

Development of a Modified Cangbu Pudding Diet For Hypertension with Hypertriglyceridemia Snacks Outpatients at Dr. R. Sosodoro Djatikoesoemo Regional Hospital

Belynda Shanti Nurwahyuningtiyas¹, Annasari Mustafa², Endang Widajati²

¹Professional Dietitian Education, Department of Nutrition, Malang Health Polytechnic Malang, East Java
65112. **Indonesia**

²Dietitian Professional Education Study Program, Department of Nutrition, Health Polytechnic of the Ministry
of Health Malang, East Java, **Indonesia**

Corresponding Author: Annasari Mustafa, e-mail: annasary@yahoo.com

Abstract. Patients with Hypertension who experience complications of Hypertriglyceridemia require strict dietary management, especially regarding energy, fat, and electrolyte intake. Snacks that are low in sodium and high in fiber are important to help maintain stable blood pressure and cholesterol levels. Yellow pumpkin (*Cucurbita moschata*) has potential as a raw material for functional foods due to its fiber, beta-carotene, and high potassium content. Mung beans (*Vigna radiata*) have a high fiber content that can help control blood pressure and help lower cholesterol levels. The case study was conducted in April 2025 at Dr. R. Sosodoro Djatikoesoemo Regional General Hospital, with homecare observation for one week. Data collected included food intake, clinical symptoms, anthropometric measurements, and biochemical parameters. The results showed that after the intervention, the patient experienced a decrease in physical complaints, increased food intake, and a gradual decrease in blood pressure and triglyceride levels, although not yet reaching the target. This study suggests that Cangbu Pudding as part of a dietary intervention can contribute to a decrease in blood pressure and triglyceride levels. Continuous monitoring and a longer intervention period may be necessary to achieve more optimal targets.

Key-Words: *Hypertension; Hypertriglyceridemia; mung beans; pumpkin; pudding*

1. Introduction

Hypertension is a circulatory system disorder that causes a person's blood pressure to rise above normal, or to a systolic pressure greater than 140 mmHg and a diastolic pressure greater than 90 mmHg. Hypertension is a multifactorial disease, with high triglyceride levels (Hypertriglyceridemia) being a risk factor [1].

Hypertriglyceridemia can cause problems, particularly in the blood vessels and heart. Elevated triglyceride levels can lead to atherosclerosis, which reduces the diameter of blood vessels, narrowing them and ultimately causing blockages. Nutritional management for patients with this complication requires attention to energy and protein intake, as well as sodium restriction [2].

One effort to support the implementation of this diet is the development of innovative food formulas based on local ingredients. Mung beans (*Vigna radiata*) and pumpkin (*Cucurbita moschata*) are local foods with significant potential due to their high content of complex carbohydrates, beta-carotene (provitamin A), and fiber, as well as relatively low levels of protein, sodium, and potassium [3].

In patients with Hypertension, diet aims to control blood pressure levels to maintain stability by paying attention to dietary sodium content. Meanwhile, in patients with Hypertriglyceridemia, providing foods high in fiber and antioxidants can slow disease progression. Therefore, the combination of Hypertension and Hypertriglyceridemia requires a specific diet, with particular attention to the quality and quantity of macronutrients, as well as fluid and electrolyte balance [4].

This pudding is made from mung beans, which in Indonesian is Kacang Hijau and yellow pumpkin, which in Indonesian is Labu Kuning, and is shortened to Cangbu. Cangbu Pudding, a low-sodium, high-fiber snack, is part of a dietetic innovation for Hypertension patients complicated by Hypertriglyceridemia. This product is designed not only as an alternative energy source but also to support healthy eating education through an attractive and easily accepted food format. This innovation is expected to improve dietary compliance and improve patients' quality of life.

Home visits allow long-term nutritional maintenance, which can further assist patients in managing their daily diet and improving their quality of life. This study aimed to determine the effect of Cangbu Pudding on controlling blood pressure and triglyceride levels in Hypertensive patients with Hypertriglyceridemia.

