Description of Intake of Macronutrients, Antioxidants, and Nutritional Status in Breast Cancer Patients with Chemotherapy

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Article Info	ABSTRACT
	Background: Breast cancer is when the growth of cells in the breast glands is fast and abnormal, so these cells lose their standard control and function and form a lump. *Research Methods: The type of research used was descriptive research with a cross-sectional research design using a proportion sampling technique. The sample in this study totaled 36 people using a questionnaire and a food recall form.* *Research Result: The results of the study showed that from 36 respondents, it was found that the respondent's energy intake (52.8%) was less than the requirement, the respondent's protein intake (61.1%) was less than the requirement, the respondent's fat intake (72.2%) was good, the respondent's carbohydrate intake (61.1%) less than needed, respondent's vitamin A intake (69.4%) is lacking, respondent's vitamin C intake (50.0%) is lacking, respondent's vitamin E intake (80.6%) is less than requirement.* *Conclusion: Breast cancer patients receiving chemotherapy at RSI Siti Khadijah experience decreased appetite, nausea, and vomiting, resulting in an imbalance of nutrients. It is recommended that cancer patients undergoing chemotherapy pay more attention to various foods, especially vegetable and fruit foods that contribute to vitamins A, C, and E, so that nutritional imbalances do not occur.*

BACKGROUND

Many women around the world have breast cancer, both in the country and around the world. People living with Cancer usually experience deficiencies in macro and micronutrients. Breast cancer patients need protein to repair damaged tissue (Nurahmatika et al., 2017). Chemotherapy can cause nausea, vomiting, diarrhea, decreased appetite, swallowing problems, and absorption problems. Intake of macro and micro substances, such as vitamin A, vitamin C, vitamin E, zinc, and protein, will be influenced by the condition after chemotherapy. These micro and macro substances prevent cancer cell development (Ni et al., 2018).

Based on data from the Global Cancer Observatory, in Indonesia in 2020, breast cancer also ranks first in the highest incidence of Cancer, namely 65,858 (16.6%) cases, 16.6% in both sexes and 30.8% in women (Globocan, 2020). Based on survey data from the South Sumatra Provincial Health Service in 2018, the incidence and prevalence of breast cancer was 0.2% or 772 people (Dinkes. Palembang, (2018).).

Based on Merisca's research in 2018 at RSI Siti Khadijah Palembang, the vitamin A intake of cancer patients was less than required by 82.4%, the suitable intake of vitamin C by cancer patients was 74.5%, the vitamin E intake of cancer patients was less than required by 72—.5 % (Meriska, 2018).

MATERIAL AND METHODS

The type of research used is descriptive with a cross-sectional design, namely data collection/observations carried out simultaneously. The population of this study was all cancer patients undergoing chemotherapy in the chemotherapy room at RSI Siti Khadijah Palembang. The sampling technique used is proportion sampling. That is, samples are taken according to existing inclusion and exclusion criteria. So that patients who come and meet the inclusion criteria will be used as samples so that 36 samples are obtained. The sample in this study was 36 people. This research was conducted in April - May 2023. This research data was collected by direct patient interviews using questionnaires and food recall forms.

RESULTS

The characteristics of respondents observed in this study consisted of age, occupation, education, cancer stage, frequency of chemotherapy, and nutritional status. Macronutrient intake (energy, protein, fat, carbohydrate) and antioxidant intake (vitamin A, vitamin C, and vitamin E) in people with breast cancer undergoing chemotherapy at RSI Siti Khadijah Palembang can be determined from the average food and drink consumed, type and frequency of meals. Intake is categorized as good if consumption is ≥ 70% and insufficient if consumption is < 70% (KPKN, 2017).

Table 1. Characteristics of Respondents

Characteristics	n	%
Age		
• 19-29	3	8,3
• 30-49	19	52,8
• 50-64	14	38,9
Work		
• Private sector employee	4	11,1
• Civil servants	6	16,7
• IRT	26	72,2
Education		
• Junior High School	9	25,0
• Senior High School	18	50,0
• S1	9	25,0
Cancer stage		
• II	13	36,1
• III	16	44,4
• IV	7	19,4
Chemotherapy Cycle		
• 1	32	88,9
• 2	4	11,1
Amount	**36**	**100,0**

From Table 3, it can be seen that the age of respondents with the highest percentage was 52.8% in the 30-49 year age group. In this study, the youngest respondent was 25 years old, and the oldest was 60 years old. The occupation of the majority of respondents is housewife, 26 people (72.2%). The respondents' education was high school as many as 18 people (50.0%). The most common cancer stage in the sample was stage III, 16 people (44.4%)—frequency of chemotherapy in 2 cycles. At RSI Siti Khadijah, chemotherapy patients undergo chemotherapy according to the level of malignancy of the cancer stage. In 1 cycle of chemotherapy at RSI Siti Khadijah Palembang, there is 6x chemotherapy. The most significant cycle in the chemotherapy sample was the first 32 people (88.9%).

