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Original Article

The Effect of Supplementary Feeding on Blood Pressure and Uric Acid in the Elderly in the Working Area of the Teppo Health Center, Pinrang Regency

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Abstract

Background: Hypertension is estimated to be the cause of death for around 7.1 million people worldwide.
Aim: The purpose of this study was to analyze differences in blood pressure in the elderly before and after supplementary feeding (SF), to analyze differences in uric acid levels in the elderly before and after giving SF, to analyze the effect of SF on blood pressure in the elderly, to analyze the effect of giving SF to uric acid levels in the elderly.
Method: This study uses a Quasi-Experimental method with a Two Group Pretest – Posttest design. The sample consisted of 30 experimental groups and 30 control groups. The results showed that in the intervention group the average pre-test systolic blood pressure was 165.33, SD 14.077, and post-test 141.67 SD 11.472. Meanwhile, in the control group, the average systolic blood pressure before SF was 158.33, SD was 7,466, while in the posttest, it was 158.33, SD was 9,499.
Results: In the examination of women's uric acid levels, the pretest showed that the intervention group had an average uric acid level of the elderly before SF which was 6.936, and SD was 0.411. The significance value is 0.000 0.05 meaning that there is an effect, while the post-test is 6359, SD is 0.418. While in the control group the average uric acid level of the elderly before supplementary feeding was 6688, SD 0.298, while in the post-test it was 6759, SD 0.355. The significance value is 0.035 0.05, which means that there is no effect. In men, the pretest of the intervention group showed the average uric acid level of the elderly before SF was 7.225, SD was 0.433, while in the posttest it was 6550, SD was 0.578. Meanwhile, in the control group, the average uric acid level before supplementary feeding was 7.215, SD 0.443.
Conclusions: There are differences in blood pressure and uric acid in the elderly before and after SF and there is a significant effect of giving SF on blood pressure and uric acid in the elderly.

INTRODUCTION

Based on Law No. 13 of 1998 concerning Elderly Welfare. Elderly is someone who reaches the age of 60 years and over. According to WHO in 2004, the elderly is someone who has entered the age of 60 years. Globally, the elderly population is predicted to continue to increase. According to the 2017 World Population Prospect Report, the elderly population is expected to increase from 962 million worldwide in 2017 to 2.1 billion in 2050 and 3.1 billion in 2100 (United Nations 2017).

In almost five decades, the percentage of the elderly in Indonesia has more than doubled (1971-2019), namely to 9.6 percent (25 million) where there are about one percent more female elderly than male elderly (10.10). percent versus 9.10 percent). Of all the elderly in Indonesia, the young elderly (60-69 years) far dominate with a magnitude that reaches 63.82 percent, followed by the middle elderly (70-79 years) and the

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elderly (80+ years) with a magnitude of each. 27.68 percent and 8.50 percent respectively. This year there are five provinces that have an elderly population structure where the elderly population has reached 10 percent, namely: DI Yogyakarta (14.50 percent), Central Java (13.36 percent), East Java (12.96 percent), Bali (11.30 percent) and West Sulawesi (11.15 percent). Meanwhile, in terms of health, there are still about half of the elderly who have experienced health complaints during the last month. The morbidity rate of the elderly tends to decrease every year. In 2019, one in four elderly people became sick in the past month. Elderly awareness of the health complaints they suffer is quite high. The majority of the elderly treat their health complaints, either by self-medicating or outpatient treatment (96.46 percent).

Elderly is an age group in humans who have entered the final stages of the phase of life. Groups that are categorized as elderly will occur a process called the Aging Process or the aging process. Elderly is an age where there is a decline in body functions, one of which is a decline in the function of blood vessels. Research shows that blood vessels do harden (stiff) as a person ages. This is what causes the heart to pump stronger, and eventually lead to the emergence of hypertension in the elderly.

Hypertension in the elderly has a high prevalence, at the age above 65 years it is found between 60-80%. Approximately 60% of hypertension in the elderly is isolated systolic hypertension (Isolated Systolic Hypertension) where there is an increase in systolic blood pressure accompanied by a decrease in diastolic blood pressure. An increase in systolic blood pressure is caused primarily by arterial stiffness or reduced aortic elasticity.

