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The Correlation of Caffeine and Fizzy Drink Consumption and Bone Mineral Density in Women Fertilizer Age in Pekanbaru City

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Abstract

Osteoporosis is defined as a decrease in bone mass and is characterized by an increased risk of fracture due to bone fragility. Prevention of low bone density can be done by optimizing the formation of bone mass at the time of growth, namely the age of 20-35 years. Research on osteoporosis in Jakarta in 2011 on subjects aged 20-25 years, stated that 6.3% had osteoporosis and 51.1% had osteopenia (pre-osteoporosis). The aim of the study was to identify the correlation of caffeine and soft drinks consumption toward bone mineral density status in women of childbearing age. This study was a quantitative analytic study, with a cross sectional research design. The sample was women of childbearing age who were in the work area of Tampan District as many as 399 people. The Chi-Square test showed the effect of caffeine consumption and soft drinks on the status of bone mineral density in women of childbearing age with a P value of 0.000 < Alpha 0.05 with a large OR of 24,330 (95% CI: 10,174- 58.182), meaning that respondents who consumed caffeine and soft drinks were 24 times more likely to suffer from osteoporosis. It is expected for women to avoid risk factors that can cause a decrease in bone mineral density and perform early detection of osteoporosis before the age of 30 years

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INTRODUCTION

Osteoporosis is defined as a decrease in bone mass and is characterized by an increased risk of fracture due to bone fragility. Prevention of low bone density can be done by optimizing the formation of bone mass at the time of growth, namely the age of 20-35 years.

Lifestyle is one of the important factors for osteoporosis, one of which is the consumption of caffeine and carbonated drinks. 8 Research has shown that high intake of caffeine and drinking can affect urinary calcium expenditure if calcium intake is not sufficient than it should be.

According to the 2013 Basic Health Research, the behavior of consuming caffeinated drinks 1 times a day in Indonesia reached 31.5%.10 Another study stated that in early adult male subjects the habit of consuming coffee was 79.38% consuming 1 cup of coffee, 17.53 % consumed 2-3 cups of coffee, and 3.09% consumed coffee >3 cups.

Based on the results of the White Paper research conducted by the Indonesian Osteoporosis Association (PEROSI) in 2007, the proportion of people with osteoporosis was around 32.3% in women over 50 years old and 28.8% in men. Then the data from the Hospital Information System (SIRS) in 2010 showed that about 200 out of 100,000 cases had an incidence of upper thigh fracture at the age of 40 years due to osteoporosis.

There are several risk factors that cause osteoporosis in women which are divided into two, including factors that cannot be controlled, namely age, gender, genetics, menopause, race, and factors that can be controlled, namely exercise activity, consumption of caffeine and soda, calcium intake, taking corticosteroid drugs, smoking, Body Mass Index, and drinking alcohol.

To prevent osteoporosis, there are several steps that can be taken, namely adequate calcium intake, adequate intake of vitamin D through exposure to the sun in the morning and evening because sunlight will convert pro-vitamin D under the skin into vitamin D, perform physical activity by carrying out stresses on the bones. such as, exercise, walking). In addition, avoid caffeinated drinks, fizzy drinks, alcohol and don't smoke.

METHOD

The design of the study was correlation, with a cross sectional research approach. The population in this study was women who were in the work area of Tampan District, amounting to 101,593 people. The sampling technique used purposive sampling. The sample in this study was women of childbearing age who were in the work area of Tampan District as many as 399 people. The data was collected through structured interviews and checklists to determine the respondents' habits of calcium intake, caffeinated and fizzy drinks. After that, the researcher checked the status of bone mineral density using a densitometer.

RESULT

1. **Univariate Results**

Table 1: Distribution of Frequency and Percentage Based on Characteristics of Respondents

No	Characteristic	Frequency	Percent
1.	**Age (years)**		
	15-19	106	26,57 %
	20-40	**189**	**47,36 %**
	>40	104	26,07 %
	Total	**399**	**100%**
2.	**Last Education**		
	Primary school	-	-
	Junior high school	56	14,03 %
	Senior High School	**177**	**44,37 %**
	College	166	41,60 %

	Total	**399**	**100%**
3.	**Work**		
	Student	29	7,27 %
	College student	122	30,58 %
	Housewife	86	21,55 %
	Work	**117**	**29,32 %**
	No Work	45	11,28 %
	Total	**399**	**100 %**

Based on the age characteristics table above, the majority of respondents aged 20-40 years are 189 people (47.36%), the majority of the latest education are high school graduates, namely 11 people (44.37%) and the majority of respondents are working as many as 117 people (29.32 %).

Table 2: Distribution of Independent Variables in Analytical Quantitative Research on Bone Mineral Density Status in Women of Childbearing Age

Independent Variable	Amount	
	N	%
Consumption of caffeine and soft drinks		
Yes	**333**	**83,5%**
No	66	16,5%
Total	**399**	**100**

Based on the age characteristics table above, the majority of respondents aged 20-40 years are 189 people (47.36%), the majority of the latest education are high school graduates, namely 11 people (44.37%) and the majority of respondents are working as many as 117 people (29.32 %).

