



# JNK

JURNAL NERS DAN KEBIDANAN  
(JOURNAL OF NERS AND MIDWIFERY)

<http://jnk.phb.ac.id/index.php/jnk>



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## Systematic Review: The Effect of Celery on Blood Pressure in Menopause



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### Article Information

#### History Article:

Received, 08/02/2022

Accepted, 26/12/2022

Published, 30/12/2022

#### Keywords:

celery, blood pressure,  
menopause

### Abstract

Menopause in women associated with depletion of follicles ovaries accompanied by physical and psychological changes. Common comorbidity experienced by menopausal women is hypertension. The purpose of this research was to find out the effect of celery on blood pressure in menopause. The systematic review used database from: Google Scholar. The search results that meet the criteria are then analyzed for articles. Celery (*Apium graveolens* L.) is one of the types of herbal therapy to treat hypertension in menopause. The simple use of celery was by boiled water which was considered safe for menopausal women to consume. This intervention could be applied as an alternative therapy in treating menopausal woman in hypertension.

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DOI: <https://doi.org/10.26699/jnk.v9i3.ART.p423-430>

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P-ISSN : 2355-052X

E-ISSN : 2548-3811

## INTRODUCTION

Frequent high blood pressure is associated with increased vascular and mortality. A meta-analysis latest of risk prediction models for hypertension found that age, gender, body mass index (BMI), baseline blood pressure, and smoking is the most common predictor from high blood pressure. Currently, hypertension is still the cause of very dangerous death because it is a chronic disorder without symptoms that secretly damages blood vessels, heart, brain, and kidney if not detected and not treated. Hypertension is one of the non-communicable diseases in the cardiovascular section of the main cause of death, and is quite difficult to control. Nowadays, the prevalence of the disease is quite high in society, both globally and nationally. Hypertension is an increase in blood pressure systolic more than 140 mmHg and blood pressure diastolic more than 90 mmHg. Enhancing long-term blood pressure for a long time can cause damage to the kidney (kidney failure), heart disease (kidney disease) coronary heart and brain (causing stroke) if not detected early and not immediately treated. Hypertensive patients with uncontrolled blood pressure can result in the amount continue to increase (Anuhgera et al. 2020; Fitira, Anggraini, and Handayani 2021; Handayani and Wahyuni 2021; Triyanto 2014).

Hypertension or high blood pressure can be classified into 5 categories starting from normal, prehypertension, grade 1 hypertension, hypertension grade 2 to hypertensive crisis. Somebody who have grade 1 hypertension where systolic blood pressure 140-159 mmHg and diastolic blood pressure 90-99 mmHg usually symptoms such as dizziness, feeling neck pain. When hypertension is already known but not immediately given handling and only left will arise complications. Hypertension is also known as the silent killer (stealth killer), because people often suffer from hypertension for many years. without feeling anything disorders or symptoms. Unnoticed by the patient can experience complications in the organs vital heart, brain or kidney (Rahayu 2017).

Menopause in women associated with depletion of follicles ovaries accompanied by physical and psychological changes. Common comorbidity experienced by menopausal women is hypertension. Woman menopause at the age of 45-55 years is at risk have higher hypertension compared to women at the time premenopause and perimenopause. Hypertension in reproductive cycle often becomes disturbing polemic especially during

pregnancy, childbirth, postpartum and premenopause to menopause. Diet, lifestyle strategies and the use of nutraceuticals has growing evidence to support its efficacy as blood pressure control strategies. Several cross-sectional studies and longitudinally stated that women menopause has a big risk for have hypertension compared to premenopausal women regardless of age and body mass index (BMI) (Anuhgera et al. 2020; Pakaya and Syamsuddin 2018).

Based on data obtained, high prevalence rates of hypertension have a major impact on mortality so it needs to be managed or intervention. Management of hypertension is available in two categories, namely pharmacological and nonpharmacologic. Pharmacological management in hypertensive patients by using drugs according to a doctor's prescription, such as anti-diuretic class hypertension, beta blocker, antagonist calcium, ACE inhibitor, angiotensin converting enzyme (ACE), a vasodilator. Whereas non-pharmacological management, namely by reducing your intake of foods that contain sodium, exercise regularly, maintain weight normal, consume foods rich in vegetables and fruit and herbal therapy. herbal therapy can be done by using plants Indonesian medicine. Non-pharmacological management is very popular with the public because it is considered safer and has no effect on the use of drugs containing chemicals. Types of herbal therapy for grip hypertension, one of which is by using celery leaf plants (Indarti, Wilda, and Nuvitasari 2020; Rahayu 2017; Wakhidah 2021).

