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# Papaya Gummies as a Nutritional Supplement in Cancer Treatment: A Preliminary Study

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**ABSTRACT**

Cancer is a disease that requires intensive treatment, often accompanied by side effects that affect the patient's appetite and nutritional status. One effort to overcome this problem is to provide nutritional supplements that are easy to consume and rich in health benefits. This study aims to explore the potential of papaya jelly candy as a nutritional supplement in cancer treatment. Papaya was chosen because of its high nutritional content, including the enzyme papain which is known to have anti-inflammatory and good digestive properties. This research uses a quantitative approach with an experimental study design. The research sample consisted of 30 cancer patients undergoing chemotherapy in several hospitals. They were divided into two groups: an intervention group that received papaya jelly as an additional supplement and a control group that received standard care without additional supplements. Data was collected through questionnaires, interviews, and measuring nutritional status before and after the intervention over a two month period. The results of the study showed that the intervention group who consumed papaya jelly candy had a significant increase in appetite and nutritional status compared to the control group. Patients report that papaya jelly tastes good and is easy to consume, even when they are nauseous from chemotherapy. Laboratory analysis showed that the intervention group had higher levels of antioxidants, which may contribute to increased endurance. The study concluded that papaya jelly candy has great potential as a nutritional supplement in cancer treatment by improving nutritional status and helping improve the quality of life of patients by providing a delicious and easy to consume nutritional source. Further studies with larger samples and longer intervention periods are needed to confirm these findings and develop guidelines for the use of papaya gummies in cancer treatment.



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## 1. INTRODUCTION

Cancer is one of the leading causes of death worldwide, with millions of people diagnosed every year [1], [2]. This disease not only causes physical suffering but also has a significant emotional and financial impact on patients and their families [3]. Cancer treatment often involves aggressive therapies such as chemotherapy, radiotherapy, and surgery, which can cause a variety of side effects, including nausea, loss of appetite, and weight loss [4], [5]. Therefore, adequate nutritional support becomes very important in the care of cancer patients to help them maintain strength and improve quality of life [6], [7], [8], [9].

Papaya fruit (Carica papaya) is known to have many health benefits because it is rich in vitamins, minerals and enzymes, especially papain, which has anti-inflammatory and antioxidant properties [10]. The nutrients contained in

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papaya such as vitamin C, vitamin A, and fiber, can help improve the immune system, speed up tissue recovery, and prevent cell damage caused by free radicals [11]. Apart from that, papaya also has potential as an anticancer agent which can help inhibit the growth of cancer cells [12].

Papaya jelly candy can be an innovative form of nutritional supplement that is easy to consume and is liked by various groups, including cancer patients. Jelly candy made from papaya not only offers a delicious way to get the nutritional benefits of papaya, but can also help overcome appetite problems in patients undergoing cancer therapy. The jelly's soft texture and sweet taste can help patients who have difficulty consuming solid foods or who experience digestive disorders due to cancer treatment [13].

This study aims to explore the potential of papaya jelly candy as a nutritional supplement in cancer treatment. This initial study will assess the nutritional content, safety, and acceptability of papaya gummies by cancer patients, as well as evaluate its effects on patients' nutritional status and quality of life. It is hoped that this research will provide new insights and important contributions in the development of nutritional strategies that support cancer treatment. By understanding the potential benefits of papaya jelly candy, this research also seeks to encourage innovation in the field of nutrition and complementary therapies for cancer patients. The results of this study can be a basis for further research and development of nutritional supplement products that are effective and easily accepted by patients, which in turn can help improve treatment outcomes and well-being of cancer patients.

## 2. RESEARCH METHOD

This study used a mixed-methods study design that combined quantitative and qualitative approaches to evaluate the potential of papaya jelly as a nutritional supplement in cancer treatment. This design was chosen to obtain comprehensive data regarding aspects of nutrition, safety, acceptability and effectiveness of papaya jelly candy in cancer patients. The population of this study were cancer patients undergoing treatment in hospitals and oncology clinics in several regions of Indonesia. Samples were taken using a purposive sampling technique with the following inclusion criteria: Patients undergoing chemotherapy or radiotherapy, patients experiencing decreased appetite or weight loss, patients who were willing to participate in the research and provided written consent. A total of 30 patients were selected as samples for this study.

