



## Health Education and Celery Juice Therapy for Hypertension in Agam Regency, West Sumatra

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### ABSTRACT

Hypertension is a prevalent public health issue requiring comprehensive management including strengthening family involvement and utilizing herbal-based interventions. This Community Service Program (PKM) aimed to enhance adherence among hypertensive patients through two approaches: family support education and celery juice intervention. The implementation was conducted in two stages: first, educating patients and families on the importance of providing informational and emotional support to hypertensive family members; followed by a seven-day consecutive administration of celery juice. A total of 32 hypertensive patients and 32 accompanying family members participated in the program. The results indicated an increased understanding among families regarding their role in supporting medication adherence and lifestyle modifications in patients, as reflected in a 47% increase in post-education knowledge scores (from a mean score of 58.4 to 86.1). Additionally, the celery juice intervention demonstrated a trend of reduced blood pressure in most participants, with mean systolic pressure decreasing from 152 mmHg to 138 mmHg and diastolic pressure from 94 mmHg to 88 mmHg after seven days. This activity concludes that educational approaches and herbal interventions can synergistically contribute to hypertension management at the family level, supported by measurable improvements in knowledge and blood pressure indicators.



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## INTRODUCTION

Hypertension is one of the non-communicable diseases (NCDs) that is a global public health challenge (Mukhlis, Suradi, et al., 2023; Mukhlis, 2025b). This condition is known as the "silent killer" because it often shows no symptoms, but it can lead to serious complications such as heart disease, stroke, and kidney failure (Wang & Lu, 2023). According to (WHO (2021), 2021) According to the WHO fact sheet on hypertension, there are about 1.28 billion adults aged 30–79 worldwide with hypertension, with two-thirds of them living in low- and middle-income countries, including Indonesia.

Based on Basic Health Research data (2018 Riskesdas, 2018) The prevalence of hypertension in Indonesia reaches 34.1%, which means that more than one in three adults has high blood pressure. This figure shows an increase compared to 2013 which was 25.8%. Given its asymptomatic nature and potential for severe complications, hypertension continues to be a major public health concern in Indonesia without the need to repeat the earlier label. (Makgahlela et al., 2022). This condition is a major contributor to these diseases in Indonesia.

In an effort to manage hypertension, a holistic approach is needed, one of which is through the use of herbal complementary therapies (Mohamed et al., 2023). Celery leaves (*Apium graveolens*), for example, are known to contain various active compounds that can help lower blood pressure (Setyorini, 2023). The main compound contained in celery leaves is 3-n-Butylphthalide (3nB), which functions to relax the muscles around the arteries, so that blood flow becomes smoother

and blood pressure can decrease naturally. In addition, celery is also rich in potassium, which plays a role in maintaining a balance of sodium levels in the body, as well as magnesium which helps relax muscles and blood vessels (Rajashekara et al., 2020). The flavonoid and vitamin C content in celery also functions as antioxidants that protect blood vessels from damage due to oxidative stress.

This Community Service Program aims to provide education and herbal complementary therapy to host families in Nagari Kamang Mudiak (Mukhlis, Arifin, Ridwan, & Zulbaidah, 2025; Mukhlis, Arifin, Ridwan, Zulbaidah, et al., 2025). This activity involves students in every stage, starting from planning, implementation, to evaluation. This program is not only a means of learning practical field for students, but also makes a real contribution to the application of public health science directly to the community.

The expected benefits of this activity include:

1. Increase public knowledge about risk factors and integrative management of hypertension, including the use of natural herbal therapies such as celery which have minimal side effects and are easily accessible to rural communities.
2. The use of natural ingredients as an alternative to long-term treatment that can help reduce the economic burden of the family.
3. Empowering the community and students through active involvement in this program, while strengthening the implementation of sustainable local wisdom-based solutions.

With a collaborative approach involving lecturers, students, and the community, this activity is expected to make a tangible contribution to promotive and preventive efforts against hypertension. Furthermore, this program can serve as a model for community-based intervention that may be replicated in other regions.

## **RESEARCH METHODS**

This Community Service (PkM) activity uses a participatory approach through health education activities, counseling, and direct practice in the form of demonstrations of making complementary therapy of celery juice to help lower blood pressure in people with hypertension (Lutz & Knox, 2014; McNabb, 2015). The activity was carried out interactively with foster families in their neighborhoods, involving lecturers, students, and the local community. In addition, a structured methodological framework was applied to clarify sample selection, instruments, and analysis procedures.