Conventional antihypertensive often associated with multiple effects. About 80% of the world's population use herbal medicines for primary health care because it is easier to accept and has an effect on lower side. In three the past decades, a lot of effort has been conducted to research plants originally with hypotensive properties and antihypertensive. Plants that are high in efficacy and easy reached, namely celery leaves (*Apium graveolens*) because in celery leaves contain compounds essential oils in the form of apiol, bisabaloene, calamenen, camphen, carvarcol, cuminal, bcaryophyllen, p-cymene, dihydrocarvon, element, elemicin, farnesen, humuladaienon, humulen, limonene, myrcen, myristicin, ocimen, a-pinene, b-pinene, santalol, sedanolid, b-selinen, sesquiterpenes acetate, terpinene, terpineol, thuyen, thymol, tricylen, and valerovenol, protein, calcium, phosphate salts, vitamin A, vitamins B and C.

Celery stems, leaves and seeds contain apigenin and apigenin which has the effect of peripheral vasodilators associated with lowering high blood pressure (Anuhgera et al. 2020; Rahayu 2017). Purpose of this studies is to discover impact of celery on blood pressure in menopause.

## METHODS

This study technique was systematic review, used 8 stages, specifically figuring out inclusion and exclusion criteria, literature search, article selection, carry out vital appraisal, carry out information extraction, information synthesis and map the consequences findings. The sources of studies information derived from the literature via the net withinside the shape of studies consequences acquired approximately. The article inclusion standards used: 1) An article that describes the effect of celery in postpartum mothers. 2) Published articles have whole sections. 3) Published in 2018-2021. The exclusion standards for articles included: Incomplete article composition. The search of the database used the keywords: "the effect of celery on blood pressure in menopause". The similar articles were then processed in order that no articles with the identical identity were found. Then the articles had been taken care of primarily based totally at the inclusion and exclusion standards that were determined. Articles that encompass abstract handiest may be eliminated. So that we get the articles to be analyzed.

Population : Postpartum mothers  
 Intervention : Celery consumption  
 Comparison : Compared without celery consumption  
 Outcome : Hypertension  
 Context : The health of postpartum mothers, especially their hypertension context.

The articles which had been received were then extracted. The extraction of the articles was primarily based totally on the writer of the item, the item that became published, the quantity of samples used, the measuring device used, the effects of the studies conducted, and the item database. After getting the item to be reviewed, the author made a vital appraisal and degree the stop is charting the data. Filtering and choice of articles the usage of PRISMA Flowchart.