2. Materials and Methods

The case study was conducted in April 2025 on outpatients of Dr. R. Sosodoro Djatikoesoemo Regional General Hospital. The method used for data collection was observation 3 times for 1 week in the intake domain using the comstock method, the physical domain using interviews, the anthropometric domain using body weight measurements, and the biochemical domain using laboratory results. The intervention was carried out by providing *Cangbu Pudding* with a weight of 50-75 grams per cup (1 day given 4 cups of *Cangbu Pudding*). The target for achieving food intake was to fulfill intake by $\geq 80\%$ and triglyceride levels < 200 mg/dL.

3. Discussion

In this case study, a 61-year-old male with a history of Hypertension and has never received nutritional education related to his diet. Currently, the patient is routinely checked at the internal medicine clinic. The patient's nutritional status is in the normal category, with activities as a carpenter, blood pressure: 153/87 mmHg (high). It is known that the patient has not been on a diet according to the previous Nutritionist's recommendations. The patient's daily diet is, the patient has no allergies / dietary restrictions. The patient has a main eating habit of 3-4x / day @ 2 ctg, with rice as a source of carbohydrates @ 100 g. Animal side dishes that are often consumed by the patient are eggs 3x / week @ 1 egg (60 g), fried chicken 3x / week @ 1 point to medium (40 g). Vegetable side dishes consumed are tofu / tempeh every day 2x / day @ 1 point to medium (50 g) processed fried. Rarely consumes vegetables, such as spinach 1x/week 2 ctg vegetables (@100 g), kale 2x/week, vegetable soup 1x/week. The patient rarely consumes fruit, papaya 1x/week 1 ptg (@100 g), banana 2x/week @100 g. Every day drinks tea with 1 tablespoon of sugar (@10 g). Frequently consumed snacks are fried foods (filled tofu, ote-ote) @50 g. In daily food processing, use flavorings and food processing by frying, stir-frying, coconut milk. The results of the patient's laboratory examination showed a Total Cholesterol level of 228 mg/dL (high), Triglycerides 432 mg/dL (high), HDL Cholesterol 37 mg/dL (low) and LDL Cholesterol 151 mg/dL (high). In addition to being given dietary modification interventions, the patient also received education on the 2000 kcal DASH diet.

4. Interventions and Result

The first visit was conducted after the patient's checkup from the hospital. During the observation, the patient appeared normal, carrying out his usual activities as a carpenter. Education was provided on how to prepare snacks that can help control blood pressure and triglyceride levels. The snack formulation was made taking into account the patient's eating habits and the availability of food ingredients at home. Both the patient and family received education on how to prepare snacks as snacks. The recommended snack was Cangbu Pudding, made from mung beans and pumpkin. Both mung beans and pumpkin are low in sodium and high in fiber, making them suitable as a safe snack for people with Hypertension and high triglycerides. The second home visit was conducted three days later. The patient appeared more refreshed, carrying out his usual activities as a carpenter, and his daily food intake had increased. As a snack, the patient consumed two cups of Cangbu Pudding daily, which was well-received.

The third home visit was conducted on the seventh day. The patient appeared more refreshed and active, carrying out his usual activities as a carpenter, and his daily food intake had increased. Cangbu Pudding was consistently consumed at two cups daily.

Education has a significant impact on patient adherence to dietary intake. Education will have a significant impact on adherence if supported by supporting factors such as family support and self-motivation. Continuous and ongoing education will yield optimal results [5]. Overall, the patient showed significant improvements in food intake, physical condition, and biochemical parameters. After the third home visit, a follow-up visit ensured that the patient continued to eat well and met the dietary goals established by the dietitian. The patient's food intake during 3 visits can be seen in the following image.

