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ANALYSIS OF COFFEE CONSUMPTION PATTERNS AS A RISK FACTOR FOR CHRONIC KIDNEY FAILURE IN DR. SOEROTO NGAWI HOSPITAL

Nurul Hidayah

Nursing Academy of Ngawi

Research Report

A B S T R A C T

Introduction: Chronic Kidney Failure (CKD) is a chronic degenerative disease that requires great attention, this is because its incidence continues to increase, and requires very large treatment time and costs. The most effective therapy for chronic kidney failure is the prevention of risk factors, one of which is the habit of consuming coffee that contains high caffeine. Caffeine in coffee can increase renin resulting in increased blood flow and decreased glomerular filtration rate. The aim of this research is to analyzed the pattern of coffee consumption as a risk factor for chronic kidney failure in Dr. Soeroto Ngawi Hospital. ***Methods:*** This research method is correlation with case control approach. The sample in this study consisted of: 34 respondents in the case group, 34 in the control group (sick), and 34 respondents in the control group (healthy). The sampling technique was purposive sampling. Univariate data analysis using descriptive statistics and bivariate analysis using chi square test. ***Results:*** The results of the study that coffee consumption habits affect the incidence of chronic kidney failure with a p value of 0.03 (<0.05). ***Conclusions:*** The habit of consuming coffee affects the incidence of chronic kidney failure.

A R T I C L E I N F O

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**Correspondence:*
Nurul Hidayah

**Email:*
nurulridlo@gmail.com

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INTRODUCTION

Chronic kidney failure is a health problem that continues to increase and requires high costs in the world (Wiliyanarti & Muhith, 2019). Chronic renal failure (CKD) is a condition of long-lasting decline in kidney function (more than 3 months) which has an impact on fluid, electrolyte and other body homeostatic functions. (Lemone, Burke & Bauldoff, 2016; Kardiyudiani & Susanti, 2019). CKD is characterized by a decrease in the glomerular filtration rate which will progress to terminal renal failure (End State Renal Disease) (Tjokroprawiro, 2015).

Data from Global Health Estimates (GHE) states that the prevalence of patients with kidney failure in the world in 2016 was 1,179,839 people, and continued to increase in 2018 by 184,308 people (WHO, 2018). According to data from the Basic Health Research (Riskesdas) in 2018, the prevalence of chronic kidney disease in Indonesia was 713,783 people, and an increase of 213,983 people when compared to 2013 which was 499,800 people. The highest incidence in Indonesia is found in the province of West Java with 131,846 people, while East Java itself ranks second with 113,045 people (Ministry of Health RI, 2018). Based on data from the medical records of Dr Soeroto Ngawi Hospital, in 2019 the number of patients with kidney failure who underwent hemodialysis was 45 people. In an initial survey of 6 CKD patients at Dr Soeroto Ngawi Hospital through interviews, it was found that all of them had a history of consuming coffee with different frequencies, types, doses and length of time consuming coffee.

Many factors cause chronic kidney failure, one of which is a change in a person's behavior or lifestyle. Chang, et al (2013) research on patients who are participating in the Kidney Early Evaluation Program (KEEP) at the National Kidney Foundation Miniapolis shows that the risk factors for chronic and terminal kidney failure are mostly caused by diabetes mellitus and hypertension, both of which occur because of diabetes mellitus and

hypertension. unhealthy lifestyle. Of the several causes of kidney failure, hypertension accounts for the largest role in the occurrence of chronic kidney failure with a total of 19,427 patients (Indonesian Renal Registry, 2018; Siagian & Damayanty, 2018). Chronic kidney failure can also be caused by the habit of consuming energy drinks that are high in caffeine (Kusnadi, 2015). Caffeine in coffee is a compound of xanthine alkaloid 1,3,7-trimethylxanthine which has the effect of increasing renin in the kidneys as a result of adenosine antagonists, resulting in increased blood flow to the kidneys and decreased glomerular filtration rate in the kidneys (Kurniawaty & Insan, 2016: Hayati). Increased blood flow causes the blood vessels in the kidneys to be depressed, if it occurs continuously, there will be damage to the kidneys (Pongsifield, 2016). There has never been a study on the effects of caffeine on human kidneys, but a similar study conducted on wistar rats showed changes in kidney tubules in wistar rats after being given 1.08 ml of oral coffee for 30 days (Gerhastuti, 2009). Given the high prevalence of chronic kidney failure and the habit of consuming coffee in some patients, the researchers are interested in conducting research related to diabetes. The habit of consuming coffee as a risk factor for kidney failure.