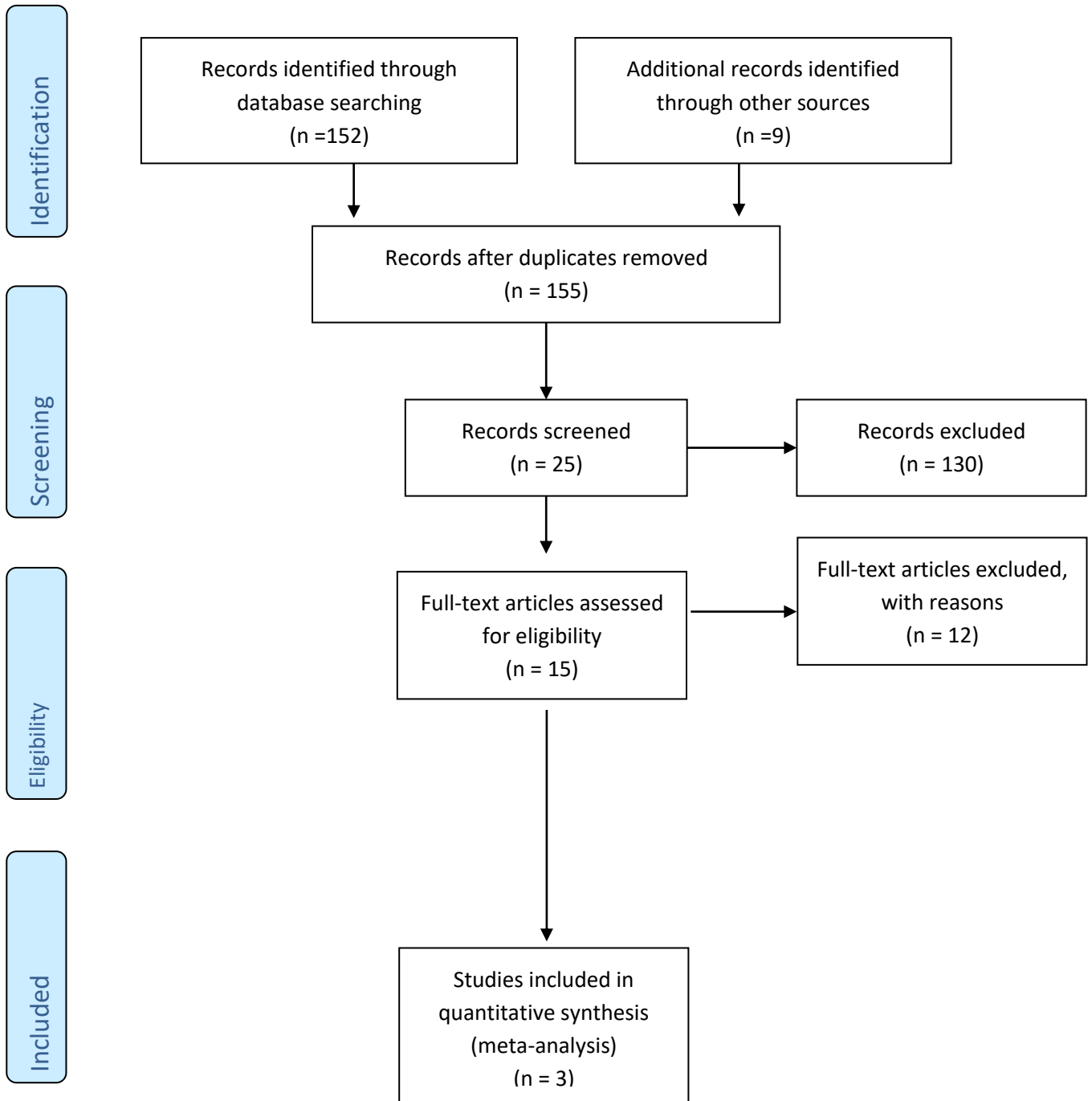
## RESULTS

Search outcomes the use of the key phrases "hypertension, celery, menopause" use the digital database. Search outcomes the use of those 3 key phrases ended in 152 articles. Then filtering the articles with inclusion and exclusion standards will receive 25 articles. Selection of the following article through getting rid of article duplication with the end result of 15 articles. Subsequently, article removal is achieved primarily based totally on a whole association of 3 articles.

Based on systematic review on some search of "hypertension, celery, menopause" as follows: (Indarti et al., 2020) giving celery boiled water 2 x 100 cc (morning  $\pm$  10.00 and afternoon  $\pm$  16.00 hours) for 7 consecutive days, (Sutrisni & Nikmah, 2020) used celery juice as much as 50 grams and given 400 ml of water for 7 days, then given treatment for 7 days for each group, (Anuhgera et al., 2020) take research to respondents with group intervention given leaf decoction celery as much as 200 ml in the afternoon for 1 week and anti-hypertension while in the group control only received anti hypertension for 1 week.



### PRISMA Flow Diagram



**Table 1:** Article Extraction

Researcher	Year	N	Result
Diah Evawanna Anuhgera, Rizky Yolanda, Riris Sitorus, Nikmah Jalilah Ritonga, Damayanti	2020	28	The results showed that there was a statistically significant difference of blood pressure levels before and after intervention in the experiment group with p value sitolic level 0.000 and diastolic level 0.001 (<0.05). Celery leaf stew has a significant effect in reducing blood pressure level in menopausal woman in hypertension.
Sutrisni, Anis Nikmatul Nikmah	2020	32	The results of the analysis showed that Ambon banana was more effective in lowering blood pressure where the average decrease in systolic blood pressure was 16.84 and diastolic blood pressure was 16.00 in Menopausal women with hypertension.
Henny Vidia Effendy, Surya Mustika Sari	2020	30	The results showed that there were differences in the mean changes in blood pressure in the Pre-PostTest. In the treatment group, the mean value of changes in TDS was -20.00 mmHg, TDD -15.33 mmHg and MAP -19.56 mmHg. Whereas in the control group, TDS was 4.66 mmHg, TDD was 9.33 mmHg and MAP was 4.24 mmHg.