Uric acid is also related to blood pressure (hypertension), theoretically explains the relationship of hyperuricemia with blood pressure (hypertension), blood pressure (hypertension) will end up in microvascular disease with the end result in the form of tissue ischemia which will increase uric acid synthesis through the degradation of adenosine triphosphate. ATP) to adenine and xanthine. HyperuricemiaProlonged exposure can lead to chronic kidney disease with tubular changes. This is due to impaired kidney function in terms of excreting uric acid, due to switching functions to remove excess sodium in order to lower blood pressure (Lingga 2012).

In South Sulawesi, hypertension sufferers at the age of 65-74 are 63.83%, at the age of > 75 as many as 67.74% (RISKESDAS Team 2019). Based on data from the health office of Pinrang Regency, in 2019 there were 4753 hypertension sufferers (18.02%) and 1586 (6.01%) gout. As for data from medical records in 2020, the number of elderly people in Patampanua District, Pinrang Regency, there are 247 (9.1%) patients with hypertension, there are 206 (7.6%) patients with gout, and in 2021 the number of elderly is 2355, there are 124 people with acid reflux. uric acid (5.3%), and 323 (13.7%) patients with hypertension. In addition, data from the Teppo Public Health Center, Pinrang Regency in 2020, there were 1021 hypertension (22.74%) and 4949 (11.23%). In 2021, it has reached 5525 (22.25%) for patients with hypertension and gout there are 1170 (4.71%).

The nutritional needs of elderly clients need to be met adequately for the continuity of the cell turnover process in the body, overcoming the aging process, and slowing down the occurrence of biological age. Caloric needs in elderly clients are reduced on the basis of calories due to physical activity. Basic calories are calories needed to carry out body activities at rest, for example for the heart, intestines, respiration, kidneys, and others. The caloric needs of elderly clients do not exceed 1700 calories, preferably the normal protein requirements of the elderly are grams/kg BW/day (Nugroho 2008).

Diet can be defined as a pattern of regulating the amount, frequency and type of food containing balanced nutrition in the process of maintaining health, improving nutritional status, and preventing or assisting disease recovery. Foods that contain animal fats should be reduced, such as beef, buffalo meat, egg yolks, brains, and others. Elderly people are advised to consume additional foods that contain lots of calcium (Ca) or lime. The calcium requirement for elderly clients is 14.1 mg/kg BW/day. Iron needs to be given to facilitate blood formation. Administration of sodium salt should be reduced because of the possibility of high blood pressure. Elderly people also need to be given fruits and vitamins. To avoid constipation, elderly clients need to be given enough fiber-containing foods, for example,

The content of nutrients that can lower blood pressure are potassium, calcium, magnesium, fiber and protein. While the nutritional content of vitamin C can reduce uric acid levels. When compared to bananas, the nutritional content of ebi cassava crackers is higher. The calcium content of cassava leaves is 166 mg: banana magnesium is 5 mg, meaning 33.2 times more calcium in cassava leaves than bananas. Cassava leaf magnesium

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262 mg: banana magnesium 27 mg, meaning 9.7 times more magnesium in cassava leaves than bananas. And the content of vitamin C in cassava leaves is 103 mg: vitamin C in bananas is 8.7 mg, meaning that the vitamin C content of cassava leaves is 11.8 times more than bananas.

The problem of hypertension and gout in the elderly is not only caused by a decrease in organ function but also due to the insufficiency of minerals and vitamins that control blood pressure and uric acid, so it is necessary to provide additional food for the elderly. Actually, there is a government program in order to increase the nutritional intake of the elderly, namely the provision of PMT for the elderly, unfortunately it is only done once a month. Meanwhile, to meet the nutritional needs of the elderly, nutritional intake is needed every day. Thus, it is necessary to teach the elderly to fulfill their own nutritional needs. After the research, it is hoped that the elderly will feel the benefits and want to fulfill their own nutritional needs, especially in preventing an increase in blood pressure and uric acid levels.Various studies have proven that nutritional interventions have a blood pressure-lowering effect such as giving tempeh drinks (Ansarullah et al. 2017), giving cassava crackers as much as 25 grams per day for 30 days to reduce blood pressure of pregnant women (Arfiani, Nurlinda & Idris 2020). Based on previous research, it will be tested giving ebi cassava crackers to the elderly who have blood pressure and uric acid problems.

