The Prevalence of Hyperuricemia and Associated Factors in Depok

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ABSTRAK

Dalam beberapa tahun terakhir telah terjadi peningkatan kejadian hiperurisemia dan hal terakhir ini telah menarik perhatian karena berkaitan dengan penyakit yang berhubungan dengan gaya hidup orang dewasa, bersama dengan hipertensi, diabetes dan dislipidemia. Hasil penelitian terdahulu menunjukkan ada hubungan antara resistensi insulin dan hiperurisemia dengan metabolik sindrom.Belum ada data yang pasti mengenai besarnya angka kejadian hiperurisemia pada masyarakat Indonesia. Penelitian potong lintang ini bertujuan untuk mengetahui prevalensi hiperurisemia dan faktor-faktor yang mempengaruhinya di Kota Depok, Jawa Barat. Penelitian ini merupakan penelitian potong lintang yang dilaksanakan di Kota Depok pada periode bulan Maret 2014 sampai Mei 2014. Sebanyak 70 orang yang memenuhi kriteria inklusi dan bersedia menjadi responden penelitian terlibat dalam penelitian ini.Uji kai kuadrat dilanjutkan dengan analisis multivariat uji regresi logistik dilakukan untuk mendapatkan faktor-faktor yang berhubungan dengan hiperurisemia. Sebanyak 18,6% mengalami hiperurisemia dimana frekuensi yang lebih sering pada laki-laki, usia di atas 50 tahun, pendidikan akhir sekolah dasar, tidak bekerja dan memiliki riwayat mengonsumsi makanan yang mengandung tinggi purin. Analisis multivariat menunjukkan hubungan yang signifikan antara jenis kelamin, usia, pekerjaan dan riwayat konsumsi purin. Oleh karena prevalensi hiperurisemia yang relatif tinggi maka disarankan perubahan perilaku konsumsi makan dan kontrol terhadap kosumsi purin yang dapat meminimalisir terjadinya kondisi ini. Lebih lanjut disarankan untuk banyak minum dan makan buah-buahan, menghindari stress dan melakukan aktivitas fisik secara teratur.

Kata kunci: *asam urat, jenis kelamin, pengetahuan, umur, tingkat pendidikan*

ABSTRACT

In recent years, there has been an increase in the prevalence of hyperuricemia, and the latter has attracted attention as an adult lifestyle-associated disease, together with hypertension, diabetes, and dyslipidemia. Previous study showed there is a strong association between insulin resistance and hyperuricemia and the metabolic syndrome.Until now, there are still no definitive data regarding the prevalence of hyperuricemia in Indonesian.This study aims to estimate the prevalence of hyperuricemia and associated risk factors in Depok City, West Java. This was a cross sectional study design which was held in Depok, West Java on the period of March until May 2014. Seventy respondents with no history of hyperuricemia who fulfilled the criteria and would like to participate in this study were followed up to join this study.Chi-square testand multivariate analysis using logistic regression test were done to obtain associated risk factors to hyperuricemia. About 18.6% subjects presented hyperuricemia,which was more frequent inmales, age ≥50 years old, with elementary school background, not working and had history of purine consumption. In the multivariate analysis, the association was remained significant with gender, age, work status and history of purine consumption. The high level of hyperuricemia prevalence suggests us changingfood consumption and controllingpurine consumption to minimize the occurrence of this condition. Moreover, we recommend drinking a lot of water and eating fruits, avoiding stress and doingregular light exercise or perform physical activities.

Keywords: uric acid, purin, gender, knowledge, age, level of education

Introduction

The increasing frequency of hyperuricemia and gout are most likely caused by westernized lifestyle and environment.Hyperuricemia often accompanies metabolic syndrome, hypertension, diabetes, dyslipidemia, chronic renal disease, and obesity, and the serum uric acid level is known to vary significantly depending on meals, lifestyle, gender, and previous use of diuretics. [1]

There are no definitive data regarding the prevalence of hyperuricemia in Indonesian. This is because Indonesia consists of various tribes; therefore, the prevalence rate was so varied among regions.The incidence of hyperuricemia is estimated around 2.3 -17.6%; while, the incidence of gout is varied between 0.16 to 1.36%. The results showed that the prevalence of hyperuricemia in Central Java were 24.3%in male and 11.7% female. In USA, the prevalence of asymptomatic hyperuricemia in the general population is approximately 2-13%. [2]

Hyperuricemia people have high level of uric acid in the body. Several people underestimate the hyperuricemia due to the lower burden consequences than other diseases, such as heart disease and stroke.[3]According to previous study, hyperuricemia is associated with various chronic diseases, such as arterial hypertension, cardiovascular diseases, obesity, dyslipidemias, diabetes mellitus, metabolic syndrome, gout, and some neoplasms which can increase the risk of death. Gout is a rheumatic disease characterized by the deposit of sodium monourate in the joints and periarticular tissues, and it is one of the main diseases resulting from hyperuricemia. Individuals with gout disease have low quality of life resulting from activity-limiting symptoms,namely intense pain and inflammation of the affected joints. [4]