MATERIALS AND METHODS

The research design used in this study was a correlation with a case control approach. This study was conducted at RSUD Dr. Soeroto Ngawi from May to June 2020. The study sample consisted of 34 case groups (patients with chronic kidney failure), 34 sick control groups. non-CKD sufferers, and 34 healthy control groups who are in the same area with the patient (patient's family) of 34 people. So that in this study there were 102 respondents. The research data was obtained through questionnaires which were distributed directly to the respondents. Univariate analysis is presented in the form of a frequency distribution, while bivariate analysis uses the chi-square test through the SPSS statistical test.

RESULTS

Table 1**.** Frequency distribution of respondents by gender, age, and education

Characteristics	Frequency							
	Case		Control (healthy)		Control (sick)		Total	
	N=34	%	N=34	%	N=34	%	N=102	%
Gender								
Man	19	55.9	14	41.2	18	52.9	51	50
Woman	15	44.1	20	58.8	16	47.1	51	50
Age								
17-25 Years	0	0	1	2.9	2	5.9	3	2.9
26-35 Years	1	2.9	6	17.6	1	2.9	8	7.8
36-45 Years	0	0	11	32.4	2	5.9	13	12.7
46-55 Years	14	41.2	8	23.5	13	38.2	35	34.3
56-65 Years	15	44.1	7	20.6	7	20.6	29	28.4
Education								
No school	8	23.5	4	11.8	2	5.9	14	13.7
SD	11	32.4	4	11.8	21	61.8	36	35.3
junior high school	4	11.8	7	20.6	4	11.8	15	14.7
high school	9	26.5	17	50.0	4	11.8	30	29.4
College	2	5.9	2	5.9	3	8.8	7	6.9

Based on age characteristics in the case group, most of them were 56-65 years old, namely 15 respondents (44.1%), in the control group (healthy) most of them were 36-45 years old, as many as 11 respondents (32.4%), and the control group. (ill) mostly aged 46-55 years as many as 13 respondents (38.2%).

Table 2. Tabulation Analysis of coffee consumption patterns with the incidence of chronic kidney failure

Characteristics	Frequency								*Sig*
	Case		Control (healthy)		Control (sick)		Total		
	N=34	%	N=34	%	N=34	%	N=102	%	
Coffee history									
Consuming Coffee	29	85.3	18	61.8	25	73.5	75	73.5	0.03
No Consuming Coffee	5	14.7	16	38.2	9	26.5	27	26.5	
Frequency of coffee per day									
1-3 glasses/day	20	58.8	21	61.8	21	61.8	62	60.8	0.038
4-6 glasses/day	7	20.6	1	2.9	3	8.8	11	10.8	
>6 glasses/day	2	5.9	0	0	1	2.9	3	2.9	
Don't drink coffee	5	14.7	12	35.3	9	26.5	26	25.5	
Frequency of coffee per week									
Seldom (1-3 times)	3	8.8	9	26.5	10	29.4	22	21.6	0.001
Often enough (4-6 times)	5	14.7	4	11.8	9	26.5	18	17.6	
Often (>7 times)	21	61.8	9	26.5	6	17.6	36	35.3	
Don't drink coffee	5	14.7	12	35.3	9	26.5	26	25.5	
Type of coffee									
Instant	1	2.9	6	17.6	4	11.8	11	10.8	0.018
Crushed/pure	28	82.4	16	47.1	21	61.8	65	63.7	
Don't drink coffee	5	14.7	12	35.3	9	26.5	26	25.5	
The dose of ground coffee									
1-3 tsp	25	73.5	17	50	21	61.8	63	61.8	0.003
4	3	8.8	0	0	0	0	3	2.9	
Don't drink coffee	6	17.6	17	50	13	28.2	36	35.3	
Instant coffee dose									
0 packs	26	76.5	14	41.2	17	50	57	55.9	0.012
1 pack	3	8.8	7	20.6	8	23.5	18	17.6	
Don't drink coffee	5	14.7	13	38.2	9	26.5	27	26.5	
Long time consuming coffee									
<10 years	4	11.8	8	23.5	16	47.1	28	27.5	0.001
>10 years	25	73.5	14	41.2	9	26.5	48	47.1	
Don't drink coffee	5	14.7	12	35.3	9	26.5	26	26.5	

From Table 2., it can be seen that the statistical test results of coffee consumption history obtained significant results with a p value of 0.03 (p <0.05), which means that there is a relationship between a history of coffee consumption and the incidence of chronic kidney failure.

