

## LITERATURE REVIEW

### Nutrition Care in Cancer Patients

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#### Abstrak

**Tujuan:** menyediakan informasi mengenai permasalahan nutrisi pada pasien kanker. **Metode:** penulisan artikel ini menggunakan metode *literature searching*. Sumber yang dipakai berupa artikel, buku dan *website* WHO untuk mengumpulkan data epidemiologi. Artikel dan buku diambil dalam menggunakan Bahasa Indonesia dan Bahasa Inggris. Pencarian sumber artikel menggunakan bantuan mesin pencari *Google scholar* dan *Google*. **Hasil:** sekitar 25-70% pasien dengan kanker mengalami malnutrisi hal ini berkaitan dengan perubahan metabolisme. Perubahan metabolisme karbohidrat seperti peningkatan metabolisme laktat 10-100 kali lebih cepat. Perubahan metabolisme protein seperti terjadinya degradasi protein di otot. Perubahan metabolisme lemak seperti peningkatan lipolisis sebesar 85%. Perubahan metabolisme ini harus dicegah dengan pemberian nutrisi yang adekuat untuk pasien dengan kanker. Kondisi malnutrisi pada pasien dengan kanker ini dapat meningkatkan lama rawat inap dan meningkatkan mortalitas. Dengan pemberian terapi nutrisi yang adekuat diharapkan dapat membantu mempercepat proses penyembuhan pasien dengan kanker. **Kesimpulan:** Kondisi malnutrisi pada pasien dengan kanker adalah kondisi yang sering terjadi dan dapat berdampak pada peningkatan mortalitas pasien. Pemberian terapi nutrisi yang adekuat diharapkan mengurangi risiko mortalitas dan mempercepat penyembuhan pasien dengan kanker. **Kata kunci:** kanker; cachexia; malnutrisi; asuhan nutrisi

#### Abstract

**Objectives:** to provide information about nutritional problems in cancer patients. **Method:** writing this article using the *literature searching* method. The sources used are articles, books and the WHO website to collect epidemiological data. Articles and books are taken in Indonesian and English. Search the source of the article using the help of *Google Scholar* and *Google* search engines. **Results:** about 25-70% of patients with cancer are malnourished, this is related to changes in metabolism. Changes in carbohydrate metabolism such as an increase in lactate metabolism 10-100 times faster. Changes in protein metabolism such as protein degradation in muscle. Changes in fat metabolism such as increased lipolysis by 85%. These metabolic changes must be prevented by providing adequate nutrition for patients with cancer. Malnutrition in patients with this cancer can increase the length of stay and increase mortality. With the provision of adequate nutritional therapy is expected to help accelerate the healing process of patients with cancer. **Conclusion:** Malnutrition in patients with cancer is a condition that often occurs and can have an impact on increasing patient mortality. Provision of adequate nutritional therapy is expected to reduce the risk of mortality and accelerate the healing of patients with cancer.

**Keywords:** Cancer, cachexia, malnutrition, nutritional care

## INTRODUCTION

Cancer is an abnormal condition that causes cells to undergo uncontrolled division and can invade surrounding tissue. Alcohol consumption, tobacco use, unhealthy diets, and low physical activity are the main risk factors for cancer throughout the world. Cancer is the second leading cause of death globally and an estimated 10 million deaths from cancer in 2020.<sup>1</sup> Based on 2018 Basic Health Research (RISKESDAS) data, there has been an increase in cancer incidence from 1.4 per 1000 population in 2013 became 1.8 per 1000 people in 2018.<sup>2</sup> It is estimated that around 20% of cancer deaths are caused by malnutrition and cachexia in cancer patients.<sup>3</sup>

That's why one of the biggest challenges in cancer management is the problem of malnutrition in cancer patients. Nutrition plays a vital role in the management of cancer, both in patients who are undergoing and recovery from therapy, in a state of remission, and prevent a recurrence. Malnutrition conditions associated with the occurrence of impaired quality of life, decreased response to treatment, increased toxicity of chemotherapy.<sup>4</sup> Approximately 25% - 70% of cases of malnutrition in cancer patients are reported from various studies.<sup>5</sup> Research conducted by Huterbne et al. (2014) found that 39% of 1903 patients from multiple types of cancer experiencing malnutrition.<sup>6</sup> The most common cause of malnutrition in cancer patients is the emergence of cachexia and anorexia. Cachexia is defined as a syndrome (collection of symptoms) characterized by loss of muscle mass and fat, weakness; while anorexia is a condition of loss of appetite.<sup>7</sup>