METHOD

Type of Research, Population and Sample

This study uses experimental research methods (Experiment Research), which aims to determine a symptom or effect that arises as a result of certain treatments. The research design used was a quasi-experimental research design (Quasi Experimental). The form of this research design used "Two Group Pretest-Post test" which in this design there is a pretest before being given treatment. Thus the results of the treatment can be known more accurately, because it can compare with the situation before the intervention. The subjects of both groups were given PMT/The experimental group was given ebi cassava crackers for 30 days. The control group was given boiled cassava, both groups were observed and re-measured or post-test.

The population in this study was the elderly who were in the working area of the Teppo Public Health Center, Pinrang Regency. The elderly population who had high blood pressure and uric acid was 95 people. The sampling technique in this study is non-probability, namely purposive sampling, namely sampling based on an assessment of who is eligible to be used as a sample. Determination of sample criteria is very helpful for researchers to reduce bias and research results, especially if confounding variables have an influence on the variables studied. Following the formula for the number of samples according to (Supranto 2000), namely (t-1) (r-1) > 15, where t is the number of treatment groups and r is the number of replications. In this study, samples were taken as many as 60 people, 30 experimental people and 30 control people.

Data collection

The sample was interviewed using the questions in the questionnaire and the answers were written by the researcher on the sheet provided. Blood pressure data was measured using a compass sphygmomanometer and uric acid was measured using a Blood uric acid touch device.

Data Analysis

Univariate and bivariate analyzes (paired sample T-test and Independent T-test) were performed in this study.

RESULTS

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Table 1. Frequency Distribution of Respondents Based on Diastolic Blood Pressure in the Working Area of Teppo Health Center, Pinrang Regency

Diastolic Blood Pressure	Pre-test		Post-test	
	n	%	n	%
Intervention				
Normal	2	6.7	9	30
Light	8	26.7	19	63.3
Currently	14	46.7	2	6.7
Heavy	6	20	0	0
Control				
Normal	0	0	0	0
Light	12	40	13	43.3
Currently	14	46.7	14	46.7
Heavy	4	13.3	3	10
Total	30	100	30	100

Based on the table above, the diastolic blood pressure during the pre-test measurement in the intervention and control groups the majority had moderate diastolic pressure. whereas in the post-test there was a change in diastolic blood pressure in the intervention group to be mild, in the control group there was no change in diastolic blood pressure.

Table 2. Differences in Uric Acid Levels, Posttest Systolic and Diastolic Blood Pressures in the Intervention and Control Group

	Sample Group	N	mean	Sig
Uric Acid Levels (Posttest)	Intervention	30	6.41	0.000
	Control	30	7.02	
Systolic (Posttest)	Intervention	30	141.67	0.000
	Control	30	158.33	
Diastolic (Posttest)	Intervention	30	87.67	0.000
	Control	30	96.67	

Posttest uric acid levels

The opportunity value (p-value) is 0.000 < 0.05 (alpha 5%), meaningthere was a difference in uric acid levels between the control and intervention groups at the posttest, meaning that there was an effect of consuming ebi cassava crackers on uric acid levels during the posttest in the elderly in the working area of the Teppo Public Health Center, Pinrang Regency.

Posttest Systolic Blood Pressure

The opportunity value (p-value) is 0.000 < 0.05 (alpha 5%), meaningThere was a difference in systolic blood pressure between the control and intervention groups at week 4 posttest, meaning that there was an effect of consumption of cassava crackers on systolic blood pressure during the posttest in the elderly in the working area of the Teppo Public Health Center, Pinrang Regency.

Posttest Diastolic Blood Pressure

The opportunity value (p-value) is 0.000 < 0.05 (alpha 5%), meaningthere was a difference in diastolic blood pressure between the control and intervention groups at the posttest, meaning that there was an effect of consumption of cassava crackers on diastolic blood pressure in the elderly in the working area of the Teppo Public Health Center, Pinrang Regency.