DISCUSSION

Describe the significance of your findings. Consider the most important part of your paper. Do not be verbose or repetitive, be concise and make your points clearly. Follow a logical stream of thought; in general, interpret and discuss the significance of your findings in the same sequence you described them in your results section. Use the present verb tense, especially for established facts; however, refer to specific works or prior studies in the past tense. If needed, use subheadings to help organize your discussion or to categorize your interpretations into themes. The content of the discussion section includes: the explanation of results, references to previous research, deduction, and hypothesis.

Previous studies discussing the effect of caffeine on human kidney work have never existed, but a similar study conducted on wistar rats showed significant results in the administration of caffeine at a dose of 1.8 ml on changes in kidney histology of wistar rats (Gerhastuti, 2009).

In the statistical test results of the frequency of consuming coffee per day and per week there is a relationship between the frequency of consuming coffee per day or per week with the incidence of chronic kidney failure with a p value of 0.038 (p < 0.05). While the results of statistical tests for consuming coffee per week obtained a p value of 0.001 (p < 0.05). The habit of consuming coffee cannot be separated from the frequency of coffee consumption itself. Where the more often the frequency will affect the caffeine consumed in coffee. In 1 cup of coffee (300 ml) contains 150 grams of caffeine, while according to SNI 01-7152-2006 the maximum limit for consuming caffeine either directly or mixed in food or beverages so as not to disturb health is 150 mg/day or 50 mg/serving (Elfariyanti, 2020). Similar research was also expressed by Ariyanto (2018) which states that someone who has a habit of consuming energy drinks containing caffeine with a frequency of more than 4 times per week has a 2.9 times risk of having chronic kidney disease compared to people who do not consume energy supplement drinks less than 4 times per week. It is recommended to consume coffee within a safe limit of 1 cup per day or the equivalent of 150 mg/day. The recommended weekly frequency limit for consuming coffee is less than 4 times. The more coffee that contains caffeine that exceeds the limit, the more you will be at risk for having chronic kidney failure. 9 times to have chronic kidney disease compared to people who do not consume energy supplement drinks less than 4 times per week. It is recommended to consume coffee within a safe limit of 1 cup per day or the equivalent of 150 mg/day. The recommended weekly frequency limit for consuming coffee is less than 4 times. The more coffee that contains caffeine that exceeds the limit, the more you will be at risk for having chronic kidney failure. 9 times to have chronic kidney disease compared to people who do not consume energy supplement drinks less than 4 times per week. It is recommended to consume coffee within a safe limit of 1 cup per day or the equivalent of 150 mg/day. The recommended weekly frequency limit for consuming coffee is less than 4 times. The more coffee that contains caffeine that exceeds the limit, the more you will be at risk for having chronic kidney failure.

For the type of coffee, significant results were obtained with a p value of 0.018 (p < 0.05). In coffee there is caffeine content in both pure / ground coffee and instant coffee, but the caffeine content in it has different contents. Differences in caffeine content in coffee depend on the type of coffee, the origin of the coffee, the climate in which the coffee is cultivated, and the coffee processing process (Kurniawaty & Insan, 2016). The use of caffeine can have short-term or long-term side effects on body health. Caffeine itself has an adverse effect on the kidneys in the form of an increase in renin as a result of adenosine antagonists, resulting in increased blood flow and decreased glomerular filtration rate (Hayati, 2012). In this case, it can be concluded that there is a relationship between the type of coffee consumed and the incidence of chronic kidney failure.

The results of statistical tests on the dose of brewed coffee consumed with the incidence of chronic kidney failure showed significant results, with a p value of 0.003 (> 0.05). Meanwhile, based on the dose of instant coffee, the p value was 0.012 (< 0.05). Based on the safe consumption of caffeine per day is 100-150 mg. The caffeine content in brewed coffee is higher than instant coffee. It is known that the caffeine content in two teaspoons of brewed coffee is 158 – 254.8 mg while in instant coffee it is 76.4 – 108 mg (Rahajeng, 2010). So for the dose of brewed coffee it is recommended to be less than 2 teaspoons / day or the amount of caffeine that enters the body is less than 150 mg. The more dose of coffee consumed indirectly, the more caffeine is consumed, so that it can have an impact on kidney health.

In the statistical test of consuming coffee, significant results were obtained with a p value of 0.001 (< 0.05). The half-life of caffeine's effect on the body is about 6-7 hours and depends on the response of the individual's body. Increasing the daily dose of caffeine will increase the half-life of caffeine in the body (Saputro, 2016). In this case, it can be concluded that the longer consuming coffee that is high in caffeine can have an impact on the health of the body, this is possible because the dose of caffeine used exceeds the normal limit, so that the dose of caffeine in the body continues to increase along with the length of coffee consumption.

CONCLUSION

In this study it can be concluded: The habit of consuming coffee affects the incidence of chronic kidney failure.

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