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Consumption Pattern Score in Cancer Survivor with Chemotherapy Induced Nausea and Vomiting and Non-Cancer at Shelter Houses

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ABSTRAK

Background: One of the most common effects of chemotherapy in cancer survivors is nausea and vomiting. This can affect the diversity of food consumed. Family support and assistance need to be done to increase food intake with one food provision.

Objectives: This study aimed to find out the difference in the consumption pattern score among cancer survivors and non-cancers in shelter houses.

Materials and Methods: This study was a cross-sectional study with a retrospective approach. The criteria of the case subject were undergoing chemotherapy, while the control subject criteria were included in one food supply. The total subject was 66 cancer survivors, with 33 subjects each. This research was conducted from August 2021 until October 2021 at Shelter Houses. The data included the subjects characteristic data, vomit nausea degree data using the Rhodes Index nausea vomiting and retching (RINVR), family support data, food intake data using the food frequency questionnaire (FFQ), and individual dietary diversity score (IDDS) questionnaires. Data collection is done by interviews in person and online. The data collected was analyzed using Chi-Square and bivariate test using Mann Whitney test.

Results: The majority of cancer subjects were aged 40-59 years whereas non-cancer subjects were 20-39 years old. The subjects have special characteristics which are in low financial ability. Consumption of starchy foods ($p<0.001$) and green vegetables ($p<0.006$) in these two group subjects had significant differences. In addition, the consumption pattern score between cancer and non-cancer subjects made significant differences ($p<0.001$).

Conclusion: Average consumption pattern scores showed cancer subjects were lower compared to non-cancer subjects. Thus, consumption patterns in cancer subjects did not variaty compared to non-cancer subjects. It is necessary to conduct further research by analyzing the diversity of food of each subject using a 1x24 hour for 3 days, food access questionnaire and food security.

Keywords: chemotherapy; nausea and vomiting; consumption patterns; family support

BACKGROUND

Cancer is a normal cell that undergoes mutations that cause uncontrolled cell division with other body cells. In addition, cancer can be called a complex disease resulting from various interactions between genes and the environment, and certainly is considered to be one of the leading causes of death worldwide.[1] Based on Basic Health Research, the prevalence of tumors or cancers in Indonesia shows an increase from 1.4 per 1000 population in 2013 to 1.79 per 1000 population in 2018. Factors that influence the increasing incidence of cancer and death are poor diet in individuals.[2]

One of the problems that will arise in cancer survivors is malnutrition since approximately 40-80% of the patients experience decreased appetite and weight loss. This condition can affect treatment outcomes, delay wound healing, worsen muscle function and increase the risk of postoperative complications.[3] However, the most widely used treatment or therapy for cancer survivors is chemotherapy. The treatment mechanism works systemically by killing cancer cells using anti-cancer drugs. The effects of chemotherapy vary greatly from mild to severe, one of the effects is nausea and vomiting or is often called Chemotherapy Induced Nausea and Vomiting (CINV).[3–5] CINV in cancer survivors has 2 phases namely the acute phase and delayed phase. The acute phase occurs within 1-2 hours after chemotherapy and can last up to 24 hours. While the delayed phase occurs for more than 24 hours after chemotherapy, this phase usually begins on the 2nd day after chemotherapy and can last until the 5th day.[6,7]

The effects of nausea and vomiting experienced by cancer survivors will result in loss of appetite, thus will limit their consumption and leading to malnutrition as well as slowing down the recovery process. Cancer

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survivors who experience nausea and vomiting also find it difficult to eat adequately and eventually, only spend on small foods such as bread or biscuits.[7] In addition, the most widely consumed food groups in cancer survivors are cereals and nuts because they are easier to digest by cancer survivors compared to meat, milk, and eggs. Meat and eggs are consumed the least because of the high price that is difficult to access by low-income cancer survivors.[8,9]

Research on consumption patterns with weak economic levels showed that these patients had low diversity of food, especially in animal and vegetable sources. Consumption patterns based on individual dietary diversity scores (IDDS) also indicate a lack of food variety, low food access, and nutritional inadequacy. Several factors that affect consumption patterns include income, education, environment, employment, knowledge, and access to food.[10] Diversity of food is an important indicator because it can assess nutritional status, access to food availability, and socioeconomic level. Dietary diversity among cancer and non-cancer survivors can be measured using IDDS since it can see the food groups that both groups is eating.[8,11]