Table 2. Nutritional Status of Respondents

Nutritional status	Amount	
	n	%
Malnutrition	15	41,7
Normal	21	58,3
Amount	**36**	**100,0**

Table 2 shows that the nutritional status of most of the respondents was normal (58.3%), BMI (body mass index) ranged from 18.5 – 25.0 kg/m2, the lowest was 16.9 kg/m2, and the highest was 33.6. kg/m2.

Table 3. Energy and Macronutrient Intake of Respondents

Nutrient Intake	n	%
Energy Intake		
Good	17	47,2
Not enough	19	52,8
Protein Intake		
Good	13	38,9
Not enough	23	61,1
Fat Intake		
Good	26	72,2
Not enough	10	27,8
Carbohydrate Intake		
Good	14	38,9
Not enough	22	61,1
Amount	**36**	**100,0**

Table 3 shows that of the 36 respondents, most of the sample had energy intake in the low category, 19 people (52.8%). The highest level of protein intake among respondents was less than 22 people (61.1%). Most respondents' fat intake was reasonable, 26 people (72.2%). The carbohydrate intake of most respondents was less than the requirements of 22 people (61.1%).

Table 4. Respondents' Antioxidant Intake

Antioxidant Intake	n	%
Vitamin A Intake		
Good	11	30,6
Not enough	25	69,4
Vitamin C Intake		
Good	18	50,0
Not enough	18	50,0
Vitamin E Intake		
Good	7	19,4
Not enough	29	80,6
Amount	**36**	**100,0**

Table 4 shows that 25 of the 36 respondents fell into the category of insufficient vitamin A intake (69.4%). The categories of good and poor vitamin C intake were the same, namely 18 people (50.0%). Most of the Vitamin E intake was insufficient, as many as 29 people (80.6%).

DISCUSSION
Respondent Characteristics
Most respondents were housewives (homemakers) because the respondents were mostly married adult women. The education level of most respondents is high school, so this is one of the factors causing breast cancer due to a lack of knowledge and information related to breast cancer. The majority of the cancer stages suffered by respondents were stage III. Women who have breast cancer often show a diagnosis of advanced severity and malignancy (stages III to IV) (Sari et al., 2014). The frequency of chemotherapy is grouped into two cycles. At RSI Siti Khadijah, chemotherapy patients undergo chemotherapy according to the level of malignancy of the cancer stage. In 1 chemotherapy cycle, there are six times chemotherapy, and most cycles occur in the first cycle. Chemotherapy can be one of the factors in the occurrence of malnutrition and affect the patient's nutritional intake and nutritional status (Ni Nyoman et al., 2018).

Nutritional status
The nutritional status of people living with Cancer must be maintained and improved so that cancer treatment can reduce complications (Habsari et al., 2017). Metabolic changes in cancer patients include protein, fat, and carbohydrate metabolism and can cause hypermetabolism (Marischa et al., 2017). Most of the respondents in this study had normal nutritional status due to several factors. Namely, the first respondents still have a good appetite and meet adequate nutritional needs (>70% of requirements). Both respondents are still in the first cycle of chemotherapy, so there is no significant change in their weight yet.

Energy and Macronutrient Intake
Most of the respondents' energy intake needed to be increased. The minimum intake was 782 kcal, and the maximum was 1207 kcal, averaging 973.1. Meanwhile, respondents in the good intake category had a minimum intake of 1207 kcal and a maximum intake of 1394 kcal with an average of 1306.5 kcal. This is not in line with research (Hidayat et al., 2020), which states that the energy intake of breast cancer patients at Fatmawati General Hospital mostly has average energy intake, namely 23 patients (67.6%). The effects of chemotherapy include changes in taste function, nausea, weakness, neuropathic pain, and psychological stress as indicated by pressure or anxiety. Changes in the function of the sense of taste, such as not being able to taste food or the bitter taste of the tongue, are one of the effects of chemotherapy, which causes a decrease in appetite (Putri et al., 2019). The sensitivity of chemotherapy patients to nausea and vomiting caused by the drug is different (Trijayanti et al., 2016).