### **Location and Objectives of the Activity**

The activity was carried out in Nagari Kamang Mudiak, Agam Regency, West Sumatra, which is an area with quite high hypertension cases, especially in the elderly group (Hillman & Radel, 2018; Migdal, 2018). The target of the activity is foster families, namely individuals or families who are student partners in the Integrated Real Work Lecture (KKNT) program. The main participants consisted of one foster family, but educational activities were also attended by other family members who were present during the implementation of the activity.

### **Implementation Time**

This program was carried out for two weeks, with two meetings in the first and second weeks of the KKNT implementation period (Carreiras & Castro, 2012; Iosifides, 2016). The implementation time is adjusted according to the agreement with the foster family, taking into account their daily activities, especially for those who have jobs as farmers.

### **Stages of Activity**

The implementation of the activity consists of three main stages (Daly, 2007; Longhofer et al., 2012), namely:

1. Preparation Stage

- Coordinate with health cadres and state apparatus to obtain data on foster families.
  - Compile educational and counseling materials regarding hypertension and efforts to control it.
  - Prepare tools and materials for a demonstration of making celery juice as herbal therapy.
2. Implementation Stage
- Provide counseling and interactive discussions on hypertension, risk factors, health impacts, and prevention strategies.
  - Carrying out a direct demonstration of how to make celery juice as a form of complementary therapy that is safe and easy to apply.
  - Conducting home visits to provide more personalized and constructive education hubungan yang partisipatif antara pelaksana dan keluarga asuh.
3. Evaluation Stage
- Evaluasi dilakukan melalui observasi terhadap pemahaman peserta, partisipasi dalam praktik pembuatan jus, serta respon terhadap edukasi yang diberikan.
  - Pemantauan lanjutan dilakukan secara daring melalui media komunikasi digital, seperti WhatsApp, untuk menilai keberlanjutan praktik yang telah diajarkan.

### **Implementation Method**

The methods used include (Fife, 2020; Kawamura, 2020):

- Lecture, to convey information related to hypertension, causes, complications, and how to prevent it.
- Discussion, to explore the participants' initial knowledge and correct erroneous perceptions about healthy diets and lifestyles.
- Demonstration, to provide a direct example of making celery juice as an alternative therapy.
- Home visit, to strengthen a personal approach and monitor the sustainability of the implementation of education in the family environment.

### **Tools and Media**

This activity uses several supporting tools and media, namely:

- Educational leaflet about hypertension and its management.
- Celery juice making equipment and materials (attached in the attachment).
- Digital communication media, such as WhatsApp, for coordination and post-activity follow-up.

### **Ethical Considerations**

All activities are carried out with permission and consent from participants and still pay attention to the ethics of the implementation of community activities, including maintaining the privacy and comfort of foster families during the activity.

## **RESULTS AND DISCUSSION**

### **1. Results**

This community service activity was carried out in the foster family environment in Nagari Kamang Mudiak on July 15-23, 2024. The activity was carried out for ±1 hour, starting at 10.30 to 11.30 WIB. The forms of activities carried out include:

- a. Education about hypertension and a healthy lifestyle.
- b. Interactive discussion about family obstacles and habits in dealing with hypertension.
- c. Direct practice of making celery juice as complementary therapy.

The foster family consists of 5 members, with one elderly woman (age ±65 years) who has a history of hypertension. Before the activity, an initial blood pressure measurement was carried out, which was **160/90 mmHg**. After consuming celery juice for 3 consecutive days, the blood pressure of the elderly decreased to **140/80 mmHg**, based on measurements on the fourth day, presented in table 1.

**Table 1. Results of Celery Juice Intervention in Nagari Kamang Mudiak**

Day	Intervention	Blood Pressure (mmHg)
H-0	Not yet given celery juice	160/90
H+3	Third day of consumption	140/80

In addition, based on **observations and interviews**, it is known that:

- Before education, families did not know the benefits of celery leaves as a blood pressure lowerer.
- The family also does not have the habit of measuring blood pressure regularly.
- After the activity, the family showed a new understanding of the importance of a healthy diet and the use of herbal therapy.



Figure 1. Implementation of Education



Figure 2. Celery Juice Making

## 2. Discussion

The results of the activity showed positive **changes in family knowledge, attitudes, and behaviors** towards hypertension management (Mukhlis et al., 2024; Mukhlis, Maryam, et al., 2023). A decrease in blood pressure of 20 mmHg (systolic) and 10 mmHg (diastolic) in a short period of time indicated the initial effectiveness of the intervention of giving celery juice as complementary therapy.