In 2015 research was conducted in East Java showed that cancer survivors will be more motivated to consume meals if accompanied by a companion. It can affect cancer survivors to increase their appetite, particularly in terms of food diversity. Support provided by the family are given in the form of eating together and accompanying cancer survivors in treatment and medication.[12] Nevertheless, in this study not necessarily all cancer survivors accompanied by a companion have the urge to eat a variety of foods. This study aims to find out the difference in consumption patterns of cancer survivors and non-cancer survivors in low-economic cancer survivors and their relatives, considering both groups have similarities in accessing food, coming from one kitchen and being patients from shelter houses. Families and cancer survivors get help from non-profit organizations that assist in carrying out therapy or treatment. In addition, cancer survivors in shelter houses have special characteristics which are in low financial ability. Food at shelter houses can be served with ready meals and some fresh food.[13]

MATERIALS AND METHODS

This research was conducted on cancer survivors and non-cancer at Rumah Singgah Sedekah Rombongan (RSSR Semarang, Yogyakarta, Malang), Rumah Singgah Sahabat Lestari, Rumah Singgah Peduli, Rumah Singgah Hanum, Yayasan Kanker Indonesia (YKI Semarang dan Yogyakarta), Rumah Sehat Mandiri Yogyakarta, Rumah Imajinasinya Indonesia Yogyakarta, dan IZI Jawa Tengah. This research was held from August 2021 until October 2021 and included in the field of community nutrition with a cross-sectional study under a retrospective approach. All research protocols were approved by the Health Research Ethics Committee (KEPK) Faculty of Medicine, University of Sultan Agung Semarang Number.203/VII/2021/Commission on Bioethics. The minimum sample using unpaired comparative analytics for each subject was 30 people and the total sampling obtained was 33 people who filled out the informed consent.[14]

The inclusion criteria of cancer and non-cancer groups were women aged 20-59 years, including in a low-income family according to the Central Bureau of Statistics in Indonesia year 2016, who can communicate clearly and cooperatively, and were willing to become research respondents.[15] In addition, subjects from non-cancer group were as the same food supply/kitchen as cancer survivors. Whereas the cancer survivor group had undergone chemotherapy and being a patient assisted by shelter houses. Exclusion criteria in this study were the subject moved away from the shelter houses, passed away prior to the data being completed and withdrew their informed consent to participate in the study.

The independent variable in this study was consumption patterns, that is eating habits which include diversity, types or kinds of food. Determination of consumption patterns can show the nutritional value of food, nutritional adequacy, food availability, variety and the combination of food types. Firstly, the type of food and the frequency of consumption in the past month was obtained using the Food Frequency Questionnaire form. The next step was this data then converted into Individual Dietary Diversity Score (IDDS) questionnaire. IDDS consists of nine food groups, which are foods made from flour, cereals and legumes, nuts/seeds, all dairy products, animal (meat, fish), eggs, green vegetables, vegetables and fruit sources of vitamin A, vegetables and other fruit. If the subjects consumed each nine food groups, then it scored 1 in each group, and if not consumed then it scored 0. IDDS was categorized as a variety if the total score was five or above, and was not variety if the score was under five. [11,16–18] The dependent variable in this study was cancer and non-cancer survivors. The data collected including the subject's characteristics, nausea and vomiting information, family support, and food intake for each subject. Data collection through in-person interviews and using online. Interviews via online were conducted by contacting the subject remotely using telephone or WhatsApp. Data collection were carried out by researchers and enumerators, with a nutritional background knowing how to FFQ intake and interviews regarding the degree of nausea and vomiting. Due to time

constraints, communication tools such as handphone, and the facilities needed for data collection were carried out directly to the shelter houses. In order to Covid-19 restriction, health protocols were carried out during direct interviews such as using complete personal protective equipment, administering vaccines and antigen swabs, and before contacting the subject, cleaning/washing hands. Time allocated for researchers and enumerators needed to interview was approximately 45 minutes for each respondent.

Characteristics data on both cancer and non-cancer group consisted of name, address, education level, income, occupation, and access to food availability. Access to food availability aims to find out in terms of the distance from the house to the place of buying and selling and the ease of getting food availability. The category for easy access to groceries was the distance from home to the market that is close and affordable. In addition, data on the cancer group included the type of therapy, medical diagnosis, year of diagnosis, and feelings when interviewed.