Most respondents' protein intake was insufficient; the minimum intake was 20 grams, and the maximum intake was 35 grams, averaging 28 grams. Meanwhile, respondents in the good intake category had a minimum intake of 39 grams and a maximum intake of 58 grams, averaging 48.2 grams. This aligns with research (Sartono et al., 2014), which states that most of the energy intake of cancer patients at Dr. Hospital. Mohammad Hoesin Palembang less (84%). Chemotherapy not only kills Cancer but also kills normal cells that are actively dividing, such as oral epithelial cells. This causes anorexia, nausea, dry mouth, changes in taste, and often pain in the upper digestive tract. As a result, people lack protein due to chemotherapy, which reduces their food intake (Kusumawardani et al., 2016).

Fat intake in the excellent category has a minimum intake of 18 grams and a maximum intake. Fifty-three grams with an average of 32.2 grams, while the intake of respondents in the less category was ten people (27.8%) with a minimum intake of 15 grams and a maximum intake of 20 grams with an average of 17.3 grams. This is in line with research (Tadja et al., 2019) that most breast cancer patients have insufficient fat intake, namely (83.3%). One of the risk factors for breast cancer is consuming fat because fat accumulates in the body, producing free radicals that can trigger the growth of cancer cells. Hormones influenced by accumulated fat will ultimately cause abnormal cell growth and become Cancer (Tadja et al., 2019).

Carbohydrate intake in the excellent category has a minimum intake of 109 grams and a maximum intake of 206 grams, with an average of 166.2 grams. In comparison, the intake of respondents in the excellent category has a minimum intake of 200 grams and a maximum intake of 255 grams, with an average of 232.4 grams. This aligns with research (Ningrum et al., 2015) that carbohydrate intake in the wrong

category was 90%. The effect of chemotherapy treatment is that it causes nausea and vomiting so that carbohydrate intake is not met correctly (Ningrum et al., 2015).

Antioxidant Intake

There are three types of antioxidant intake to be studied here, namely, Vitamin A, Vitamin C, and Vitamin E. First, most of the respondents' intake of Vitamin A is less, with a minimum intake of 650 mcg and a maximum intake of 1951 mcg with an average of 1119.6 mcg. In contrast, Vitamin A intake in the excellent category has a minimum intake of 2110 mcg and a maximum intake of 2348 mcg with an average of 2229.7 mcg. This aligns with research conducted (Merisca, 2018) that 82.4% of cancer patients' vitamin A intake was included in the wrong category. Vitamin A also activates enzymes that destroy carcinogens, which cause Cancer, improve the performance of white blood cells, and increase the body's ability to function. This helps the body convert toxins into harmless substances. As an antioxidant, vitamin A can donate electrons from its atoms to free radicals to bond with unpaired electrons to form new free radicals. In addition, vitamin A helps maintain the stability of cell membranes against free radicals (Cakrawati et al., 2011).

Second, the respondents' vitamin C intake had a minimum intake of 50 mg and a maximum intake of 377 mg, with an average of 158.9 mg. This aligns with research (Ni Nyoman, 2018), which states that vitamin C is in the excellent category, as much as 65%. Vitamin C in fruit has an excellent antioxidant effect, which functions as a chemopreventive and strengthens the immune system (Ni Nyoman, 2018).Third, most of the respondents' vitamin E intake was in the poor category, with a minimum intake of 2 mg and a maximum intake of 10 grams with an average of 5.8 mg. In comparison, respondents in the excellent category had a minimum intake of 15 mg and a maximum intake of 17 mg, with an average of 16.2 mg. This aligns with research (Merisca, 2018), which states that 72.5% of cancer patients' vitamin E intake is insufficient. Vitamin E has antioxidant properties that protect cells and body parts from free radical attacks, stop damaging chain reactions or oxidation, and prevent DNA damage that causes mutations (Parwata., 2016).

CONCLUSION

Based on the results of this study, it can be concluded that the respondents' energy intake (52.8%) was less than requirements, the respondents' protein intake (61.1%) was less than requirements, the respondents' fat intake (72.2%) was good, the respondents' carbohydrate intake (61, 1%) less than requirements, Vitamin A intake of respondents (69.4%) is less, Vitamin C intake of respondents (50.0%) is less, Vitamin E intake of respondents (80.6%) is less than requirements. Breast cancer patients undergoing chemotherapy at RSI Siti Khadijah experience decreased appetite, nausea, and vomiting, resulting in nutritional imbalance.

SUGGESTION

It is best for cancer patients undergoing chemotherapy to pay more attention to various foods, especially vegetables, and fruit, which contribute to vitamins A, C, and E, so that nutritional imbalances do not occur.

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