2. Bivariate Results

Table 3: Correlation of Independent Variables to Bone Mineral Density Status in Women of Childbearing Age

Consumption of caffeine and soft drinks	**Density Status Bone Minerals**				**Amount**		***P value***
	Osteoporosis		No Osteoporosis		n	(%)	
	n	(%)	n	(%)			
Yes	236	(70,9)	97	(29,1)	333	100	0,00
No	6	(9,1)	60	(90,9)	66	100	

Based on the table. 3 It is known from 333 respondents who consume caffeine and soft drinks, as many as 236 people (70.9) have osteoporosis. From the results of the Chi Square statistical test, it was concluded that the consumption of caffeine and soft drinks had a P value of 0.000 < Alpha 0.05, meaning that it was concluded that there was an influence between the intake of caffeine and soft drinks consumption with the status of bone mineral density. For consumption of caffeine and soft drinks, the P value is 0.000 < Alpha 0.05 with a large OR of 24.330 (95% CI: 10.174-58.182), meaning that respondents who consume caffeine and soft drinks are at risk of developing osteoporosis 24 times.

DISCUSSION

These results, RE Dixon, et.,al , (2010) suggest that caffeine activates K_{ATP} channels in oviduct myosalpinx. Since caffeine abolishes slow waves and associated contractions of the myosalpinx, it would have a negative effect on egg transport through the oviduct and may contribute to the documented delayed conception in women consuming caffeinated beverages.

From the results of the Chi Square statistical test, it was concluded that the consumption of caffeine and soft drinks had a P value of 0.000 < Alpha 0.05, meaning that it was concluded that there was correlation an influence between the intake of caffeine and soft drinks consumption with the status of bone mineral density.

Osteoporosis cannot be completely cured, nor can bone mass be restored to its original state. What can be done is to reduce risk factors to prevent them early. Food regulation has an important role, you should consume foods with balanced nutrition while meeting nutritional needs with elements rich in calcium and low in fat. Caffeine consumption of more than two cups per day is associated with lower bone mineral density (DMT). Then the impact will be greater in women who lack calcium intake. Soft drinks also contain caffeine and phosphorus. Therefore, it is necessary to limit drinks containing caffeine, which is no more than 2 cups per day.

Foods that contain caffeine include coffee, tea, carbonated drinks and chocolate. Robusta coffee and Arabica coffee are types of coffee that are often consumed in Indonesia. Robusta coffee has a higher caffeine content than Arabica coffee, which is 2% by weight of coffee, while Arabica coffee contains 1% of caffeine by weight of coffee. The next highest caffeine content of caffeine is instant coffee and tea around 20-73 mg/100 ml and carbonated drinks which is 9-19 mg/100 ml. In addition to coffee, tea and carbonated drinks, chocolate is also a source of caffeine. Whereas 100 grams of chocolate candy contains around 5-20 mg of caffeine.

It's never too late to adopt a healthy lifestyle. Reducing the consumption of caffeine, soft drinks and alcohol wisely can get better benefits. Caffeinated beverages such as coffee and tea can cause bone loss, brittleness and damage.

Soft drinks contain phosphorus and caffeine. Phosphorus will bind calcium and carry calcium out of the bones, while caffeine can increase the excretion of calcium through the urine. To avoid the danger of osteoporosis, you should consume soft drinks along with drinking milk or consuming extra calcium.

Based on the results of a 2008 study, a bone and calcium biologist conducted by Heany and Rafferty of the Creighton University Osteoporosis Research Center, Nebrasca USA, found that drinking caffeinated beverages such as coffee more than three cups per day causes the body to always want to urinate (pee). This causes a lot of calcium to be wasted in the urine.

The same study on risk factors for osteoporosis was also conducted by Koraag the Geriatrics Polyclinic of RSUP. Dr. Sardjito Yogyakarta in menopausal women who visited the Geriatric Polyclinic aged 50-80 years, the results showed that consuming coffee was associated with the risk of osteoporosis.

High intake of caffeine can increase urinary calcium excretion through a mechanism of decreasing calcium reabsorption in the kidneys, causing a negative calcium balance which will affect bone density. Renal reabsorption. Research has shown that the intake of caffeine contained in 177.5 ml of coffee can increase the excretion of calcium through the urine as much as 4.6 mg/day.

CONCLUSION

Consumption of caffeine and soft drinks affected the status of bone mineral density, namely the effect of consumption of caffeine and soft drinks on the status of bone mineral density in women of childbearing age with a P value of 0.000 < Alpha 0.05. High intake of caffeine and fizzy drinks and balanced with low intake of calcium in women of childbearing age had a negative impact on bone mineral density status.

SUGGESTION

It is expected for women to avoid risk factors that can cause a decrease in bone mineral density and perform early detection of osteoporosis before the age of 30 years and perform physical activities such as exercising regularly to stimulate bone mass formation and help maintain healthy bones, muscles, and joints.

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