Uric acid is a final metabolite of purine metabolism in humans. Although many mammals such as rats have uricase, an enzyme that degrades uric acid into allantoin, humans lost uricase during the course of evolution. As a result, uric acid tends to accumulate. Naturally, there purines in the body and the purine can be found in all forms of food from living cells, for example plant (vegetables, fruits, nuts) or animal sources (meat, offal, sardines).[1,5]

In general, more men have higher level uric acid and it increases appropriate to the increasing age. While,women a little bit less to suffer from hyperuricemia due to the estrogen protective hormone. Estrogen helps the body to remove uric acid through

urine.While in men, uric acid tends to be higher than women because they do not have estrogen. Normal levels of uric acid in serum: women: 2.4 - 6 mg / dL, Men: 3.0 - 7 mg / dL of clinical experience, usually without symptoms: <5 mg / dL.[6]

Hyperuricemia, usually defined as a serum urate (SU) level >7 mg/dL, may be present in up to 18% of some populations.[7]Hyperuricemia can be caused by overproduction of urate, or, far more commonly, by inefficient excretion by the kidney. The level of SU may also increase with aging and weight gain.[8-10] At least two third of patients with hyperuricemia can be expected to remain asymptomatic, and current evidence does not support treating asymptomatic hyperuricemia.[11-15]

Depok City is one of the main city in Central Java which growing rapidly. This situation could influence the environtment and the lifestyle. Based on study in Depok City, there is an increasing of adult lifestyle-associated disease. There is a strong association between insulin resistanceand hyperuricemia and the metabolic syndrome. Previous study showed the prevalence of metabolic syndrom in Depok City remained 23.8%. Therefore, this study aims to estimate the prevalence of hyperuricemia and associated risk factors in Depok City, West Java.[16,17]

Methods

The design of this study is a quantitative analytical research using *cross sectional* research design. The population in this study were the people who live in the Pancoran Mas Village, Pancoran Mas subdistrict, Depok. Sampling was done with sample size of 70 people with the criteria respondents aged 25-70 years, not obese and do not suffer from disease (gout, history of hypertension, kidney disorders, intestinal disorders, heart disease and lung cancer)and willing to be a respondent.

Uric acid levels is the amount of uric acid levels in the blood after calculated using rapid test digital uric acid which is expressed in units of mg / dl. Divided into two categories, namely hiperuricemia (examination showed results above 7.0 for women and 6.0 for men) and in the category of normal range (examination of the results showed less than 7.0 for women and 6.0). Purine consumption is consumption of food that is eaten every day in this high purine-containing foods (eg seafood, meat, bowel, chips, durian, avocado, butter / fried). Age is divided into two categories, the first age less than 50 years representing the younger group. Both age above 50 years old group

represents.Chi-square test and multivariate analysis using logistic regression test were done to obtain associated risk factors to hyperuricemia.

Results

Table 1 shows that the majority of respondents were female. Most respondents education is elementary school, not working, has good knowledge on nutrition and more than 40 percent has history of purine consumption.

Table 1. Characteristics of the subject

Variable	Category	n (%)
Age	Less than 50 years	43 (61.4)
	50 years and over	27 (38.6)
Gender	Male	15 (21.4)
	Female	55 (78.6)
Level of education	Elementary school	45 (64.3)
	Junior and high school	18 (25.7)
	Higher education	7 (10.0)
Work status	Working	10 (14.3)
	Not working	60 (85.7)
Nutritional knowledge on hyperuricemia	Poor	23 (32.9)
	Good	47 (67.1)
History of purine consumption	Yes	29 (41.4)
	No	41 (58.6)

Table 2. Bivariat analysis correlation risk factors with hyperuricemia, Depok

Variables	Uric Acid		*P value*	*OR*	*95% CI*	
	Normal (%)	Hyperuricemia (%)			Min	Max
Age (years)						
Less than 50 years	38 (88.4)	5 (11.6)	0,117	3.2	0.92	11.12
50 years and over	19 (70.4)	8 (29.6)				
Gender						
Male	9 (60.0)	6 (40)	0.026 *)	0.22	0.059	0.80
Female	48 (87.3)	7 (12.7)				
Level of education						
Elementary school	36 (80)	9 (20)	0.566			
Graduated from junior high / high school	16 (88.9)	2 (11.1)		0.5	0.097	2.58
Higher Education	5 (71.4)	2 (28.6)		1.6	0.27	9.63
Working status						
Working	4 (40)	6 (60)	0.002 *)	0.088	0.020	0.39
Not working	53 (88.3)	7 (11.7)				
History of purine consumption						
Yes	22 (75.9)	7 (24.1)	0,242	1.59	1.23	2.05
No	35 (85.4)	6 (14.6)				
Nutrional knowledge on hyperuricemia						
Poor	21 (91.3)	2 (8.7)	0.196	0.54	0.16	1.81
Good	36 (76.6)	11 (24.4)				

*): Significant, α = 5%

Table 3 Multivariateanalysis of logistics regression (final model)

Variables				95% C.I.for OR	
	B	P value	OR	Min	Max
Work status (working)	-3.892	*0.002*	0.020	0.002	0.243
Age (more than 50 years)	0.065	*0.074*	1.068	0.994	1.147
History of purin consumption (no)	-3.508	*0.012*	0.030	0.002	0.461
Constant	-0.716	0.685	0.489		

Bivariate analysis

Bivariate analysis showed that gender (male) and working status (working) had relationship with hyperuricemia. However there aren't relationships between age, level

of education, history of purin consumption and knowledge on nutrional with hyperuricemia.

