Melon Fruit as an Effort to Reduce Plaque Index in Hypertension Patients

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A R T I C L E   I N F O

A B S T R A C T

Background: Dental and oral hygiene is a condition in which the oral cavity is free from dirt such as plaque and calculus. One simple way to reduce dental plaque is to regulate diet, especially by increasing consumption of fibrous foods such as vegetables and fruits, for example melon. Melon contains vitamin A, vitamin B1, vitamin B6, vitamin C, and fiber. In every 100 grams of melon, there are 88.9 grams of water and 0.6 grams of fiber. Purpose: This study was to analyze the Plaque Index Before and After Consuming Melon Fruit in Hypertension Patients. Method: This study was a quasi-experimental study with with a pretest and posttest design with one group design. Sampling technique with purposive sampling, as many as 38 respondents. The study was conducted in the community of RW 14 Bukit Cimanggu City Housing, Bogor in 2024. The instrument used in this study was a plaque index examination sheet and data analysis using a paired sample test. Results: Before consuming melon, the results of the plaque index were good for 4 people (10.5%), moderate criteria for 22 people (57.9%), and poor criteria for 12 people (31.6%). After consuming melon, the results of the plaque index with the criteria of very good were 4 people (10.5%), good for 20 people (52.6%) and moderate for 14 people (36.8%). The results of the statistical test obtained p = 0.04. Conclusion: Consuming melon is effective in reducing the plaque index in hypertension patients.

INTRODUCTION

Dental and oral hygiene is a condition in which the oral cavity is free from dirt such as plaque and calculus. If dental and oral hygiene is not maintained, plaque can form and spread across the surface of the teeth (Nurilawaty et al., 2023). The condition of the mouth which is always moist, dark, and wet creates an environment that supports the growth and reproduction of plaque-forming bacteria (Marsh et al., 2015).

Plaque is a layer formed from food residue that sticks to the teeth and interacts with saliva, bacteria, enzymes, and acids. This sticky layer contains bacteria that form on the surface of the teeth. Plaque forms when foods containing carbohydrates, such as soft drinks, cakes, or candy are left on the teeth. If the teeth are not cleaned properly, plaque will stick even more (Jakubovics et al., 2021). Plaque control can be done through three methods: mechanical, chemical, and natural. The mechanical method involves brushing your teeth, while chemical control is done by rinsing with antimicrobial drugs. Regular dental cleaning, especially by brushing, is an effective method to reduce plaque (Koagouw et al., 2016).

One way to reduce plaque is to regulate your diet, especially by increasing the consumption of high-fiber foods such as vegetables, fruits, and water (Nurilawaty et al., 2021). High-fiber foods take longer to chew, so they can stimulate the production of more saliva. Saliva contains substances such as antibacterial, glycoprotein, calcium, and fluoride which are useful for protecting teeth (Zafar et al., 2020). Chewing high-fiber foods such as fruits can help clean your teeth. Fruits such as melon, papaya, pineapple, watermelon, and apples are easy to find and can be consumed fresh (Khalsa, 2003). Melon contains vitamin A, vitamin B1, vitamin B6, vitamin C, and fiber. In every 100 grams of melon, there are 88.9 grams of water and 0.6 grams of fiber (Afandi, 2018). Melon belongs to the pumpkin family, is round with a slightly rough outer skin. This fruit is rich in various minerals, low in calories, and low in fat, and contains flavonoid antioxidants (Huda et al., 2018). According to (Setiani et al., 2021), chewing melon can reduce plaque scores.

Basic Health Research in 2018, the main dental problems in Indonesia are damaged, cavities, or diseased teeth, which reached 45.3% (Riskesdas, 2018). In addition, most of the Indonesian population experiences oral health problems such as swollen gums and abscesses with a prevalence of around 14%. Dental caries occurs due to the activity of bacteria in the oral cavity that collects in plaque. These bacteria decompose the substrate, and their metabolic products increase the acidity level (pH). This condition causes demineralization of the tooth enamel layer and forms white spot lesions as an early sign of caries (Van Loveren & Lingström, 2015).

One of the causes of caries is a habit that is often ignored, such as food residue that sticks to the surface of the teeth and is not cleaned properly. Cleaning your teeth properly and on time can remove food particles that stick (Kidd & Fejerskov, 2016). However, in Indonesia, people often do not clean their teeth at the right time and with the right technique, so that many food particles remain. In addition, the use of incorrect brushing techniques can damage teeth and cause new problems such as caries (Purnama & Sofian, 2023).

Hypertension is a disease condition that can affect individuals of all ages, both young and old. Hypertension is one of the most dangerous medical conditions in the world, significantly increasing the risk of developing diseases in vital organs such as the heart, brain, kidneys, and other diseases (Bell et al., 2015). Worldwide, around 1.28 billion adults aged 30 to 79 years have hypertension, two-thirds of whom live in low- and middle-income countries, and most (46%) of whom are unaware that they have this condition. Only around (42%) people are diagnosed with hypertension and receive treatment. About one in five adults (21%) with hypertension can control their blood pressure well. Worldwide, hypertension is a leading cause of premature death. One of the global goals in tackling non-communicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030 (Organization, 2023).

A person is considered to have hypertension if the measured systolic blood pressure reaches or exceeds 140 mmHg and/or the measured diastolic blood pressure reaches or exceeds 90 mmHg after several blood pressure measurements (Kario et al., 2024). This definition applies to all adults (> 18 years). Hypertension or high blood pressure refers to a condition in which blood pressure rises above the normal value, which is 120/80 mmHg (Hidayati et al., 2022).

