyday. From our results, it may be suggested that regular consumption of alcohol such as drinking almost everyday is a risk factor of breast cancer. This concurs with previous results(van den Brandt et al. 1995). Results from the Netherlands cohort study showed that there was a positive association between alcohol and breast cancer among postmenopausal woman and that increased risk was particularly found among those who consumed 30g or more of alcohol daily(van den Brandt et al. 1995).

Summary and Conclusion

This study was conducted using a self-administered questionnaire to compare dietary patterns, dietary behaviors and life styles before and after breast cancer surgery from September 2 to October 16 of 1997. The subjects were 220 Korean females operated for stage I-III breast cancer at general hospitals.

The results are summarized as follows :

1) After breast cancer surgery, the frequency of eating fruits and vegetables was significantly increased whereas that of meat consumption was significantly decreased compared to those before breast cancer surgery. Also there was a significant difference in the intake of salty and spicy foods between before and after breast cancer surgery. As for the intake of sweet and caffeinated foods, the frequency of eating these foods after breast cancer surgery was significantly decreased compared to that before breast cancer surgery. Also, the frequency of eating deep-fried, and instant or processed foods after breast cancer surgery was significantly decreased compared to that before breast cancer surgery.

2) There was a significant difference in meal regularity and breakfast skipping between before and after breast cancer surgery.

3) There was a significant difference in the frequency of snack between before and after breast cancer surgery. After breast cancer surgery, the intakes of cookies and chips, instant foods, and fast foods as snacks were significantly reduced whereas the intakes of fruits and vegetables as snacks were significantly increased compared to those before breast cancer surgery.

4) The frequency of eating-out was decreased and low-fat food such as Japanese foods was preferred after breast cancer surgery.

5) Nutritional supplements and natural healthy foods were used more after breast cancer surgery.

6) Most subjects were non-smokers and drank little alcohol and the rate of smokers and alcohol intake was reduced compared to before breast cancer surgery.

Therefore, there was a significant difference in diet patterns and behaviors, and dietary factors may be a contributing factor in breast cancer incidence in Korea. For prevention of breast cancer incidence and recurrence, a dietary pattern including the high-fruit and vegetable, reduced fat, and increased fiber should be recommended. Also strict control of risk factors in life styles, such as smoking and drinking, exercise and weight control may reduce the recurrence risk in postsurgical breast cancer patients.

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