

6-30-2023

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Recommended Citation

Sugma, Lidya Aprilia; Yenny, Satya Wydy; and Rasyid, Roslaili (2023) "An overview of risk factors for androgenetic alopecia among women at Pasar Ambacang, Kuranji, Padang," *Journal of General - Procedural Dermatology & Venereology Indonesia*: Vol. 7: Iss. 1, Article 4.

DOI: 10.7454/jdvi.v7i1.1138

Available at: <https://scholarhub.ui.ac.id/jdvi/vol7/iss1/4>

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An overview of risk factors for androgenetic alopecia among women at Pasar Ambacang, Kuranji, Padang

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Abstract

Background: Androgenetic alopecia (AGA) is a patterned hair loss due to chronic and progressive miniaturization of hair follicles. Hair represents femininity and self-confidence in women. Therefore, AGA may affect the quality of life and psychology in women. This study aims to describe the risk factors for AGA in women living in Pasar Ambacang Sub-district, Kuranji District, Padang City.

Method: This was a descriptive, cross-sectional study that included 40 women with AGA. Interviews with subjects were conducted. This study was approved by the Health Research Ethics Committee at Universitas Andalas (252/UN.16.2/KEPK-FK/2021)

Results: AGA was mostly found on patients aged >65 years old (32.5%), married with childbearing (87.5%), overweight (32.5%), had a family history of AGA from the patient's father (57.5%), and a family history of AGA from the patient's mother (75%). According to their medical history, respondents mostly had no hypertension (65%), type-2 diabetes mellitus (DM) (92.5%), and polycystic ovarian syndrome (PCOS) (100%). Most respondents had menarche at <16 years old (95%), regular menstrual cycles (95%), and were non-menopausal (67.5%). The most common type of AGA was the type I Ludwig Classification (67.5%).

Conclusion: Among women, AGA mostly occurred in patients with the following conditions: aged >65 years old, overweight, married with childbearing, had menarche at <16 years old, regular menstrual cycles, non-menopausal, and paternal or maternal history of AGA. AGA risk factors, such as hypertension, DM, and PCOS, were slightly found. The most common type of AGA was the type I Ludwig Classification.

Keywords: *androgenetic alopecia, risk factor, women*

Background

The precise prevalence of androgenetic alopecia (AGA) is unknown, but it can be affected by race, ethnicity, and gender.¹ AGA was more common in men (50%) than women (19%) and was found to be higher in the Caucasian race.² Only few data on AGA incidence in Indonesia exist. Based on a study conducted on alopecia patients at Dr. Cipto Mangunkusumo Hospital, Jakarta, in 2009-2011, it was found that 11.2% had AGA.³ A research conducted at Dr. Soetomo Hospital Surabaya, in 2009-2011, found that the incidence of AGA was 54.9% in men and 45.1% in women.⁴

The prevalence of AGA increases with age, with hair

thinning beginning as early as during puberty.¹ A study by Kubra et al. on 1006 Caucasian women found that the incidence of AGA in women begins in the late 20s and peaks at over 50 years of age. AGA is not a dangerous and life-threatening disease, but it can affect the patient's self-confidence, self-image, and overall quality of life.⁵ Hair represents femininity and self-confidence in women, so women with AGA have a worse quality of life and psychological impact than men.^{5,6} This causes the incidence of AGA in women requiring careful evaluation and management so they can use hair cosmetics safely.⁷

The prevalence of AGA can be affected by various risk factors. The most common comorbidity associated with AGA in women is a history of

polycystic ovary syndrome (PCOS). A metabolic syndrome characterized by obesity, insulin resistance, and hypertension is also associated with an increased incidence of AGA in women.⁸ In addition, body mass index (BMI), family history, age at menarche, fasting blood glucose, number of births, contraceptive use, menstrual cycle, menopause, and sun exposure in women can also affect the incidence of AGA.⁹ Research on the effect of these risk factors toward the incidence of AGA in women found conflicting results.