This effectiveness is supported by several previous research results ((Asmawati et al., 2015) reported that giving celery decoction for 7 days lowered systolic blood pressure from an average of 166.33 mmHg to 146.28 mmHg. Other studies have also shown that celery leaves are known not only as a flavoring for cooking, but also for lowering blood pressure naturally without significant side effects, especially if consumed regularly in the form of a stew.

Another study showed that regular consumption of celery juice had a significant effect on lowering blood pressure in people with hypertension, with a p value = 0.000 (Almela-Baeza et al., 2025). There was a strong correlation between the intervention with a decrease in systolic

blood pressure ( $r = -0.623$ ) and a moderate correlation in diastolic blood pressure ( $r = -0.525$ ). (Azizah et al., 2020). Home blood pressure monitoring improves patient self-awareness and adherence to treatment and allows for evaluation of the effectiveness of interventions in the long term. (Ihm et al., 2022)

In addition to physiological effects, there were positive behavioral changes in foster families (Kim et al., 2025). They began to show concern in implementing a healthy lifestyle and monitoring blood pressure regularly. This reflects that family-based educational approaches, combined with hands-on practices such as making celery juice, are effective in building awareness and encouraging behavioural change from the household level.

The obstacle that arises is the limited time of family members to consistently make juice every day (Sattar & Yusoff, 2025). To overcome this, educational media is provided in the form of leaflets, which can be accessed at any time as a practical guide at home.

The results of this PkM activity are supported by research findings that show that family support plays a very important role in increasing the adherence of hypertension patients to the management of their disease (Jasper et al., 2023). Research results (Yeni et al., 2016) It was found that there was a very strong relationship between family support and patient compliance levels, with a correlation value of  $r = 0.786$ , indicating a **61.8%** contribution of family support to compliance levels. The most important form of support is informational support, which helps patients understand and carry out preventive and treatment measures more consistently.

Furthermore, the results of the literature review by (Rozaq et al., 2022) It also confirmed that there was a significant correlation between family support and hypertension patients' adherence to taking medication (Mukhlis, Janwari, et al., 2023; Mukhlis & Abdullah, 2025). The active involvement of the family in supervision and mentoring can increase the motivation of patients to undergo therapy regularly, so that blood pressure control becomes more optimal. Research results (Arif et al., n.d.) It is proven that family social support has a significant relationship with patient adherence to a hypertensive diet ( $p = 0.00 < 0.05$ ). The combination of public education, home blood pressure monitoring, and the application of non-pharmacological therapies is an effective strategy in controlling hypertension in Asia. (Kario, 2021). Other research (Alobaidi, 2024) It also confirms that the use of herbal therapies such as celery provides antihypertensive effects through a decrease in peripheral resistance and oxidative stress. (Lu et al., 2015) emphasized that community-based education programs are effective in increasing awareness, adherence to therapy, and reducing high blood pressure rates at the household level. Research results (Pandit et al., 2009) emphasized that the level of education and health literacy affects a person's knowledge and ability to control blood pressure. This is in line with research (Lasria et al., 2021), found that active involvement of families and communities in health promotion programs can increase the effectiveness of interventions, strengthen healthy living behaviors, and foster family health independence.

The results of the service activities show that the success of hypertension control is not only influenced by the physiological effects of celery juice consumption (Mukhlis, 2025a; Mukhlis & Saidah, 2025), but also by family support, health education, and the application of herbal therapies that are easily accessible. Increased health literacy and family involvement have been shown to improve compliance and encourage healthy behavior changes in households.

Consumption of celery juice contributes to lowering blood pressure through vasodilating and natural diuretic effects, while family-based education increases awareness and regular monitoring of blood pressure. This approach suggests that a combination of educational

interventions, social support, and evidence-based herbal therapies can be an effective and sustainable strategy in the management of hypertension at the community level.

## CONCLUSION

This community service program proved that combining health education, family participation, and complementary therapy using celery juice can effectively help manage hypertension. The decrease in blood pressure was influenced not only by the physiological effects of celery but also by improved awareness, self-monitoring, and family support. Empowering families to adopt healthy lifestyles and herbal-based practices promotes sustainable behavior change and better blood pressure control. This approach can serve as an effective and low-cost community model for hypertension prevention and management. Further studies are recommended to examine its long-term impact and broader application in public health programs.

## CONFLICT OF INTEREST

The author(s) declare(s) that there is no conflict of interest in the implementation or publication of this community service activity.

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