DISCUSSION

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Hypertension

Hypertension has risk factors that are divided into 2, namely risk factors that cannot be changed and risk factors that can be changed. Non-modifiable risk factors such as age, gender, heredity. Modifiable risk factors such as obesity, smoking, excessive alcohol and caffeine consumption, excessive salt consumption, stress and balance (Ministry of Health 2018). A relevant study was also conducted by (Sinaga & Arianti 2021). The intervention group was given cucumber juice 2 times a day, morning and evening with a composition of 250 ml of pure cucumber. The results showed that there was an effect of consuming cucumber juice on reducing blood pressure in patients with hypertension. with a p value of 0.000 (p value < 0.05). Previously, research using cucumbers was also carried out by (Kusnul & Munir 2012).

The results of the study are in line with research conducted by (Tjiptaningrum & Erhadestria 2016) that the content of potassium, magnesium, and phosphorus inhibits renin-angiotensin-secreting aldoterone, so that the reabsorption of water and sodium in the kidney tubules decreases or decreases. Then it will increase the secretion of diuresis which serves to regulate osmolarity or fluid balance and urine volume so that blood volume also decreases. In addition, potassium will also cause vasodilation of peripheral blood vessels, resulting in a decrease in peripheral resistance and a decrease in blood pressure. This juice combination also contains very high water around 90% which can function as detoxification because of its diuretic effect. The minerals in cucumbers can also bind to sodium or salt that will be excreted in the urine.

When compared to lemon and watermelon, cucumber infused water is the most effective in reducing hypertension when compared to lemon and watermelon. The results of this study are the same as the results of other studies with a significance of = 0.000; 0.000; 0.000 < 0.05 (26–28). Cucumber contains magnesium, phosphorus, and potassium which are diuretic, potassium is found outside the cells as much as 2% functions as a neuromuscular which affects the heart muscle so that it can lower blood pressure. Anggreni (2020) showed that in the treatment group, most of the respondents had moderate hypertension at the time of initial observation. After giving cucumber juice for 1 week, The results showed that most of the respondents experienced a decrease in blood pressure to mild hypertension with an average blood pressure of 151 mmHg. In the control group, most of them were categorized as moderate hypertension with an average blood pressure of 169.6 mmHg. The results of the Mann Whitney test showed that there was a difference in blood pressure of postmenopausal women between the control group and the experimental group after consuming cucumber juice for 1 week (Z count = -2.762 and p -value = 0.005).

The results showed that cucumber juice consumed regularly for 1 week had an effect on reducing blood pressure in postmenopausal women with hypertension. The results of this study are in line with research conducted by Iswidhani, Luthfiyah & Al-Khair (2014). This study measured the difference in blood pressure of hypertensive patients before and after being given cucumber juice therapy as much as 600 grams with a frequency of 2 times a day for 3 days. The results showed that there was a decrease in blood pressure by patients with hypertension, both systolic and diastolic. Cucumber (Cucumis sativus Linn) is a food ingredient that contains high potassium and low sodium. The content of potassium in cucumber is 122 mg and water is 97.9 grams in every 100 grams of cucumber (Atmarita 2005). Cucumber has the same effect as ACE inhibitor hypertension drugs, to inhibit the protein angiotensin in the blood. If this protein is not inhibited, then this protein can turn into angiotensin II which can cause constriction of blood vessels (vasoconstriction) so that as a result blood pressure will increase. In order to prevent this, you should regularly consume cucumbers for people with high blood pressure.

A study comparing the effects of Cucumber and Watermelon Juice (Marvia, Astuti & Jannah 2018) showed that there was a difference in the effectiveness of giving cucumber juice and watermelon juice in lowering blood pressure in people with hypertension. Cucumber is one of the most widely consumed fruit vegetables in Indonesia in fresh form. Changes in blood pressure also occur after administration of mixed juice therapy consisting of 65 grams of watermelon and 65 grams of cucumber because watermelon and cucumber contain Citrulline and arginine which play a role in the formation of urea in the liver from ammonia and CO2 so that it can cause increased urine output and potassium content that can help work heart and normalize blood pressure (Bjarnadottir, 2015 in Shanti & Zuraida 2016).