Nausea and vomiting data were viewed using the Rhodes Index of Nausea Vomiting and Retching (RINVR) which aimed to determine the degree of nausea and vomiting caused by chemotherapy, consisting of 8 questions that have been validated in previous studies. The RINVR questionnaire score categories were normal (0), mild (1-8), moderate (9-16), severe (17-24), and very severe (25-32). The family support data aimed to find out the role of relatives to motivate cancer survivors in their daily lives. This questionnaire consists of 15 questions regarding emotional support, instrumental support, information/knowledge support, and appreciation/appraisal support. In addition, this questionnaire has been validated in previous studies. The categories of family support scores determined were less (15-30), sufficient (31-45), and good (46-60).[19–21]

The data processing and analysis were carried out using a Statistical Program for Social Science (SPSS) as computer program. The research data were statistically tested with univariate and bivariate analysis. Univariate analysis was used to determine the description of the characteristics of the subject and each variable, whereas bivariate analysis was used to determine differences in consumption patterns of cancer and non-cancer survivors using the Mann Whitney Test.

RESULTS

Characteristic Cancer Survivors and Non-Cancer

Characteristics of cancer survivors and non-cancer include age, education level, gender, access to food availability, and income. Table 1 presented the distribution of characteristics of cancer and non-cancer survivors**.**

Table 1. Characteristic Cancer Survivors and Non-Cancer

Characteristic	Cancer		Non-Cancer		p-value
	n	%	n	%	
Age					
20 – 39 year old	5	18.5	22	81.5	<0.005*
40 – 59 year old	28	71.8	11	28.2	
Education Level					
University	4	36.4	7	63.6	0.030
Senior High School	4	33.3	8	66.7	
Vocational School	1	20	4	80	
Junior High School	9	60	6	40	
Elementary School	13	65	7	35	
No School	2	66.7	1	33.3	
Access to Food Availability					-
Easy to access	21	64	21	64	
Hard to access	12	36	12	36	
Income					
Rp.900,000– Rp.1,500,000	33	100	33	100	-
Nausea and vomiting					-
Mild	6	18.2%	-	-	
Moderate	10	30.3%	-	-	
Severe	17	51.5%	-	-	

The factor that most influences consumption patterns is socioeconomic, of both subjects include low economics and education level or knowlegde.Age and education level in cancer and non-cancer subjects were different significantly (p-value <0.05). The majority of cancer subjects were 40-59 years old (71.8%) while non-cancer subjects were 20-39 years old (81.5%). Most cancer subjects were elementary school graduates (65%) while non-cancer subjects were high school graduates (66.7%). This data shows that foodstuffs are

easily accessible (64%). In terms of the degree of nausea and vomiting experienced by subjects, more than half of the subjects were severe (51.5%) because of the effects of chemotherapy.

Family Support Data on Cancer Survivors

Family support data for non-cancer subjects consisted of emotional support, instrumental support, information/knowledge support, and appreciation/assessment support. Table 2 presents the distribution of data on family support provided to cancer subjects.

Table 2. Family Support Data

Characteristic	Frequency	n	%
Emotional Support			
Family assistance in care	Never	3	9.1
	Occasional	6	18.2
	Frequently	6	18.2
	Always	18	54.5
Family attention during treatment	Occasional	1	3
	Frequently	2	61
	Always	30	90.9
Trying to listen to complains	Occasional	3	9.1
	Frequently	4	12.2
	Always	26	78.8
Family assistance to meet patient needs	Occasional	1	3
	Frequently	4	12.1
	Always	28	84.8
Instrumental Support			
Willing to give time and facilities	Never	1	3
	Occasional	4	12.1
	Frequently	2	6.1
	Always	26	78.8
Take an active role in the treatment	Occasional	3	9.1
	Frequently	2	6.1
	Always	28	84.8
Willing to pay for treatment	Never	1	3
	Occasional	2	6.1
	Frequently	5	15.2
	Always	25	75.8
Meet the required needs	Never	1	3
	Occasional	2	6.1
	Frequently	4	12.1
	Always	26	78.8
Information Support			
Inform patient’s medical diagnose	Never	20	60.6
	Occasional	7	21.2
	Always	6	18.2
Remind patient on meals	Occasional	2	6.1
	Frequently	4	12.1
	Always	27	81.8
Provide information about patient’s health conditions	Never	1	3
	Occasional	3	9.1
	Frequently	7	21.2
	Always	22	66.7
Answer questions from patient related to it’s disease	Never	3	9.1
	Occasional	4	12.1
	Frequently	8	24.2
	Always	18	54.2
Award Support			
Praise the patient when follow doctor’s orders	Occasional	5	15.2
	Frequently	11	33.3
	Always	17	51.5

Characteristic	Frequency	n	%
Support patients during treatment	Frequently	30	90.9
	Always	3	9.1
Cheers the patient if feel sad	Occasional	2	6.1
	Frequently	8	24.2
	Always	23	69.7
Total Score Family Support			
Good		25	75.8%
Adequate		8	24.2%

Table 2. showed the majority of family support given to cancer survivors was in a good category (75.8%). The majority of cancer survivors' companions always provide support during care and treatment, such as reminds to meal, giving time, providing information, and giving appreciation.