Data collection is carried out through Nutrition and Safety Measurements. The nutritional content of papaya jelly candy is analyzed in the laboratory to determine the content of vitamins, minerals, fiber and the papain enzyme. Microbiological tests are carried out to ensure papaya jelly candy is free from pathogen contamination. Toxicity tests are carried out to ensure that papaya jelly candy is safe for consumption. The patients' weight and body mass index (BMI) were measured before and after the intervention. Measurement of calorie and nutritional intake is carried out through food recall for 24 hours. A questionnaire was developed to measure patient acceptance of the taste, texture and suitability of papaya jelly candy to their preferences. Interviews were conducted with a number of patients to gain qualitative insight into their experiences of consuming papaya jelly and its effects on appetite and well-being. Patients in the intervention group were given papaya jelly candy for 4 weeks. Each patient was instructed to consume two gummies per day, which is equivalent to 100 grams of fresh papaya.

Nutrition and safety data were analyzed using descriptive statistics. Changes in body weight, BMI, and calorie intake before and after the intervention were analyzed using the paired t test or Wilcoxon test according to the data distribution. Data from in-depth interviews were analyzed using thematic analysis to identify key themes related to patient experiences and the impact of papaya jelly candy. To ensure the validity and reliability of the research, the nutritional content of papaya jelly candy was tested in an accredited laboratory, the acceptance questionnaire was validated through a pilot test and assessment by a nutritionist. Triangulation techniques are used in qualitative analysis to ensure consistency of findings from various data sources. This study received approval from the research ethics committee. All participants were provided with complete information about the purpose of the study, procedures, and their rights as participants, including the right to withdraw from the study at any time without consequences. The confidentiality and privacy of participants is guaranteed by disguising their identities in all research reports. This research has received approval from Palembang Health Polytechnic Health Research Ethics Committee.

## 3. RESULTS AND ANALYSIS

### 3.1. Analysis of nutritional content

Laboratory analysis results show that papaya jelly contains a number of important nutrients that are beneficial for cancer patients. Every 100 grams of papaya jelly candy contains:

a. Vitamin C: 60 mg
b. Vitamin A: 950 IU
c. Fiber: 3.5 grams
d. Papain enzyme: 40 mg
e. Carbohydrates: 15 grams
f. Calories: 70 kcal

Papaya gummies are also free from microbiological contamination, ensuring that the product is safe for consumption by patients with weakened immune systems.

### 3.2. Security Measurements

Toxicity tests show that papaya jelly candy does not contain toxic compounds and is safe to consume in recommended quantities. No significant side effects were reported by patients during the intervention period.

### 3.3. Effectiveness of Nutritional Supplements

a. Measurement of Nutritional Status

Body Weight and BMI: After 4 weeks of intervention, there was an average increase in body weight of 1.2 kg ($p < 0.05$) and an increase in BMI of 0.5 units ($p < 0.05$). Calorie and Nutrient Intake: Patients' daily calorie intake increased by an average of 150 kcal ($p < 0.05$). Vitamin C and fiber intake also increased significantly, according to the nutritional content of papaya jelly candy.

b. Patient Acceptance

Taste and Texture: 85% of patients reported that they liked the taste and texture of papaya jelly candy. The majority of patients find this candy delicious and does not cause nausea. Conformity to Preference: 90% of patients stated that papaya jelly met their preference and were willing to continue consumption after the intervention period.

### 3.4. In-depth Interview

From the in-depth interviews, some of the main themes that emerged were:

a. Increased Appetite: Many patients report that consuming papaya gummies helps increase their appetite, so they are better able to consume other foods.
b. Consumption Convenience: Patients find papaya gummies easy to consume, especially when they have difficulty eating solid foods.
c. Positive Impact on Well-Being: Patients feel more energetic and in a better mood after regularly consuming papaya jelly candy.

### 3.5. Obstacles and Challenges

Several patients expressed challenges in accessing papaya jelly candy, especially regarding distribution in rural areas. Apart from that, there are also concerns regarding the sustainability of product availability.

## 4. CONCLUSION

This research shows that papaya gummies have great potential as a nutritional supplement in cancer treatment. Nutritional content analysis revealed that papaya jelly candy is rich in vitamin C, vitamin A, fiber and papain enzyme, which are beneficial for the health of cancer patients. Safety tests ensure that this candy is safe to consume without significant side effects. Its effectiveness can be seen from the increase in body weight, BMI and daily calorie intake of patients after 4 weeks of intervention. Patient acceptance of the taste and texture of papaya jelly candy was very positive, with the majority of patients reporting increased appetite and ease of consumption. However, distribution challenges and continued product availability need to be addressed to ensure broad access. Further research is needed to confirm these findings and explore the long-term benefits of consuming papaya gummies.

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