## DISCUSSION

Based on the gender from research, women entering menopause tends to be sensitive due to changes in pattern shape body and a decrease in the hormone estrogen. Decreased estrogen that occurs in women tend to experience increased blood pressure, because the hormone estrogen can also regulate some of the body's blood vessels (Fitira, Anggraini, and Handayani 2021). Hypertension or high blood pressure is a chronic condition characterized by increased blood pressure on the wall arteries. This situation resulted in the heart working harder to circulate blood throughout the body through blood vessels. High blood pressure involves two measurements, namely systolic at heart rate contracts then diastolic when the heart rate relaxes. Then, one of the causes of hypertension is that men aged 45 years are more susceptible to an increase in blood pressure while women tend to increase blood pressure at age 55 (Indarti, Wilda, and Nuvitasari 2020; Sari 2019).

The micro-impact of hypertension is a condition when the blood pressure in the blood vessels is chronically elevated. This can happen because the heart works harder to pump blood to meet the body's needs for oxygen and nutrients. If left untreated, this disease can cause headaches, eye problems, and often have trouble sleeping at night. The increased risk of hypertension in menopause is often caused by a shift in the arteries which results

in loss of elasticity and becomes stiff so that the arteries cannot expand when the heart pumps blood through the arteries. The hormone estrogen plays a role in the regulation of blood pressure directly or indirectly. On the other hand, the cessation of estrogen production at menopause can reduce the elasticity of blood vessels. The macro impact of an increase in blood pressure that lasts for a long time (persistent) can cause damage to the kidneys (kidney failure), heart (coronary heart disease) and brain (causing stroke) if not detected early and receive adequate treatment. Hypertension will make the heart work harder and contribute to the formation of blockages that can interfere with blood flow. Blood pressure that is too high can cause a blood vessel to burst in the brain (stroke). Kidney damage is one of the most common long-term complications (Fatmawati, Rahmawati, and Sulistyawati 2020; Sutrisni and Nikmah 2020).

Hypertension can attack anyone, from various age groups and socioeconomic status. In general, hypertension is an asymptomatic condition, where high blood pressure in the arteries causes an increased risk of cardiovascular-related diseases such as stroke, heart failure, and kidney damage. Although this disease is considered to have no initial symptoms, in fact there are some symptoms that are not very visible so that sufferers are ignored. These symptoms can begin to be felt by people with hypertension with blood pressure greater than

140/90 mmHg. Hypertension increases with age. Almost everyone experiences an increase in blood pressure in the elderly. Systolic pressure usually continues to increase throughout life and diastolic pressure at 45-60 years of age then decreases slowly. This is related to one of the changes that occur due to the aging process, namely the reduced speed of blood flow in the body. With increasing age, the walls of the arteries become stiffer and their elasticity decreases, resulting in an increase in vascular resistance, which causes the heart to work harder to pump blood. As a result, there is an increase in systolic blood. As we age, the body's cells also experience aging and a decrease in the ability to perform cell functions, the blood vessels should become stiffer (stiff), then the heart pumps harder and ultimately results in high blood pressure. (Simamora, Pardede, and Sujoko 2021)

Low intake of fruit and vegetables can be a risk factor for stress and high blood pressure. Therefore, increased consumption of fruit and vegetables can be a prevention against hypertension and cardiovascular disease. Epidemiological studies have shown food groups certain green leafy vegetables can prevent high blood pressure and also have the most protection significant for heart disease coronary heart disease and ischemic stroke risk. Celery is an herbal plant that is very low in calories. Celery leaves contain only 16 calories per 100 grams and contain insoluble fiber, which when combined can reduce weight and cholesterol levels in the blood, a rich source of flavonoid antioxidants such as zeaxanthin, lutein, and beta carotene which function as body protectors, increase immunity, and cancer prevention. Celery is a good source of vitamin A. Vitamin A and beta carotene are natural flavonoid antioxidants needed to keep skin, eyes and mucous membranes healthy. General mechanism of celery plants in controlling blood pressure, among others, provides a dilating effect on blood vessels and inhibits angiotensin converting enzyme (ACE). Inhibition of the renin-angiotensin system can reduce the kidney's ability to increase blood pressure. Celery has a good effect for lowering blood pressure high in patients with hypertension. Then, this is related to the content of the leaf celery. Blood pressure generally starts to drop the day after treatment followed by subjective improvement such as sleep feels comfortable, and the amount of urine excreted increases, then the content that can be lowering high blood pressure, namely apiin, apigenin, flavonoids and 3-n butyl phthalide (3nB)