Pasar Ambacang Sub-district, an area of 5.03 km² and one of nine sub-districts located in Kuranji District, Padang City, West Sumatra, ranks the third district with the highest female population in Kuranji, according to the Central Statistics Agency for the City of Padang in 2018. The most common age group in this area is 20-24 years old, the common onset of AGA. This sub-district is also known for the highest number of people aged 50-54, the peak age for AGA incidence. Based on the number of patient visits at the Pasar Ambacang Health Center, hypertension, one of AGA risk factors, was the most common disease the community suffers.¹⁰ Until now, there has been no research related to the incidence of AGA in Padang City, West Sumatra. This research was conducted on women in one sub-district in the city of Padang to limit the population and area coverage. The researchers aimed to describe the risk factors for AGA in women at Pasar Ambacang Sub-district, Kuranji District, Padang.

Methods

This was a descriptive, cross-sectional study, conducted at Pasar Ambacang, Kuranji, Padang. The population is all women in Pasar Ambacang. The sample in this study were all members of the population who met the inclusion and exclusion criteria. The inclusion criteria were women living in Pasar Ambacang who were diagnosed with AGA with anamnesis and clinical manifestations. This pattern of hair loss is classified according to the Ludwig Classification.¹¹ The exclusion criteria were respondents aged <18 years old, currently or have ever used drugs to treat hair loss/thinning/baldness, living with cancer or currently using anticancer drugs, patients with alopecia areata, thyroid disease, or the subject refuse to be a respondent in the study. The number of samples in this study were 40 with minimum total sample were 39 based on the categorical descriptive minimum sample

formula, achieved through a consecutive sampling technique. This study used primary data from interviews. This study classifies BMI based on the Asia-Pacific BMI classification. AGA was defined in the history of father if it is known has a Hamilton-Norwood Scale and mother has a Ludwig Classification. Hypertension, type 2 DM, PCOS was defined if sample had been diagnosed by a doctor or currently being treated. The data was then analyzed using univariate analysis to determine the frequency distribution and percentage of each variable. This research was approved by Health Research Ethics Committee – Universitas Andalas (ethical approval number: 252/UN.16.2/KEPK-FK/2021).

Results

The frequency distribution of risk factors for AGA among women in this study can be seen in table 1. Most respondents aged >65 years (32.5%). The respondents were primarily married childbearing (87.5%). Thirteen (32.5%) subjects were overweight. The numbers, of patients with history of AGA in their father and mother were 23 (57.5%) and 30 (75%), respectively. Based on their medical history, most respondents had no hypertension (65%), type 2 diabetes mellitus (92.5%), and PCOS (100%). Almost all respondents experienced menarche at the age of <16 years (95%) and had regular menstrual cycles (95%). Most of the respondents were non-menopausal (67.5%). The frequency distribution of the type of AGA can be seen in table 2. The most type of AGA was type I Ludwig Classification.

Discussion

Androgenetic alopecia (AGA) is the most common type of patterned hair loss due to chronic and progressive miniaturization of hair follicles.¹² AGA can be caused by hormonal imbalances, genetics, and other risk factors.^{12,13}

AGA can occur in men and women with different clinical manifestations. The type of hair loss in men is characterized by thinning of hair in the bitemporal and vertex areas, which are classified according to the Norwood-Hamilton Scale. The type of hair loss in women is characterized by diffuse thinning of hair with minimal or non-thinning in the bitemporal area.

Table 1. Frequency Distribution of Risk Factors for Androgenetic Alopecia Among Women in Pasar Ambacang, Kuranji, Padang (N=40).

Risk Factor	Frequency (n)	Percentage
Age (years)		
17-25	2	5%
26-35	1	2,5%
36-45	9	22,5%
46-55	7	17,5%
56-65	8	20%
≥65	13	32,5%
Marital status		
Single	2	5%
Married without childbearing	3	7,5%
Married with childbearing	35	87,5%
Body mass index		
Underweight	8	20%
Normal	12	30%
Overweight	13	32,5%
Obese I	4	10%
Obese II	3	7,5%
History of androgenetic alopecia in father		
Yes	23	57,5%
No	17	42,5%
History of androgenetic alopecia in mother		
Yes	30	75%
No	10	25%
History of hypertension		
Yes	14	35%
No	26	65%
History of type 2 diabetes mellitus		
Yes	3	7,5%
No	37	92,5%
History of polycystic ovary syndrome		
Yes	0	0%
No	40	100%
Menarche (years)		
<16	38	95%
≥16	2	5%
Menopause		
Yes	13	32,5%
No	27	67,5%

N = total frequency

Table 2. Frequency Distribution the Type of Androgenetic Alopecia Among Women in Pasar Ambacang, Kuranji, Padang (N=40).