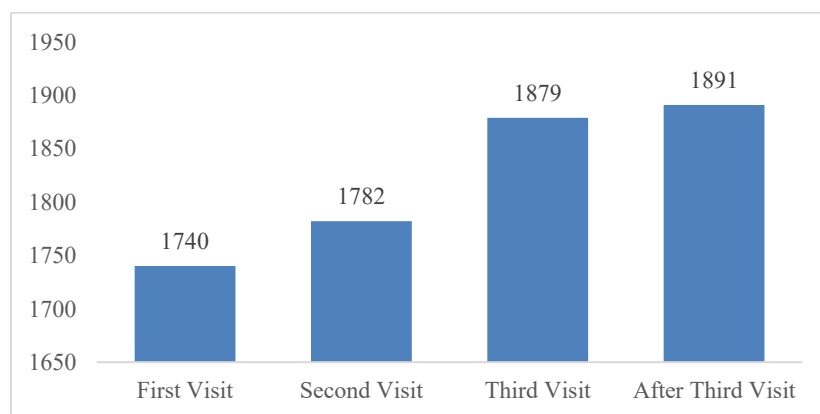


Figure 1. Patient energy consumption in three-day of home visits

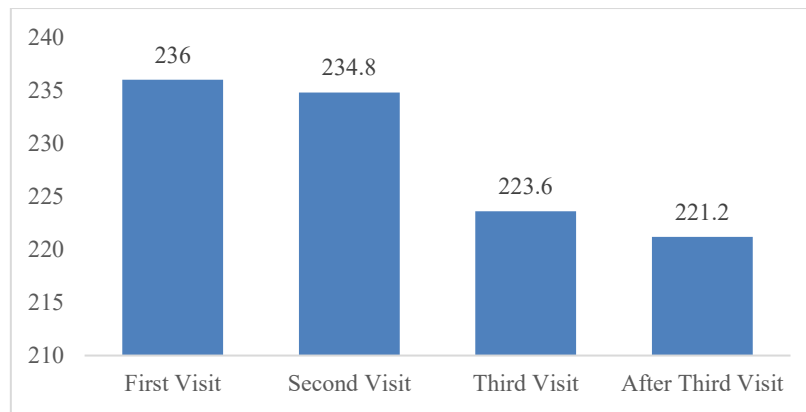


Figure 2. Sodium consumption of the patient in three-day home visits

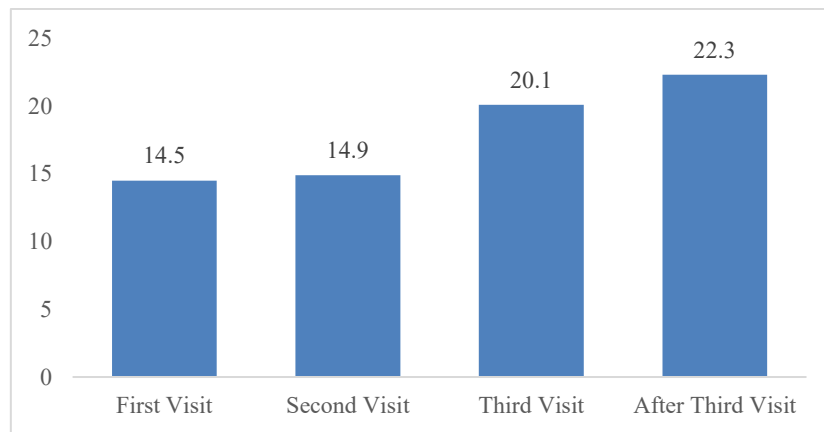


Figure 3. Patient fiber consumption during the three-day home visits

5. Monitoring and Evaluation

Based on the results of monitoring and evaluation, the patient's energy intake increased to 91% of the recommended requirement during the first visit. A diet was provided that was adjusted to the patient's condition. At the second visit, the energy intake reached 1782 kcal, and during the third visit, it increased again to 1879 kcal.

