Association Between Body Mass Index and Severity of Androgenic Alopecia in Men

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Abstract

Background: Androgenic alopecia is the most common type of hair baldness in men. Obesity is a risk factor that can cause androgenic alopecia. Until now the relationship between body mass index (BMI) and the severity of androgenic alopecia is still controversial. Aim: This study aimed to determine the association between BMI with the severity of androgenic alopecia in men. Methods: The study was analytic observational with cross-sectional design. The sample is men who are suffering from androgenic alopecia in the working area of the Sukaramai Community Health Center. Consecutive sampling was used to collect samples. Chi square analysis results are significant if the p value is < 0.05. Results: A total sample of 66 subjects was obtained in the form of 49 samples (74.2%) with mild and moderate severity of androgenic alopecia and 17 samples (25.8%) with severe androgenic alopecia severity. Characteristics of research subjects with the largest population based on age range, BMI, education level, and risk factors respectively were 46-55 years (33.3%), normal BMI (57.6%), high school / equivalent (51.5%), and family history (42.4%). Chi square analysis results showed no relationship between BMI and the severity of androgenic alopecia in men (p = 0.242). Conclusion: There is no association between BMI and the severity of androgenic alopecia in men.

Keywords: androgenic alopecia, body mass index, men

I. Introduction

Androgenic alopecia is the most common type of hair baldness in men that causes poor self-image, low self-esteem and significant negative impact on a person's quality of life so that most of them seek both alternative medicine and medical treatment.[1] At least 80% of Caucasian men will show the incidence of androgenic alopecia at the age of 70 years.[2]

Based on studies on the prevalence of androgenic alopecia in China, 21.3% of men suffer from androgenic alopecia with the highest prevalence found in men over 70 years of age.[3] One of the most common factors that causes androgenic alopecia is family history with a predisposing factor of 80%.[4] The severity and early onset of androgenic alopecia are more common in men who have a family history of androgenic alopecia. There is other risk factors that also cause androgenic alopecia including smoking, alcohol use, hypertension, obesity, and age.[5,6]

Men who suffer from obesity will cause an increase in androgenic alopecia more often than men with a normal body mass index (BMI).[5] However, some studies show no association between increased BMI and the incidence of androgenic alopecia.[7] Because the result of the studies are still controversial and data regarding androgenic alopecia are still lacking in Indonesia, researchers want to examine whether there is an association between BMI and the severity of androgenic alopecia in men.

II. METHODS

The study design was observational analytic with cross-sectional design. The study was conducted at the Sukaramai Health Center. The samples in this study were men who suffer from androgenic alopecia with consecutive sampling data selection method. The dependent variable was the severity of androgenic alopecia and the independent variable was the BMI of subjects suffering from androgenic alopecia.

The study subjects were excluded if under 18 years of age, did not meet the criteria for androgenic alopecia according to the Norwood-Hamilton Scale, had BMI <18.5 kg/m^2, were taking drugs containing finasteride and minoxidil, and had had a hair transplant. The study was conducted after obtaining approval from the ethics committee regarding the implementation of health research NO: 40/TGL/KEPK FK USU-RSUP HAM/2018. Data collection was carried out after the subject agreed to inform consent. History taking was taken to exclude the exclusion criteria. After the subject criteria are met, data collection is conducted in the form of interviews using research status and research questionnaire. Subject's body weight and height were measured using a body scale and a height gauge which are validated. The type of baldness of the subjects was measured using the Norwood-Hamilton Scale.[8,9]

Risk factors such as family history, hypertension, smoking, and type 2 diabetes melitus were collected through history taking. Family history was defined as subejct's father suffering from androgenic alopecia. Hypertension was defined as subject was diagnosed

by doctor suffering from hypertension. Smoking was defined as subject smoked more than 100 cigarettes in the past 6 months. Type 2 diabetes melitus was defined as subject was diagnosed by doctor suffering from type 2 diabetes mellitus.

Chi square was used to analyze data. Data are grouped into two groups. Subject BMI was divided into normal BMI (18.5-25.0 kg/m^2) and obese BMI ($\geq$25.1 kg/m).[18] The severity of androgenic alopecia was divided into mild-moderate (Norwood-Hamilton grade I-IV) and severe (Norwood Hamilton grade V-VII). In addition, data in the form of age, BMI, education level, and risk factors[3-5,14,16] obtained through interviews are presented in the form of frequency. Association between risk factors and the severity of alopecia androgenic are also analyzed using Chi square. In this study, the value of p <0.05 was considered significant. Data were prosessed using SPSS computer program.

III.   RESULTS

There were a total of 66 subjects collected from October 2018 to November 2018. The number of subjects with mild and moderate severity of androgenic alopecia were 49 subjects (74.2%) and 17 subjects (25.8%). Subjects with normal BMI were 39 subjects (59.1%) and obese BMI were 27 subjects (40.9%). The highest age range was in 46-55 years (early elderly), namely 22 subjects (33.3%). The highest level of education is high school / equivalent of 34 subjects (51.5%). Risk factors found which were family history, hypertension, smoking, and type 2 diabetes mellitus were 28 (42.4%), 11 (16.7%), 27 (40.9%), and 3 (4, 5%) (Table 1).