Ludwig Classification	Frequency (n)	Percentage
Type I	27	67,5%
Type II	11	27,5%
Type III	2	5%

N = total frequency

This study, most women with AGA in Pasar Ambacang, Kuranji, Padang aged > 65 years old (32.5%). The prevalence of AGA is known to increase with age. This is in accordance with the research in the United States on 377 women aged 18-99 only about 6% of the subjects were diagnosed with AGA under 50 years old and 38% above 70 years old.¹⁴ The overall mean incidence of AGA in white women is 19%, with the incidence being 3%, 17%, and 23% among women aged 20-30 and 50 years old, respectively.¹⁵

However, less percentage results were found in a study in Taiwan. The prevalence of AGA was 13% in the 60-69 age group and about 15% in > 69 age group.¹² Indonesia has a higher temperature than Taiwan so can increase scalp moisture, which results in increased hair loss.^{16,17}

Most respondents (87.5%) in this study were married, similar to a study in Turkey, which found that 71.42% of AGA respondents were married.¹⁸ Slightly different results were found in China, where only 26% of research participants are married and childbearing.¹⁹ This might be due to the difference in the average age of marriage between Indonesia (19-21 years old) and China (28.4 years old).^{11,20} The marital status of respondents who are married and childbearing can affect the incidence of AGA. Hormonal changes during pregnancy can affect the hair growth cycle. Decreased postpartum estrogen levels can result in lengthened telogen phase (resting phase). However, the role of estrogen in the hair growth cycle is still controversial.^{21,22} In addition, increased prolactin hormone after childbirth is thought to cause hair loss, although the mechanism is not clear yet and requires further research.²³

Most respondents (32.5%) had an overweight BMI classification. Similar results were found in a study on 362 women with AGA in Iraq, which found that, 78% of the participants were overweight.²⁴ However, a study conducted in Egypt with differences subject characteristics which included 33 premenopausal women found that the average BMI of AGA was 28.1±4.3 kg/m² (obese I), whereas most respondents in this study were over 65 years old.²⁵ In theory, the elderly experience body metabolism and decreased muscle mass, leading to the tendency towards overweight rather than obese.^{26,27}

The relationship between obesity and AGA is still uncertain and controversial. Obesity is associated with changes in body metabolism, such as insulin resistance, chronic inflammation, and changes in adipokine profiles. Changes in the adipokine profile, such as bone morphogenetic protein-2, leptin, and adiponectin, are determinants of hair growth and cycle. This is thought to modify AGA process in obesity.²⁷

Many patients in this study had a history of AGA in the family 57.5% in their father and 75% in their mother. AGA occurs due to hormonal imbalances, genetics, and other risk factors.²⁸ This is in accordance with a study on 210 patients with AGA in Canada, which found that, 85% of AGA patients had a family history of AGA. About 51% of them had a history of AGA in their father, 20% in their mother, and 24% in both.²⁹

Research conducted on 982 women with AGA in South Korea found that 30.5% of study participants had a history of AGA in their father, 13.7% in their mother, and 7% in the lower proportion of AGA patients with a family history could be influenced by the older age of the study participants. That study mostly included patients in their forties, most respondents in this study were over 65 years of age.³⁰ The parents in this study are generally assumed to have passed away. Hence, the history of AGA in parents was obtained based on only the memories of the study respondents.