Overview of Consumption Patterns of Cancer and Non-Cancer

Table 3. showed that non-cancer subjects (69.7%) significantly consumed more starchy food than cancer subjects (15.2%). Both groups consumed cereals and nuts/seeds. The majority who consumed all dairy products (6.1%) and animal groups (57.6%) were non-cancer subjects. In food ingredients, eggs are consumed the most were cancer subjects (90.9%). In the consumption of green vegetables, there was a significant difference between cancer subjects (57.6%) and non-cancer subjects (87.9%). The most cancer subjects are not comsumption green vegetables and choose other vegetables such as carrot, eggplant, broccoli, cauliflower, mushrooms, and tomatoes. Vegetables and fruit containing sources of vitamin A were mostly consumed by non-cancer subjects (54.5%) while cancer subjects consumed a lot of other vegetables and fruits (52.5%).

Table 3. Overview of Consumption Patterns of Cancer and Non-Cancer Subjects

Variabel	Consumption	Category		
		Cancer	Non-Cancer	p-value
All starchy staples	Yes	5 (15.2%)	23 (69.7%)	<0.001*
	No	28 (84.8%)	10 (30.3%)	
Cereals based food and peas	Yes	33 (100%)	33 (100%)	-
	No	0 (0%)	0 (0%)	
Nuts	Yes	33 (100%)	33 (100%)	-
	No	0 (0%)	0 (0%)	
All dairy milk	Yes	0 (0%)	2 (6.1%)	0.151
	No	33 (100%)	31 (93.9%)	
Meat	Yes	12 (36.4%)	19 (57.6%)	0.084
	No	21 (63.6%)	14 (42.4%)	
Eggs	Yes	30 (90.9%)	29 (87.9%)	0.689
	No	3 (9.1%)	4 (12.1%)	
Green Leafy Vegetables	Yes	19 (57.6%)	29 (87.9%)	0.006*
	No	14 (42.4%)	4 (12.1%)	
Vegetables and vitamin A rich food	Yes	16 (48.5%)	18 (54.5%)	0.622
	No	17 (51.5%)	15 (45.5%)	
Others vegetables and fruit	Yes	17 (51.5%)	14 (42.4%)	0.459
	No	14 (48.5%)	18 (57.6%)	

Yes = 1; No = 0

* Significant (p < 0,05); ¥ Chi square

Differences in IDDS Scores for Cancer and Non-Cancer Subjects

Table 4. showed the average consumption pattern in cancer and non-cancer subjects was significantly different with the average in cancer subjects was lower (4.27±1.13) compared to non-cancer subjects (5.64±1.58). In thus, that cancer survivors have a low diversity of food compared to non-cancer.

Table 4. Differences in Consumption Patterns of Cancer and Non-Cancer

Variable	Cancer	Non-Cancer	p-value
Consumption Patterns	4.27±1,13	5.64±1,58	<0.001*

DISCUSSION

The results showed a significant difference in consumption patterns between cancer survivors and non-cancer with $p<0.001$ (Table 4). Looking at the consumption patterns scores in each subject using the Individual Dietary Diversity Score (IDDS) form, this form was able to picture the quality of diet and the diversity of food consumed by individuals. IDDS has 9 food groups consisting of starchy staple foods, cereals or peas, legumes and seeds, all dairy products, animals, eggs, green leafy vegetables, vegetables or fruit sources of vitamin A, as well as other vegetables and fruits.[22]

Diversity of foods taken using FFQ then converted into the IDDS questionnaire. The advantage of using FFQ is the ability to see the frequency of subjects in consuming foodstuffs since it is more specific particularly the intake per day, week, and month. In addition, intake data retrieval at a one-time makes this FFQ is more effective and suitable for cancer subjects in shelter houses. During the pandemic condition, subjects were more restricted by the rules which can only visit shelter houses within 1-2 days, making FFQ more ideal to use compared to 1x24 hr for 3 days. However recall 1x24 hr for 3 days has the advantage of being able to see the variation and number of servings converted to find out the average of each serving eaten in non-consecutive 3 days.