Tabel 1. Data Characteristics of Alopesia Androgenik responden.

Characteristics	n	%
Grade severity :		
Mild-moderate	49	74,2
Severe	17	25,8
BMI :		
Normal (18.5-25.0 kg/m^2)	39	59,1
Obese (>25.0 kg/m^2)	27	40,9
Agre range :		
17-25 age (late adolescent)	0	0
26-35 age(early adulthood)	8	12,1
36-45 age (late adulthood)	16	24,2
46-55 age (early erderly)	22	33,3
56-65 age (late erderly)	16	12,1
>65 age (seniors)	4	6,1
Level of education :		
Primary school/equivalent	5	7,6
Junior high school/equivalent	12	18,2
High school/equivalent	34	51,5
College	15	22,7
Risk Factors :		
Family History	28	42,4
Hypertension	11	16,7
Smoking	27	40,9
Type 2 diabetes mellitus	3	4,5

The results of the SPSS analysis showed no association between BMI and the severity of androgenic alopecia in men (p = 0.242). The results of cross tabulation calculations can be seen in table 2. The results of cross tabulation showed no association between risk factors and the severity of alopecia androgenic in men. The association between risk factors and mild-moderate vs. severe are family history 18 v 10 (p = 0.112), hypertension 9 v 2 (p = 0.529), smoking 23 v 4 (p = 0.91), and type 2 diabetes melitus 2 v 1 (p = 0.759). The results of analysis can be seen in table 3.

Table 2. Analysis of the association between BMI with the severity of androgenic alopecia in men.

		Grade severity of androgenic alopecia		P value*
		Mild-moderate	Severe	
BMI	Normal	31	8	0.242

Obese	18	9

*Analyzed using Chi's square method

Table 3. Analysis of the association between risk factors with the severity of androgenic alopecia in men.

Risk Factor	Grade severity of androgenic alopecia		P value*
	Mild-moderate	Severe	
Family History	18	10	0.112
Hypertension	9	2	0.529
Smoking	23	4	0.91
Type 2 diabetes melitus	2	1	0.759

IV. DISCUSSION

The studies that study the relationship between BMI and the severity of androgenic alopecia in men are still limited. There are studies that find a significant relationship and some also find a relationship that is not significant. Some studies found that there are no significant relationship between BMI and the severity of androgenic alopecia. Su and Chen[10] found that the increased severity of androgenic alopecia was not associated with an increase in BMI ($p = 0.63$, $n = 740$). Then the study was conducted by González-González et al.[7] found that there is no significant relationship between IMT and subjects with androgenic alopecia (28.7 kg/m^2, $n = 80$) with IMT on a healthy subject (27.3 kg/m^2, $n = 80$). Nabaie et al.[19] comparing men with early onset of androgenic alopecia ($n = 97$) with men without androgenic alopecia ($n = 87$) who both had BMI above 30 kg/m^2 did not show a significant relationship ($p <0.62$). While the research conducted by Yang et al.[5] states that there is a significant relationship between BMI and the severity of androgenic alopecia ($p <0.01$).

Until now there has been no study that could explain the relationship of BMI with androgenic alopecia in men. Possible related explanations are the pathophysiology of androgenic alopecia in which an increase in dihydrotestosterone levels is triggered by an increase in the level of 5α-reductase type II in men.[11,13,14] The cause of the increase in type II 5α-reductase which is known to date is insulin resistance. Insulin resistance is thought not to occur in the subject of this study. Another possibility is an increase in the hormone itself, dihydrotestosterone. The increase in testosterone also affects the levels of dihydrotestosterone. But the fact is that testosterone and dihydrotestosterone levels are actually low / normal in obese men.[11,12]

We also suggest that each risk can not contribute alone in increasing androgenic alopecia severity. But the family history itself can determine the severity of androgenic alopecia[6] although it was not significant. Some subjects with negative results of fathers who suffer from androgenic alopecia reported have positive results of maternal androgenic alopecia grandfathers. This concludes that mothers carry the career genes of androgenic alopecia. Other risk factors such as smoking also doesn't contribute alone in increasing the severity of androgenic alopecia. We also found that some of the quitted-smokers and non-smokers also have a high severity of androgenic alopecia.[20,21] This concludes that each of the risk factors can't contribute alone in increasing the severity of androgenic alopecia.

V. CONCLUSION

No association between body mass index and severity of androgenic alopecia in men. We hope further research able to explain the relationship between BMI and the severity of androgenic alopecia in men. Family history alone maybe can contribute alone in increasing the severity of androgenic alopecia, but obesity and other risk factors can contribute together to increase the severity of androgenic alopecia.

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