Multivariate analysis

The multivariat analysis shows that work status, age and purin consumption were related with hyperuricemia.

Discussion

In this study, respondents who suffer from hyperuricemia in the Village Pancoran Mas, Depok was 18.6%. This finding was similar with other study in Indonesia. The prevalence of hyperuricemia in Legian Kuta, Bali in 2008 was 16.9%. Moreover this figure is similar to previous studies in other areas of Bali. Like a preliminary study in the village of Sembiran with 18.2%, the research on the island of Bali Ceningan with 17%, research in Denpasar with 18.2%, whereas in the Ubud area is around 12% and the village of Tenganan Pegrisingan Karengasam 2008 of 18.63%. More over, research in the rural population in Central Java, found the prevalence of hyperuricemia was 24.3%.[6]

The results showed that age does not significantly affect prevalence of hyperuricemia. This finding similar with study byAndry, et al. in 2009, there was no significant relationship between ages less than 50 years with respondent's ≥ 50 years with hyperuricemia. It is known that the enzyme that oxidizes uric acid urikinase be alotonin throwaway decreases with increasing one's old age. If the formation of this enzyme disrupted the blood uric acid levels to be increased. [18,19]

Kuzuya, et al. on 50,000 men and 30,000 women in Japan nonhiperuricemia who received the annual examinations at the health authority from 1989 to 1998 found that after some time the serum uric acid increased in all groups, but the men who were born later (younger) hadhigher levels of uric acid in men older. The study also proves that there are always people who are older tend to have high levels of uric acid are higher.[20]

The results showed that gender has a significant relationship to the occurrence of hyperuricemia, it is due to the influence of hormones in this the female which called estrogen. Uric acid levels begin to rise during puberty in men but women remain low until menopause due to the effects of estrogen urikosurik. In the human body there are

enzyme urate oxidase or urikase that will oxidize uric acid into allantoin. Urikase deficiency in humans will lead to high levels of uric acid in serum. [21]

The results of the analysis between level of education and hyperuricemia revealed that there is no significant relationship between the level of education and hyperuricemia.

The results of the analysis of the working status with the incidence of hyperuricemia can be concluded that there is a significant relationship between working status withhyperuricemia. This finding similar with the research conducted by Andry et al (2009) that many office workers suffering from hyperuricemia which amounted to 60%. Krisnatuti et al (1997) said that one of the causes that affect uric acid levels is a sport or physical activity.[19,21]

The results purine intake history can be concluded that the respondents consume as much as 24.4% purine suffering from hyperuricemia compared with those who did not consume purin (8.7%).From the chi square test there is no significant relationship between a history of consumption of purine with hyperuricemia. This finding similar with study conducted by Andry, et al (2009) showed from 30 people who have uric acid levels above normal, 27 (90%) consume foods high in purines. While the results of bivariate analysis using chi square test P = 0.071 obtained. This shows that consumption did not significantly influence the levels of uric acid in the office workers in the village of Karang Turi Brebes Brits districts.[19]

However in the multivariate analysis, the association was remained significant with gender, age, work status and history of purine consumption. Research conducted by Choi et al (1998) found that consumption of purines contained in meat and seafood related to the risk of elevated uric acid levels, then dairy products may lower risk of gout and purine consumption of plant origin does not affect the risk of gout.In general, respondents in the study consume all the foods that contain high levels of purines either of animal origin, including meat and milk are also from plants. According Sustrani et al (2004) the consumption of complex carbohydrates such as rice, bread, sweet potato and cassava can spur disposal of excess uric acid in the blood. [18]

According to previous studies, some foods canhelp increase or decrease the serum uric acid levelsdepending on their purine content. Thereis still little information on the

exact amount ofpurines contained in foods, since their contentand availability depend on the food processing procedures, among other factors. [22]

This research suggested modifiable risk factors for hyperuricemia, such as control of high purin consumption, multiply drinking water and eating fruits that contain fluid; avoiding stress and regular light exercise or perform physical activities. For future study, it is sugessted to carry out further research and make a more in-depth research and broader about factors that influence the prevalence of hyperuricemia.

Conclusion

About 18.6% of the subjects presented hyperuricemia,which was more frequent inmales, age ≥50 years, with elementary school background, not working and has history of purin consumption. In the multivariate analysis, the associations remained significant with gender, age, work status and has history of purin consumption. The high hyperuricemia prevalence suggests that changes in nutritional profile and control of high purin consumption could help minimize occurrence of this condition. More over multiply drink water and eat fruits that contain fluid and the low purine diet, avoid stress and regular light exercise or perform physical activities. For next researcher, it is sugessted to carry out further research and make a more in-depth research and broader about factors that influence the incidence of hyperuricemia.

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Conflict of Interest

The authors affirm no conflict of interest in this study.

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