The patient's monitoring results showed that she consumed main meals and snacks according to the recommended schedule. *Cangbu Pudding*, as a snack, was consumed twice daily (morning and afternoon), with an average portion size of 100-150 grams per meal. Daily records showed an increase in the patient's total energy intake due to the additional calories from the pudding, without increasing protein intake. In terms of food tolerance, there were no gastrointestinal complaints such as nausea, diarrhea, or bloating after consuming the *Cangbu Pudding*. The patient felt comfortable and stated that the pudding had the right sweetness and soft texture.

Anthropometric monitoring and evaluation were performed by measuring body weight. The results showed a stable value of 64 kg, within the normal BMI category.

Monitoring and evaluation of snack intake showed that during the first, second, and third visits, the patient was able to consume two cups of *Cangbu Pudding* as recommended.

In addition to dietary intake, biochemical monitoring was also performed during the patient's routine check-up at the hospital in May 2025. Results showed a decrease in the patient's blood pressure to 140/80 mmHg and triglyceride levels to 432 mg/dL. This decrease was influenced not only by pharmacological therapy but also by the addition of *Cangbu Pudding* to the diet.

Dietary adherence improved, as evidenced by the absence of non-recommended food consumption. The patient's family helped remind him of meal times and supported the consumption of the prepared menu. The patient demonstrated enthusiasm for following the dietary recommendations, including recording daily food intake. Furthermore, the patient demonstrated good adherence to the prescribed diet, avoiding high-fat and high-sodium foods.

During the home visits, the patient's family shared that she lives with her child. She works as a carpenter. The patient's house is located close to the market, which facilitates easy access to a variety of food items.

6. Nutrient Content

Nutrients that are particularly important for patients with diabetes mellitus include carbohydrates and fibre. Carbohydrates not only serve as the main source of energy, but also help prevent excessive protein breakdown and support fat and mineral metabolism.

One factor influencing the development of Hypertension is the habit of consuming foods high in sodium, low in potassium, high in animal fat, and low in fiber. This aligns with research conducted by Buata, which found that patients with Hypertension generally have a high-sodium diet [5].

Table 1. Monitoring and Evaluation Antropometry, Intake Analysis, Dietary Formula

Indicators	First Visit	Second Visit	Third Visit
Antropometry			
Height	168 cm	-	-
Weight	64 kg	64	64
%LiLA	98%		
Intake analysis	Energy 1740 kcal	Energy 1782 kcal	Energy 1879 kcal
Snack Formula (Modified Diet)	2 pieces (50 g/pcs)	2 pieces (50 g/pcs)	2 pieces (50 g/pcs)

In patients with chronic diseases such as hypertension and hypertriglyceridemia, dietary modifications are carried out based on the principle of controlling carbohydrate, protein, and fat intake, as well as limiting electrolytes such as sodium, potassium, and phosphorus according to the stage of the disease [6]. High sodium intake is caused by food processing, which tends to be fried, and the addition of salt and instant seasonings. Dietary fiber plays a crucial role in regulating blood triglyceride levels.

Table 2. Nutrient content of *Cangbu Pudding*/portion

Energy and Nutrient Content	Purple Sweet Potato Rolled Pancake
Energy (kcal)	163,2
Protein (g)	9,1
Fat (g)	7,8
Carbohydrate (g)	19,5
Natrium (mg)	28,5
Fiber (g)	6,3

7. Summary of Patient Progress

The diet provided was adjusted to meet the nutritional needs of patient. The patient's needs were calculated using the Harris-Benedict formula, which is 2044 kcal, with protein accounting for 15% of total energy, fat 25%, and carbohydrates 60% of total energy [7]. Home visits is an effective strategy for educating patients on how to achieve targeted energy, sodium, and fiber intake, while also understanding their health benefits.

As a result, home visits became an effective strategy to educate the patient on how to achieve targeted energy, carbohydrate, and other macronutrient intake, along with understanding their health benefits.