Respondents in this study generally did not have a history of hypertension (65%) and type 2 diabetes mellitus (92.5%). Hypertension can cause decreased blood flow to the hair roots due to vascular resistance, which leads to AGA. In addition, some antihypertensive drugs such as b-blockers, ACEIs, and diuretics are known to cause hair loss.³¹ Hyperglycemia that occurs chronically in diabetes mellitus patients can also cause a decrease in the supply of oxygen and nutrients to the hair due to microvascular disorders.³²

The results of this study are similar to a study on 360 women with AGA in Korea³³ and another study on 32 female patients with AGA in India.³⁴ They found

that 68.1% of the patients had no hypertension and 81.1% had no diabetes mellitus.³³ The study from India found that 75% of the patients had no hypertension.³⁴ However, a study in Iran on 51 female patients with AGA showed that less than half of the patients with AGA had no history of hypertension (41.2%) and diabetes mellitus (47.1%).³⁵ This difference can be influenced by almost 70% were undiagnosed hypertension in Indonesia and due to low health awareness, so they rarely visit health services for routine blood pressure checks.³⁶ In addition, the incidence of hypertension is known to be 2-3 times more common in patients with type 2 diabetes mellitus. Decreased nitric oxide levels in patients with type 2 diabetes mellitus leads to disrupted blood pressure regulators and subsequently results in hypertension.³⁷

Most study respondents (95%) had menarche at the age of <16 years old. The onset of AGA in women usually occurs after menarche due to hormonal changes.³⁸ However, a study in Taiwan showed that respondents who experienced menarche at the age of >16 years (12.2%) were slightly more than <16 years (11.8%).³⁹ This difference can be influenced by various factors, such as genetic, social, environment, and ethnicity.⁴⁰

Almost all study respondents (95%) had regular menstrual cycles. This contradicts the findings of in Taiwan, which showed that respondents who had irregular menstrual cycles (12.9%) were slightly more than those with regular menstrual cycles (12%).³⁹ This difference can be attributed to the absence of PCOS history in this study. PCOS is the most common endocrine disorder in women of reproductive age which is associated with hyperandrogenism and anovulation as causes of irregular menstrual cycles. Hyperandrogenism can cause hirsutism, acne, or alopecia. Increased testosterone, androstenedione, and free androgens with PCOS are risk factors for AGA in women.⁴¹

In this study, most patients (67.5%) had not reached menopause yet. This is similar to a study in Australia (2005) on 80 women with AGA, which stated that 58% of the respondents had not reached menopause yet.⁴² But in India (2016) found that, 62.5% of women with AGA were menopausal. This difference might be due to the high proportion of respondents (73.5%) who had anemia, which can affect the nutritional status.³⁴ The onset of menopause is known to be influenced by the onset of menarche, nutritional status, and genetics.⁴³

Most respondents (67.5%) had AGA type I Ludwig

Classification in this study. Similar findings were found in China, which found that out of 1,825 women with AGA, 881 experienced type I AGA.¹⁹ A study by on 10,132 patients with AGA in Korea, including 4,601 females, also found that the severity of alopecia increased with age and AGA type I was the most common type in patients <60 years old, while patients aged >60 years old experienced AGA type I and type II with similar prevalence. Patients with type III AGA were not found in the study.⁴⁴ In contrast, a study conducted in Iran found that more patients experienced type II (48.7%) than type I (41.7%) and type III (4.9%).⁴⁵ The severity of AGA can be influenced by the number of risk factors the patient has. In this study, the respondents generally did not have a history of hypertension, type 2 diabetes mellitus, PCOS, and had not been through menopause. This can explain why most respondents in this study experienced type I AGA.

Conclusion

Women diagnosed with androgenetic alopecia in Pasar Ambacang, Kuranji, Padang were mostly aged > 65 years old, married, and childbearing. Most of the participants were overweight and had a history of AGA in their father and/or mother. Based on their medical history, most of the respondents did not have a history of hypertension and type 2 diabetes mellitus, and none had PCOS. Most of the respondents were non-menopausal, experienced menarche at <16 years old, and had regular menstrual cycles. The most common type of AGA among women in Pasar Ambacang, Kuranji, Padang was type I Ludwig classification.

For further research, an analytical approach is needed to examine the relationship between each of the risk factors and the incidence of AGA in women. Further studies need to include other factors that can affect the incidence of AGA in women, such as number of birth deliveries, oral contraceptives, UV exposure, quality of sleep, alcohol consumption, serum ferritin levels, and vitamin D levels.

Author Contributions

All authors act as the guarantor of the manuscript. LA is the main investigator of this study. SW and RR participated in the conception, data acquisition, data interpretation, and writing of the study. LA, SW, and RR participated in data analysis and statistical analysis of the study. LA, SW, and RR have given final approval of the version to be published

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