Research on complaints of loss of taste has been reported in the Prevalence of Malnutrition in Oncology (PreMiO) of 1949 cancer patients, found as many as 41% (802 patients) experienced loss of appetite.<sup>5</sup> Sun et al. (2015) research found that 140 (35.9 %) of 390 cancer patients suffering cachexia.<sup>8</sup> A study involving 907 cancer patients found 8.6% of them had a Body Mass Index (BMI) below 18.5 and weight loss of more than 5% of body weight usually one month before the study or more than 10% in the six months before the survey conducted reportedly occurred in 23.7% of cancer patients. From the results of this study, it was also found that cancer patients with weight loss below 10% will have a higher quality of life than cancer patients with weight loss above 10% ( $p < 0.001$ ).<sup>9</sup> Cancer patients often experience hypermetabolism, a condition like this can trigger cachexia.

From the data in the research that has been mentioned, shows that it is indispensable for nutritional intervention as soon as the patient is diagnosed with cancer. This nutritional therapy aims to improve nutritional status, reduce the risk of cachexia, prevent cancer complications such as immune system depletion or infection, and meet the needs of micronutrients.<sup>3</sup> By providing nutrition can affect carcinogenesis processes such as carcinogenic metabolic processes, cellular defense, cell differentiation, and tumor growth.<sup>10</sup> This article will focus on the problem of providing nutrition to cancer patients to improve the quality of life of cancer patients.

## METHOD

This article using the literature searching to collect the necessary

information. Sources of information in this article were obtained from various literature such as research articles, books, and website (e.g WHO). For information sources from research articles taken in English and searched using the keywords 'Hypermetabolism AND Cancer,' 'Cachexia AND Cancer,' 'Nutrition AND Cancer' on the Google Scholar search engine. Information from the book is taken from books that contain explanations about nutrition in both English and Indonesian. The website is used to search for data on the epidemiology of cancer patients.

## DISCUSSION

Hypermetabolism i.e.increased resting energy expenditure (REE)>110% of predicted REE is often reported in cancer patients. A study involving 390 cancer patients with solid tumors, found 192 (49%) of 390 cancer patients experiencing hypermetabolism. In this study also found that in patients who had metastasized cancer, the hypermetabolism group had a lower median survival value than norm metabolism (14.6 months versus 21.4 months; odds ratio: 1.48; p = 0.044).<sup>11</sup> Changes in carbohydrate, protein, and fat metabolism in cancer patients are summarized in table 1.

**Table 1. Changes in the metabolism of cancer patients<sup>3</sup>**

Carbohydrate	Fat	Protein
Glucose intolerance	↑ Lipolysis	↑ turn-over
Insulin resistance	↓ Lipogenesis	↓ Syntesis in muscle
Impaired insulin secretion	Hyperlipidemia	↑ Proteolysis in muscle
↑ lactate production	↑ Free fatty acid	↑ Syntesis of liver
↑ Cori cycle activity	↓ Lipoprotein lipase activity	Amino acids are not normal

### **Changes in carbohydrate metabolism.**

The process of carbohydrate metabolism in cancer cells is different from

healthy cells. In cancer cells, there is a drastic increase in glucose usage and lactate production even though there is sufficient O<sub>2</sub>, and mitochondria are functioning well (typically lactate is only produced when O<sub>2</sub> is insufficient). This phenomenon in cancer cells is called the Warburg effect. The rate of glucose metabolism through aerobic glycolysis is higher so that the production of lactate from glucose increases 10-100 times faster.<sup>12</sup>

### **Changes in protein metabolism.**

Skeletal muscle depletion is the most crucial change in the case of cancer cachexia. Muscle mass is reduced by 75% when losing about 30% body weight, and the situation has a high mortality. Protein degradation in muscles releases some amino acids, such as alanine and glutamine. Tumor cells will use glutamine to help the process of self-division.<sup>3</sup>