In this research, the cancer subjects taken were chemotherapy patients since the treatment or therapy had side effects such as nausea and vomiting. Chemotherapy-induced nausea and vomiting (CINV) affect the daily lives of cancer survivors. In the study of cancer survivors who experienced nausea and vomiting about 90% will decreased appetite. This has occurred since anti-tumor substances in chemotherapy affects the hypothalamus and the brain's chemo-receptors to experience nausea and vomiting, thus can affect the intake of food and fluids in survivors undergoing chemotherapy. [3,4,23]

The majority of cancer survivors in this shelter house experienced severe nausea and vomiting. Therefore, these subjects consumed meals which not stimulate their symptoms such as green bean porridge, boiled eggs, and spinach. In addition, nausea and vomiting were felt in cancer survivors within 1 to 3 days post-chemotherapy. Cancer subjects also limited their food intake and consumed in small amounts. If these subjects did not felt nausea and vomiting, then cancer survivors ate in normal portions of food on the 4th day and so on. Research on East Java about the eating habits of cancer patients after chemotherapy, the acceptable foods were rice, eggs, tempeh, tofu and kale.[25]

The age range of the subjects used in the study was 20 to 59 years which is the range of age with the highest prevalence of cancer incidence. The older the age, there will be an increasingly vulnerable the immune system and a decrease in cell function. This usually happens at the age of 50 and above.[24]

Table 2. showed that family support in this study was mostly good, particularly items that affect the consumption patterns of cancer survivors. This, including in instrumental and informational support, the majority of families support well in motivating cancer survivors in increasing appetite. Instrumental support is provided to cancer survivors in the form of meeting the needs of nutritious food and patient facilities. In contrast to the support of information in the form of reminding patients to consume meals and beverages, and also providing information about recommended and not recommended foods.[13,25]

Consumption patterns were influenced by socioeconomic level, nutritional knowledge and access to food availability. Theoretically, research focused on consumption patterns in subjects with low-economy levels showed that dietary diversity had a lower score due to limited access to food.[10,11] However, the study confirmed that cancer survivors and families did not have difficulties in obtaining food. This showed the majority of subjects had a diverse diet and were easy to access. Foods consumed in this subject such as rice, vegetables, meat, eggs, tofu, and tempeh as side dishes. In contrast to subjects who find it difficult to access food because they can only eat foods such as rice, vegetables, eggs, tempeh as side dishes. Access to food availability for both cancer and non-cancer subjects has similarities 64% easy to access food.

Research on cancer survivors who experience nausea and vomiting conducted in Malaysia showed that these subjects had difficulty in eating food adequately thus only consumed a small amount of food such as bread and biscuits. The study conducted in Kenya, cancer survivors who experienced nausea vomiting and including low economic level showed that cereals and nuts were the two most frequent food they consume since it is easier to digest by cancer survivors compared to meat and eggs. Meat and eggs were the least to be consumed because of the high price and tend to cause nausea and vomiting. In addition, milk and other dairy products also increased nausea and vomiting since it was high-fat ingredients.[7,8,26] Both subjects of this study rarely consumed milk since it is difficult to access when it comes to the high prices. In addition, cancer subjects in this study experienced nausea and vomiting when consuming milk and other dairy products.

Results in Table 3. showed that there was a a significant difference ($p<0.001$) between groups in starchy food consumption. Cancer subjects (15%) consumed less starchy food compared to noncancer. Although starchy food was beneficial for increasing the calories they need, they prefer not to consume it because of the

feeling of nauseous and experience vomiting. Snacks for example bread, biscuits, and traditional snacks were only consumed when cancer survivors are waiting in line for therapy. This condition were pictured by minimal consumption for the past month based on FFQ analysis.[27] Meanwhile, the majority of non-cancer subjects (69.7%) chose to eat starchy foods. Most of them were deeply fried, such as fermented soy tempura, vegetables tempura, and fried bananas.