Home visits also had a positive psychological impact on the patient. However, during home visits, the patient showed increased enthusiasm, as the atmosphere allowed them and their families to ask questions and receive clear and personalized explanations. These visits also provided practical education on how to select and prepare appropriate food.

The patient appeared happier and more motivated during the visits and more motivated to follow the dietary recommendations. Furthermore, patients expressed confidence that nutritional interventions could indeed improve recovery.

Overall, the home visits received good feedback from the patient and his family. They expressed grateful for the guidance on feeding patients with Hypertension and Hypertriglyceridemia, and that patients learned about the benefits of nutrition and physical activity

Table 3. Summary of patient progress

	First visit	Second visit	Third visit
Physical	Fully conscious	Fully conscious	Fully conscious
Clinical	The patient look energized and able to do homework	The patient look energized and able to do homework	Lively, energetic, and able to do homework
Food tolerance assessment	Appetite increased, no nausea	Appetite increased, no nausea	Appetite increased, no nausea

8. Conclusion

Cangbu Pudding is an appropriate, safe, nutritious, and popular snack alternative, especially for Hypertension patients with Hypertriglyceridemia complications, as it meets the recommended snack requirement of 10-15% of total daily calorie needs. Monitoring showed increased energy intake, stable blood pressure, and improved dietary compliance. No clinical signs indicating dietary inadequacy were found.

References

- [1]. Djafar, M. (2021). The Concept of Hypertension. *Ecuadoriana Gastronomía y Turismo Lokal.*, 1(69), 5–24.
- [2]. Asrini R.D., Yeni A.H., Diana N.F. (2024). The Relationship between Hypertension Incidence and Triglyceride Levels in Bus Drivers at the Arjosari Terminal, Malang City. *Medical Laboratory Journal E-ISSN 2685-8495 Vol. 06 No. 02, November 2024.* <https://ejournal.poltekkes-smg.ac.id/ojs/index.php/JLM/>
- [3]. Caesar Rayhand A.N, Eti Yerizel, Nita Afriani. (2025). Overview of Triglyceride Levels and Blood Pressure in the Andalas University Housing Community. *Journal of Health and Medicine Volume 2 Number. April 2, 2025.* <https://doi.org/10.62383/vimed.v2i2.1453>
- [4]. Laurensia, L., Destra, E., Saint, H. O., Syihab, M. A. Q., & Ernawati, E. (2022). Intervention Program to Prevent the Increase in Hypertension Cases in the Sindang Jaya Community Health Center Work Area. *E-Amal: Journal of Community Service*, 2(2), 1227–1232. <https://doi.org/10.47492/eamal.v2i2.1472>
- [5]. Pravitasari, H. F., Mahmuda, I. N. N., Jatmiko, S. W., & Nursanto, D. (2021). The Relationship Between Blood Pressure, Total Cholesterol, and Triglycerides in STEMI and NSTEMI Patients. *PublikasiIlmiahUMS*, 243–256. <https://publikasiilmiah.ums.ac.id/xmlui/handle/11617/12632>.
- [6]. Pakhri, A., Suaib, F., & Yuniarti, S. (2021). Acceptability and Nutritional Value of Cake with Mung Bean Flour and Pumpkin Flour Substitution. *Media Gizi Pangan*, 27(2), 49-59. Putra, E. S., & Pramudya, A. (2022). Designing a Stoneware Snack Plate as a Snack Serving Container for Leisure Activities at Home. *Indonesian Design Journal*, 4(2), 60-74.
- [7]. Persagi and ASDI. 2019. Diet and Nutrition Therapy Guide. Jakarta: EGC Medical Book Publisher. Indonesian Nutritionists Association and Indonesian Dietitians Association. 2020. Diet and Nutrition Therapy Guide, 4th Edition. Jakarta: EGC Medical Book