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Original Research

Decreasing Respiratory rate, blood pressure and pulse after drinking secang in prehypertension patients

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ABSTRACT:

Introduction: In Indonesia, secang wood (*Caesalpinia sappan Linn*) is usually consumed in drinks that are categorized as health drinks. It contains substances that have pharmacological effects such as vasorelaxant. This vasorelaxant can decrease respiratory rate, blood pressure, and pulse. The purpose of this study is to determine the effect of consuming secang drink to respiratory rate, blood pressure, and pulse in prehypertension patients. **Method:** The type of this study was quasi-experimental in 30 respondents who came to the Panyileukan Health center with prehypertension blood pressure. The data obtained were analyzed by using paired t-test with $\alpha = 0.05$. **Result and Discussion:** The results show that the average respiratory rate before and after consuming secang drink was 19.30 (SD:0.99) and 18.02 (SD:0.84) respectively. The average pulse was 79.81 (SD:7.85) and 72.38 (SD:6.26) respectively, and the average systolic blood pressure changes from126.47(SD:4.23)mmHg to 120.13 (SD:4.92)mmHg.The average diastolic blood pressure changes from 83.13(SD:2.25) mmHg to 78.31 (SD:3.01)mmHg. The results of paired t-test showed a significant decrease in respiratory rate, blood pressure, and pulse before and after drinking secang with p-value of 0.00 less than 0.05. **Conclusion:** This study concludes that consuming secang drink can affect the respiratory rate, blood pressure, and pulse measurement in prehypertension patients.

Key words: blood pressure, prehypertension, pulse, respiratory rate

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INTRODUCTION

Secang (Caesalpinia sappan Linn) is a plant that has long been used as a traditional medicine. The active substances in secang are brazilin or brazilein that give red color to secang wood. Brazilin is useful as antioxidant and antimicrobial.[1,2] Brazilinis included in flavonoid compounds that have the ability to inhibit free radicals.[3] Secang has many usage such as anti-bacterial, anti-inflammatory, anti-photoaging, hypoglycemic, vasorelaxant, anti-allergic, and antioxidant.[4] According to a research the vasorelaxant effect of brazilin affects the rat aorta and human umbilical vein endothelial cells. In this research, it was found that brazilin could increase the synthesis of endothelial Nitric Oxide (NO).An increase of NO can cause vasodilatation of blood vessels, which affects the reduction in blood pressure, pulse, and respiratory rate.[5] The purpose of this study is to determine the effect of consuming secang drink to respiratory rate, blood pressure, and pulse in prehypertension patients.

METHOD

The type of this study was quasi-experimental performed to 30 respondents that came to the Panyileukan Health center. The criteria of the subjects: having pre-hypertension blood pressure, no alcohol consumption, no smoking, no drugs consumption that affect blood pressure. Secang drinks made from secang powder packed in sachets (15gram) with175 ml hot water (100^{o}C). First, the secang sachet was soaked in the hot water for 2 minutes, then the sachet was removed and the water will turn red. The water was then left to cool itself. Measurements taken from the subjects before consuming the secang drinks were: respiratory rate, blood pressure, and the pulse. The frequency of the respiratory rate was measured in 1 minute. The blood pressure was measured using an aneroid sphygmomanometer (ABN) and

stethoscope (ABN). The pulse was counted per minute on the radial artery. The subject was ordered to drink 100 ml of the secang drink and was asked to wait 1 hour for the second measurements. Then after 1 hour consuming secang drink, the subject was then measured respiratory rate, blood pressure, and pulse again. The data obtained were analyzed using paired t-test with $\alpha = 0.05$

RESULTS

The minimum age of the subject/respondents in this study was 18 years old. The Characteristics of the respondents based on age are presented in Table 1. The majority of the subjects (9 subjects, 30%) belonged to the age group of 46 to 55 years.

The average respiratory rate, blood pressure, and pulse, before and after consuming secang drinks are presented in Table 2. Statistical testing results show that there are significant differences in respiratory rate, blood pressure, and pulse after consuming the secang drinks, and the results are presented in Table 3,4,5, and 6.