This shows that all research uses food ingredients that contain potassium, magnesium, vitamin C, fiber, calcium. Given the mineral content of cucumber, namely potassium, magnesium and phosphorus, and the

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price is still relatively cheap, in order to prevent hypertension, it is recommended that patients drink it every day by choosing cucumber for an alternative to lower blood pressure and stabilize blood pressure while still consulting a doctor.

Uric Acid Level

Gout is also known as gout, while high uric acid is called arthritis gout. Uric acid is the result of the body's metabolism or rather the end result of the catabolism of a substance called purine. Uric acid in the human body is actually something normal. Everyone has uric acid that flows with the blood in the veins, because uric acid is the end result of the body's natural metabolic processes. The human body routinely produces uric acid through the process of catabolism (breakdown) of purines. Therefore, the intake of several types of foods that contain purines also has the potential to trigger increased levels of uric acid in the body. When the intake of purines that enter the body exceeds 15%, there will be a buildup of purines.

If the purine level in the body is too high, then the potential for hyperuricemia or gout also increases and has the potential to cause a buildup of uric acid crystals in certain organs of the body (Damayanti 2013). Normal uric acid levels in human blood are 2.4-6.0 mg/dL for women and 3.0-7.0 mg/dL for men. If the uric acid level in the blood is more than 7.0 mg/dl, then the person is said to have hyperuricemia. This hyperuricemia condition has the potential to cause multiple effects, gouty arthritis is only one of many diseases caused by uric acid deposits in the body. Even the presence of long and persistent high uric acid in the body can cause complications of various dangerous diseases such as kidney disorders, coronary heart disease, and diabetes mellitus (Suriana 2014).

In a study conducted by (Annita, Morika & Sari 2019)regarding the effect of pineapple juice consumption on uric acid levels in gouty arthritis sufferers in the working area of the Lubuk Begalung Health Center. Giving pineapple juice 1 time a day for 14 days. The decrease in uric acid levels in gouty arthritis is due to the pineapple content contained in it, namely the bromelain enzyme which is able to cure gout. Pineapple juice also contains vitamin C and potassium. Vitamin C functions as an antioxidant, which is to protect the body from various diseases. Potassium plays a role in maintaining the health of the body's muscles (Lely 2013). In addition, pineapple contains vitamin B6. Vitamin B6 which serves to help the distribution of water throughout the body. Adequate vitamin B6 is very important to supply fluids (hydration) to the tissues optimally. This method is useful for preventing the deposition of uric acid crystals (Lingga 2012). Every 100 grams of pineapple contains 68 kcal. This fruit contains potassium. Potassium is a mineral that is used for the prevention and treatment of gout (Mia 2013). The results showed that there was an average difference before being given treatment of 8,631 and after being given treatment of 7,181 with a p value of 0.000 where p 0.05, meaning that there was an effect of pineapple juice consumption on uric acid levels in patients with gouty arthritis.

The results of the research according to Kristara 2018, strategies for controlling uric acid levels using soursop juice and pineapple juice in the elderly in Malangan, kel. giwangan, kec. Umbulharjo Yogyakarta. Pineapple contains bromelian enzyme which is a protease enzyme that can break down protein so that it can be used to soften meat. The bromeilan enzyme in pineapple increases blood circulation in the body which makes uric acid crystals more easily decompose so that uric acid levels in the blood can decrease. The difference in decrease in pineapple juice is 0.286, while the difference in soursop juice is 0.22. This shows that pineapple juice is more effective in lowering uric acid levels. The results of statistical test calculations can be concluded that the p-value for pineapple juice is 0.002 ($p<0.05$) and the p-value for soursop juice is 0.015 ($p>0.05$).

According to (Cumayunaro A 2017 in Sya'ban 2021) from the results of his research there was a decrease in uric acid levels after giving boiled water of bay leaves with the finding of the average level of uric acid before giving boiled water of bay leaves 8.317 mg/dl and after giving boiled water of bay leaves 6.825 mg/dl with an average difference of 1.4917 mg/dl. Statistically there was a significant change with a p value of 0.000 ($p < 0.05$). This shows the effect of giving boiled water of bay leaves on uric acid levels in gouty arthritis sufferers.