(Anuhgera et al. 2020; Handayani and Wahyuni 2021; Rahayu 2017).

The general mechanism of this plant in controlling blood pressure, namely, providing a dilating effect on blood vessels and inhibiting angiotensin converting enzyme (ACE). In addition, the content of 3-n-butylphthalide or phthalides in celery plays a role in relaxing and relaxing the smooth muscles of blood vessels and lowering stress hormones in the blood. Celery also contains natural ingredients to lower cholesterol levels in the blood, namely phytosterols which prevent cholesterol deposition on the inner walls of blood vessels. Celery has been widely used in the community and many studies have been carried out on its pharmacological effects and have been shown to be able to reduce high blood pressure. The Apigenin content in celery acts as a beta blocker that can slow down the heart rate and decrease the strength of heart contractions so that less blood is pumped and blood pressure is reduced. Mannitol and apiin are diuretics, which help the kidneys remove excess fluid and salt from the body, so that reduced fluid in the blood will lower blood pressure (Simamora, Pardede, and Sujoko 2021; Wakhidah 2021).

Menopause is associated with an increased risk of cardiovascular disease and high blood pressure when compared to the perimenopausal period. For women who have entered the age of menopause are expected to be able to realize the importance of health by implementing a healthy lifestyle and continuing to measure blood pressure regularly. In menopause, estrogen deficiency occurs which may be a contributor to high blood pressure in menopausal women by 65% while 35% can be influenced by lifestyle factors and other factors. Therefore, lifestyle modifications such as food intake and daily activities can play an important role in blood pressure and cardiovascular risk reduction. Menopause is certainly not the only factor that influences the emergence of cardiovascular disease or hypertension. Lifestyle, medical, and genetic factors also play a role in the incidence of cardiovascular disease in women (Effendy 2020).

Research from (Effendy 2020) showed that blood pressure before being treated with celery boiled water the average (MAP pretest) in the treatment group and the control group was categorized as high. Blood pressure after treatment with celery boiled water (MAP Post-test) in the treatment group decreased, while in the control group remained high. There is a therapeutic effect of

giving celery boiled water on blood pressure in patients with hypertension for the treatment group and the control group, this is indicated by the difference in the mean value of changes in blood pressure (MAP pre-posttest) the mean value of the treatment group is greater than the control group. So that the therapy of giving celery boiled water can be used as an alternative treatment for people with hypertension.

The high prevalence of hypertension is one of the problems that affect public health status. As a result of many changes in lifestyle, age, race, family history, gender, obesity, stress, and attitudes that encourage hypertension. The use of appropriate and correct herbal medicines can help the process of controlling blood pressure. There are even advantages, because herbal therapy has no side effects. One of the non-pharmacological methods to stabilize blood pressure is celery considering that this plant is often encountered in the environment and has great benefits, so it is hoped that by doing non-pharmacological treatment of hypertension (celery), blood pressure in patients can decrease. Thus, the public can minimize the use of pharmacological hypertension drugs

## CONCLUSION

From this research it can concluded that Celery (*Apium graveolens* L.) is one of the types of herbal therapy to treat hypertension in menopause. Simple use by celery boiled water is considered safe for menopausal women to consume.

## SUGGESTION

This intervention could be applied as an alternative therapy for treating menopausal woman in hypertension. Therefore, future studies may also be enriched by experience or perception of the menopausal women.

## FUNDING

The authors declare that the research was conducted in the absence of any commercial or financial financial support to conduct the research and/or preparation of the article and to briefly describe the role of the sponsor(s) in the whole research process.

## CONFLICTS OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## AUTHOR CONTRIBUTION

Author searching journal from database, extract it, and then made an interpretation based on the data.

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