The prevalence of hypertension based on blood pressure measurements in West Java reached 41.6%. Hypertension was found in the age groups 31-44 years (31.6%), 45-54 years (45.3%), and 55-64 years (55.2%). This shows that most people with hypertension are not aware that they have hypertension, so they do not get treatment (Riskesdas, 2018).

Researchers chose melon as the subject of the study because this fruit is generally easy to find and is liked by most people because of its delicious taste. In addition, melon has an attractive color, so many people like it. The selection of melon as the focus of this study was based on its potential to reduce the plaque index on teeth.

METHOD

The design of this study is a quasi-experimental study with a pretest and posttest design with one group design. This study was to analyze the Plaque Index Before and After Consuming Melon Fruit in Hypertension Patients. Data collection will be carried out in April to May 2024. This study uses sampling with the total sampling method, so the total sampling in this study was 34 students. The sampling method used was purposive sampling, the samples taken were 38 people with hypertension in RW 14 Bukit Cimanggu City Housing. The inclusion criteria in this study include:

1. Registered as residents in RW 14 Bukit Cimanggu City Housing, Bogor City
2. Hypertension sufferers in RW 14 Bukit Cimanggu City Housing, Bogor City
3. Willing to be respondents and provide written consent
4. Have a history of hypertension
5. Present at the time of the study before and after consuming melon

Data analysis used in this study used SPSS with paired sample test analysis. The instrument used for data collection is the plaque index examination sheet. The procedure is made according to the implementation which aims to see the plaque index before and after consuming melon in hypertension sufferers as follows:

1. Applying disclosing solution to the entire surface of the index teeth, then the researcher gave instructions to rinse once.
2. Before consuming melon, the plaque index was first checked using a mouth mirror and sonde. Then the results were recorded on the examination format.
3. Respondents were given melons to be consumed.
4. Respondents were instructed to consume 100 grams or 5 pieces of melon per person and the author instructed them to chew on 2 sides, namely the right and left.
5. After consuming 100 grams of melon, 10 minutes later the plaque index was rechecked by applying disclosing solution to the index teeth.

RESULT

Table 1. Frequency Distribution of Plaque Index Before Consuming Melon Fruit in Hypertension Patients

Plaque Index	Before		After	
	F	%	F	%
Very good	0	0	4	10.5
Good	4	10.5	20	52.6
Moderate	22	57.9	14	36.8
Poor	12	31.6	0	0
Total	**38**	**100**	**38**	**100**

Table 1 shows that of the 38 hypertension patients studied before consuming melon, there were 4 hypertension patients with good plaque index criteria (10.5%), 22 moderate criteria (57.9%), 12 poor criteria (31.6%), and no hypertension patients with very good plaque index criteria. Meanwhile, after consuming melon fruit, the results obtained with very good plaque index criteria were 4 people (10.5%), good criteria were 20 people (52.6%), moderate criteria were 14 people (36.8%), and there were no hypertension sufferers with poor plaque index criteria.

Table 2. Effectiveness Plaque Index Before Consuming Melon Fruit in Hypertension Patients

Knowledge	*Mean*	Difference	*p-value*
Pre-test	2.9		
Post-test	1.6	0.7	0.04

Table 2 shows that the plaque index before consuming melon fruit was 2.9 and the plaque index after consuming melon fruit was 1.6. There was a decrease in the plaque index by 0.7, with statistical tests obtained p = 0.04 (p <0.05).

DISCUSSION

Natural plaque control can be achieved by consuming foods rich in fiber. The habit of consuming fibrous foods plays a role because fibrous foods tend to be dense and stimulate chewing activity, which in turn produces more saliva. Saliva cleans food particles that stick to the teeth and also reduces the amount of sugar trapped between the teeth. as a natural plaque controller (Chairani et al., 2023). Melon fruit is a rich and complete source of nutrition, so it is considered a good choice to increase endurance and prevent various diseases. Melon fruit also has a positive impact on oral health with vitamin C in melon juice which helps fight bacteria that cause gum disease and maintains dental health (Setiani et al., 2021).

The results of the study on 38 hypertensive patients obtained results before consuming melon with good criteria of 4 people (10.5%), moderate criteria of 22 people (57.9%) and poor criteria of 12 people (31.6%). The highest plaque index criteria before consuming melon were moderate criteria of 22 people (57.9%). The results after consuming melon were obtained with very good criteria of 4 people (10.5%), good criteria of 20 people (52.6%) and moderate criteria of 14 people (36.8%). The highest plaque index criteria after consuming melon were with good criteria of 20 people (52.6%). Therefore, the average plaque index before and after consuming melon was obtained before consuming melon was 2.6 and the average

plaque index after consuming melon was 1.9. There was a decrease in plaque index of 0.7 with a statistical test of p = 0.04

Research conducted by (Setiani et al., 2021) found in the study that there was a decrease in plaque index before and after consuming melon. This study is in line with research conducted by researchers that there was a decrease in plaque index before and after consuming melon with the same method used. Melon can reduce plaque index, this happens because consuming fibrous and solid foods which results in increased intensity, chewing time, and chewing movements will stimulate saliva secretion containing antibacterial agents. Saliva can also remove or rinse food residue on the surface of the teeth. Melon has a nutritional content that includes 92.1% water; 1.5% protein; 0.3% fat; 6.2% carbohydrates; 0.5% fiber; 0.4% ash; and Vitamin A as much as 357. Melon is a good source of energy because every 100 grams of fruit flesh that can be consumed contains 21 calories, 5.1 grams of carbohydrates, 0.6 grams of protein, 0.1 grams of fat, and various other vitamins and minerals that are important for growth and development. The high water content in melon can help prevent dehydration and keep teeth and gums healthy (Afandi, 2018; Karimi, 2021).

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the consuming melon is effective in reducing the plaque index in hypertension patients.

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