### **Changes in fat metabolism**

In the case of cancer cachexia, the most considerable decrease in adipose tissue is around 85% through increased lipolysis or decreased lipogenesis.<sup>3</sup> Lipase sensitive hormones, and triglyceride lipases are the main enzymes that contribute to the breakdown of triglycerides in adipose tissue. Triglyceride lipases act as catalysts in the first stage of triglyceride hydrolysis. During lipolysis, fatty acids and glycerol are produced from the hydrolysis of triglycerides.<sup>13</sup>

From what has been explained above, nutritional problems in cancer patients are a critical problem. Malnourished cancer patients tend to have longer hospital stays and higher mortality.<sup>15</sup> They need proper treatment so that it can reduce the mortality and morbidity of cancer and can improve the

quality of life of cancer patients. The goals of nutritional therapy are:<sup>3</sup>

1. Improve nutritional status.
2. Reducing the symptoms of cancer cachexia.
3. Prevents complications such as infection, immune system depletion.
4. Meet the adequacy of micronutrients.

Nutrition interventions provided must be based on individual nutritional needs in both the amount and composition. Table 2 provides a summary of the needs for energy, protein and fat as well as food sources

**Table 2. Nutritional needs of cancer patients**

Needs	Number of needs <sup>3</sup>	Food source <sup>14</sup>
Energy	<ul style="list-style-type: none"> <li>• 25-35 Kcal/KgBW (to maintain nutritional status)</li> <li>• 40-50 Kcal/KgBW (replacing body reserves)</li> </ul>	Chicken, beef, green beans, granulated sugar, corn, tofu, coconut oil, fish, sweet potatoes
Protein	Intake ranges from 1.5-2 g/KgBW	Soybeans, shrimp, chicken eggs, cheese, chicken, fish, tempeh, green beans
Fat	Intake ranges from 30-50% of total calories	Palm oil, chicken, beef fat, avocado chicken eggs, butter, cheese, milk, sardines

National Cancer Institute makes a strategy in managing nutrition based on symptoms in cancer, that is:<sup>16</sup>

- Loss of appetite and weight
- Eat foods that are high in protein and calories (such as chicken, fish, eggs, yogurt, beans and so on) when your appetite increases.
- Add extra protein and calories to food, for example cooking with added fortified milk and adding ingredients that enhance the aroma of food.

- Consuming juice or soup if you don't like solid food.
- Eat in small portions but often, usually six times a day, 3-4 meals and 2-3 times snack.
- Drink little by little after breakfast.
- Notify the doctor if there are eating complaints such as nausea, vomiting or changes in taste.

Aside from nutritional problems with loss of appetite and weight, care should be taken in handling the following conditions:

- Constipation
- Drink warm water or juice every day.
- Eating foods that are high in fiber.
- Limit certain foods (such as broccoli, cabbage, cauliflower, and cucumber) if there are complaints of bloating.
- Diarrhea
- Drink enough water to replace lost fluids
- Eat foods high in sodium and potassium such as bananas, apricots, potatoes
- Avoid foods that cause bloating, high fiber, high sugar, too hot or cold, fatty or fried, alcohol, sour and spicy
- Vomiting
  - Try to eat runny foods like porridge and eat slowly.
  - Avoid fatty foods.
  - Don't lie down after eating.
  - Avoid stimulating odors.
  - Discuss with your doctor if antiemetic drugs are needed.
- Sore throat and difficulty swallowing
  - Choose foods that are easily consumed such as milkshakes, cereals.
  - Choose foods and drinks that are high in protein and calories.
  - Cut food into small sizes.
  - Avoid eating or beverages that can burn or hurt the throat such

as spicy foods, overheating, juices or foods that are high in acid, sharp or crunchy foods, and alcohol.

- Avoid consumption of tobacco products such as cigarettes.
- Cook food until soft

## CONCLUSION

Nutrition management in cancer patients is a critical problem. Nutritional status in cancer patients will affect the quality of life, therapeutic response, and prognosis. Circumstances such as cachexia and hypermetabolism are conditions that are often found in cancer patients, and this condition will increase the mortality and morbidity of cancer patients. Appropriate and adequate nutritional therapy will provide significant benefits for cancer patients. Nutrition therapy must be adjusted to the conditions of the patient's dietary needs.

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## CONFLICT OF INTEREST

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