The results of this study are supported by research conducted by (Andriani & Chaidir 2016) on "The Effect of Giving Boiled Water of Salam Leaves on Reducing Uric Acid Levels", which obtained the average level of uric acid before giving boiled water of bay leaves in arthritis gout patients was 7, 16 mg/dl and giving boiled water of bay leaves in patients with arthritis gout is 5.76 mg/dl with a difference of 1.4 mg/dl with a p value of 0.000.

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The decrease in uric acid levels after administration of boiled water of bay leaves is influenced by the content of flavonoids which are antioxidants that can inhibit the synthesis of xanthin oxidase, so that the formation of uric acid in the body is inhibited and is also influenced by the content of tritepen, polyphenols and alkaloids which are diuretics which produce more urine so that uric acid out through the urine (Suparni & Wulandari 2012)

Based on research conducted by (Hoesny, Alim & Hartina 2018) it was found that there was a decrease in pain experienced by patients with Gout Arthritis or Gout after giving compresses using warm water media which was effective on the gout pain scale. Arthritis or Gout patients who show a significant reduction in the results of warm compresses.

From the results of the study according to (Widiyono, Aryani & Sartagus 2020) stated that there was an effect of uric acid before and after giving the bay leaf stew which was indicated by the paired test value before giving the bay leaf stew the average value was 7.26 and after giving the bay leaf stew the average value was 4.75. with a p-value of 0.001 < . (0.05). This means that the elderly who suffer from gout boiled in bay leaves will be able to reduce uric acid so that uric acid levels will also decrease. The results of this study are in line with previous research conducted by (Ardhiyanti 2013), entitled the effect of giving boiled water of bay leaves (syzgiumolyanthum weight) on reducing uric acid levels with hyperuricemia in Leyengan Village, Ungaran Timur District, Semarang Regency in 2013.

The results of the study (Ndede, Oroh & Bidjuni 2019) stated that consuming bay leaf stew regularly and in accordance with the recommended dose of 200 ml or 1 cup of bay leaf boiled water drunk once a day can reduce uric acid levels in gout arthritis sufferers. Based on research conducted for 7 days by giving bay leaf decoction once a day to each respondent, it can be concluded that consuming bay leaf stew regularly and in accordance with the recommended rules at the time of the study can reduce uric acid levels.

This study is in line with research conducted by (Febriyanti & Andika 2018), entitled the effect of giving bay leaf decoction (Syzigium polyanthum) on reducing uric acid levels in the elderly, the average value of uric acid levels before being given bay leaf decoction is 8, 14 and the average value of uric acid levels after being given a decoction of bay leaves is 4.24 with a p value of 0.000 (<α0.05), which means that giving boiled bay leaves can reduce uric acid levels in the elderly in Kuranji Village, Padang City.

This shows that all studies that use food ingredients containing Vitamin C, Potassium/Potassium and Flavonoids can be an option for gout sufferers to stabilize uric acid levels in the body. As for how to stabilize uric acid by maintaining the right diet, and doing physical activities such as walking, riding a bicycle. By doing physical activity will remove or levels of uric acid in the blood.

CONCLUSION

Based on the results of research on the effect of supplementary food on uric acid levels in the elderly, it can be concluded as follows: 1). There is a difference in systolic and diastolic blood pressure before and after PMT in the elderly in the working area of the Teppo Health Center, Pinrang Regency in 2022. 2). There is a significant effect of PMT on systolic and diastolic blood pressure in the elderly in the working area of the Teppo Public Health Center, Pinrang Regency in 2022. 3). There are differences in uric acid levels before and after giving additional food to the elderly in the working area of the Teppo Health Center, Pinrang Regency in 2022. 4). There is a significant effect of PMT on uric acid levels in the elderly in the working area of the Teppo Health Center, Pinrang Regency in 2022.

SUGGESTION

It is recommended that the wider community, especially the elderly, consume PMT which contains nutrients that can lower blood pressure and uric acid. It is hoped that future researchers can conduct further research by paying more attention to confounding variables that can affect uric acid levels and blood pressure in addition to supplementary feeding.

Declaration of Conflicting Interest

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All authors state that there is no potential Conflict of Interest in this research and article.

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