Table 1: Characteristics of respondents based on age

	Age (Year)	Frekuension	Percentage (%)
	19-25	6	20
	26-35	6	20
	36-45	3	10
	46-55	9	30
	>55	6	20
Total		30	100
Mean	42,47		
Median	44,5		

Table 2: Average of respiratory rate, blood pressure, pulse rate, before and after consuming secang drinks

No	Measurement	Average before drinks	Average after drinks
1	Respiratory rate (per minute)	19,30	18,02
2	Systolic Blood Pressure (mmHg)	126,47	120,13
3	Diastolic Blood Pressure (mmHg)	83,13	78,31
4	Pulse Rate(per minute)	79,81	72,38

Table 3: Paired t-test results on the pulse rate before and after consuming secang drinks

Group	N	t-test	t-table	p-value	Sig.
Before consuming secang drinks After consuming secang drinks	30	-6,637	2,045	0,000	.054

Table 4: Paired t-test results on the systolic blood pressurebefore and after consuming secang drinks

Group	N	t-test	t-table	p-value	Sig.
Before consuming secang drinks After consuming secang drinks	30	-11.802	2,045	0,000	.000

Table 5: Paired t-test results on the diastolic blood pressure before and after consuming secang drinks

Group	N	t-test	t-table	p-value	Sig.
Before consuming secang drinks After consuming secang drinks	30	-10.180	2,045	0,000	.000

Table 3: Paired t-test results of respiratory rate before and after consuming secang drinks

Group	N	t-test	t-table	p-value	Sig.
Before consuming secang drinks After consuming secang drinks	30	-10.462	2,045	0,000	.054

DISCUSSION

Secang drinks is a traditional health drink that tastes fresh and is widely consumed especially in of Central Java and Jogjakarta provinces, Indonesia. Secang drinks are derived from secang wood shavings. People can find this drinks in sachets, make it easy to consume. According to a study in the central laboratory of Padjadjaran University, secang drinks contain brazilein and was tested by phytochemical test, brazilein is an oxidized brazilin. The test results show that Brazilin is the highest content in the sample of secang wood shavings.[6] Brazilin has a vasorelaxant effect which can relax the vascular vessels through endogenous NO so that blood vessel dilatation occurs.[4]The subjects are a prehypertension patients who have a systolic blood pressure of 120-139 mmHg or diastolic 80-89 mmHg

According to the results (Table 1), the majority of the patients of the study groups belonged to the age group of 46 to 55 years, and there were 9 patients (30%), with an average blood pressure of 127.04 / 83.93 mmHg. This is related the prevalence of pre-hypertension patients in Indonesia, namely at the age of 45-54 years. Prehypertension is a condition that commonly occurs at various ages, sexes and ethnicities in the world community.[7]The average systolic blood pressure changes from 126.47(SD:4.23) mmHg to 120.13 (SD:4.92) mmHg (Table 2). The average diastolic blood pressure changes from 83.13 (SD:2.25) mmHg to 78.31 (SD:3.01) mmHg after consuming secang drink (Table 2). The results of paired t-test show a significant decrease in blood pressure, p-value of 0.00 less than 0.05 (Table 4 and 5).The decrease in blood pressure is thought to be due to the subject taking secang containing brazilin that has vasorelaxant effect. According to a research, brazilin has a vasorelaxant effect in rat aorta which increases plasma Nitric Oxide synthesis so that it lowers blood pressure.[8]The results on the pulse and respiratory rate, before and after drinking, there were significant differences. The results showed a decrease in pulse and respiratory rate. The average pulse was 79.81 (SD:7.85) change to 72.38 (SD:6.26). Respiratory rate before and after consuming secang was 19.30 (SD: 0.99) per minute and 18.02 (SD: 0.84) per minute respectively. The respiratory system is associated with the cardiovascular system. Decreased blood pressure, pulse, generally will be followed by a decrease in the respiratory rate. This is related to the activity of the sympathetic and parasympathetic nervous system.[9]

In this study secang drinks contains brazilin and brazilein which work as vasorelaxant. Under these conditions the parasympathetic nervous system is actively working and will stimulate a decrease in the pulse and respiratory rate. Decreasing pulse and decreasing respiratory rate can be caused by the smooth flow of blood due to vasodilation so that oxygen needs are fulfillment smoothly. Relaxation conditions reduce respiratory rate.[10] Relaxation conditions cause palpable radial arteries as one indicator of pulse rate. This is an increase in oxygen saturation which causes the fulfillment of oxygen in the body. Fulfilled oxygen needs to facilitate the function of respiration.[10]

CONCLUSION

The conclusion of this study is that consuming secang drink can affect the respiratory rate, blood pressure and pulse measurement in prehypertension patients.

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