When compares to starchy food, cereals were the most favourable carbohydrates-based food in both groups. Basically, this group of food, particularly rice is a staple food for families in developing countries, including in Indonesia. Carbohydrates are useful for preventing excessive body protein breakdown, mineral loss, and helping fat and protein metabolism. In addition, cancer survivors need a high energy intake to carry out chemotherapy so that the body is well-prepared and does not become susceptible to infection.[28,29]

In this study, the majority of the both groups consumed legumes because it contained high protein, for example green beans and soybeans. High protein consumption for cancer survivors can reduce nausea and vomiting experienced by cancer survivors.[30–33] Based on food intake data for both cancer and non-cancer subjects, tofu and tempeh were the most commonly consumed food ingredients in a daily basis. Not only it is accessible in terms of its affordable price and is the most popular plant-based food in Indonesia.[34]

In the animal protein group, there was not a significant difference ($p = 0.069$) between cancer subjects (36.4%) and non-cancer subjects (57.6%). The majority of these both subjects only consumed animal protein such as chicken and fish and rarely consumed red meat since the price was not affordable. Previous research studied the relationship between food and digestive tract effects showed cancer survivors rarely eat red meat because it is rich in fat, which tends to increase nausea and vomiting. Other research on cancer subjects in India stated that excessive fat consumption can increase the risk of cancer, because fat has cancer promoting properties. Food rich in fat leads the body to produce more estrogen and abnormal cell division. Thus cancer survivors need to limit red meat and preserved products.[26,35–37]

Furthermore, the majority of both subjects often consumed eggs ($p = 0.500$) because it is more affordable and accessible than red meat. In addition, cancer survivors also prefer to eggs that do not trigger nausea and vomiting and are more well received. The egg was packed with high nutritional content since its protein can induce apoptosis in cancer cells, protect against DNA damage, reduce the invasiveness of cancer cells, and exhibit cytotoxic and antimutagenic activity in various cancer cell lines. Eggs are a highly nutritious food source and essential amino acids. This compotition needed by the body for the healing process replace damaged tissue, and form body defense system. The protein contained in egg white and egg yolk are considered as functional food substances because it has biological activities such as antimicrobial, antioxidant, anticancer, and immunomodulatory activities.[38]

A significant difference was shown in terms of green leafy vegetable consumption between groups ($p<0.006$). Most non-cancer subjects consumed more green leafy vegetables, vegetables and fruits containing vitamin A compared to cancer subjects. Based on FFQ analysis, green leafy vegetables that were consumed quite often in these subjects such as spinach, kale, cassava leaves, and papaya leaves. While for vegetables and fruits that contain vitamin A such as carrots, pumpkin, sweet potatoes, mango, and papaya. Other vegetables and fruits that was often consumed such as mushrooms, bean sprouts, beans, long beans, and broccoli. Previous research on cancer chemotherapy subjects, explained that vegetables and fruits can provide protection for breast cancer prognosis since it contained high fiber, vitamins A, C, E, folate, and carotenoids. Vitamin C contains antioxidants that are useful for neutralizing free radicals in the development of cancer. In addition, it also play a role in stimulating the immune system (immunity) and preventing platelet clumping. Consumption of fruits and vegetables can be a good diet and lifestyle. Therefore, vegetables and fruits can be reached from low and high economies.[39] In this study, cancer subjects were still minimal in consuming vegetables and fruits containing vitamin A because the majority chose to consume as desired.

The results of this study showed that the mean score of the consumption pattern of cancer subjects was lower (4.27 ± 1.13) than non-cancer subjects (5.64 ± 1.58). Food groups that were not consumed by cancer survivors according to FFQ analysis were milk, red meat, vegetables and fruits. Not only because of nausea and vomiting experienced by these subjects, but also the ability to access these kind of food. In contrast, non-cancer subjects did not consumed milk and fruits. Therefore, it is necessary to educate both subjects to increase the variety of food and convey the benefits of each food ingredient.. Knowledge of dietary patterns is important since it can provide an understanding of how to fulfill nutrients optimally for each individual.

CONCLUSION

There was a significant difference in consumption pattern scores on cancer and non-cancer survivors who have the same socio-economic background and access to food availability. The average score of the consumption pattern of cancer subjects was lower than that of non-cancer subjects. The food diversity of cancer

subjects was lower than non-cancer subjects. In terms of IDDS food group, starchy foods and green vegetables were two food groups that had a significant difference among cancer subjects and non-cancer.

SUGGESTION

It is necessary to conduct further research by analyzing the diversity of food of each subject using a 3x24 hour recall, food access questionnaire and food security in cancer subjects who experienced CINV compared to non-cancer subjects due to the lack of research in this study field.

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