JMedSci

Journal of the Medical Sciences
(Berkala Ilmu Kedokteran)

Volume 54, Number 1, 2022; 40-50
http://dx.doi.org/10.19106/JMedSci005401202205

The type of androgenetic alopecia and quality of life (QoL) in male patients

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Submitted: 2021-08-27
Accepted : 2021-10-29

ABSTRACT

Androgenetic alopecia (AGA) is a nonscarring baldness that mostly affects >50% men worldwide. Hair loss led to psychological difficulties and have a negative impact on the quality of life (QoL). This study aimed to evaluate the relationship between the type of AGA and QoL in male patients. A total of 67 male AGA patients were clinically assessed using the Hamilton-Norwood scale and interviewed using the Hair-Specific Skindex-29 scale to assess QoL. The patients were predominantly in the age group 31-50 years (50.7%), mean age 49.60 years, grade I obese (32.8%), mean BMI 24.93 kg/cm^2, 41.8% with father's AGA history, smoking (62.7%), smoking >100 cigarettes in last 6 months (41.8%), and have hypertension (16.4%) and diabetes mellitus (3%) as concomitant diseases. Based on Noorwood-Hamilton scale, the types of AGA were predominantly type II (25.4%) and followed by type III (16.4%). The results of the Hair Specific Skindex-29 on AGA patients were moderate (58.2%) and severe (41.8%). There were a relationship between AGA type and QoL (p = 0.041) and significant positive correlation between AGA type and QoL (p = 0.020, r = 0.282). In conclusion, patients experienced moderate to severe impact on QoL due to AGA. Thus, every increased in the type of AGA will impact patient's quality of life.

ABSTRAK

Alopesia androgenetik (AGA) adalah kebotakan tanpa jaringan parut yang paling banyak diderita hingga 50% pria di seluruh dunia. Kerontokan rambut menyebabkan masalah psikologis dan berdampak negatif pada kualitas hidup. Penelitian ini bertujuan mengkaji hubungan derajat keparahan AGA dengan kualitas hidup pasien laki-laki. Sebanyak 67 pasien AGA pria dinilai secara klinis menggunakan skala Hamilton-Norwood dan diwawancarai menggunakan skala *Hair-Specific Skindex-29* untuk menilai kualitas hidup. Pasien didominasi kelompok usia 31-50 tahun (50.7%), rerata usia 49.60 tahun, obesitas derajat I (32.8%), rerata BMI 24.93 kg/cm^2, 41.8% dengan riwayat AGA pada ayah, merokok (62.7%), merokok >100 batang dalam 6 bulan terakhir (41.8%), dan memiliki hipertensi (16.4%) dan diabetes (3%) sebagai penyakit penyerta. Berdasarkan skala Noorwood-Hamilton, tipe AGA didominasi tipe II (25.4%) dan diikuti tipe III (16.4%). Hasil *Hair Specific Skindex-29* pada pasien AGA adalah sedang (58.2%) dan berat (41.8%). Terdapat hubungan antara tipe AGA dan QoL (p = 0.041) dan korelasi positif yang signifikan antara tipe AGA dan QoL (p = 0.020, r = 0.282). Simpulan, pasien mengalami dampak sedang ke berat pada kualitas hidupnya dikarenakan AGA. Dengan demikian, setiap peningkatan pada tipe AGA akan berdampak pada kualitas hidup pasien.

Keywords:
androgenetic alopecia;
hair-specific Skindex-29;
quality of life;
risk factors;
age

INTRODUCTION

Androgenetic alopecia (AGA) is a nonscarring baldness that mostly affects up to 50% of men worldwide.[1,2] The AGA onset may be at any age following puberty and increase frequency with age.[1] Approximately 50 to 60% of men are

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affected by the age of 50 years increasing to approximately 80% by the age of 70 years and beyond.[1,3] The etiology of AGA is multifactorial.[1] In men, AGA is an androgen-dependent trait, especially dehydroepiandrosterone (DHEA) levels.[1,3] Considering how lifestyle factors influence hormonal levels greatly, it could be presumed that lifestyle and behavioral patterns may contribute to the occurrence and severity of AGA.[3]

Hair loss led to psychological difficulties and have a negative impact on quality of life (QoL).[4] Loss of self-confidence, lowered self-esteem, low personal attractiveness and social life were reported in male AGA patients.[5,6] People with alopecia are more likely to develop depression and anxiety.[6] Regardless of the extent of the reported psychosocial consequences of alopecia, each investigator used different tools, such as the Skindex-16, the Skindex-29, and the Dermatology Life Quality index and the brief COPE. Among these tools, the Skindex scale was recently used to measure the QoL of patients with hair loss.[7] Gonul *et al*.[8] also reported that AGA patients had significantly higher total Hairdex scores in terms of emotions, functioning, and symptoms, while self-confidence was significantly higher in the alopecia areata patients. Meanwhile, Bade *et al*.[9] reported younger AGA patients were more stigmatized, had poor functioning and emotions stability, but they had more self assuredness. Younger patients seem to retain better QoL despite AGA.[8] However, studies using hair specific Skindex-29 to evaluate the relationship between the type of AGA and QoL in male patients are limited.

MATERIALS AND METHODS

Sample selection

This was cross sectional study conducted in Department of Dermatology and Venereology, University of Sumatera Utara/Universitas Sumatera Utara Hospital, Medan, since July to December 2018 including 67 male with androgenetic alopecia. The diagnosis of androgenetic alopecia was assessed clinically by using Hamilton-Norwood scale. Inclusion criterias were androgenetic alopecia cases with age greater than 18 years, literacy, and absence of psychiatric disorders. Patients with diagnoses other than androgenetic apolecia were excluded in the study. Demographic and detailed clinical data were collected on each patient. Age, gender, body mass index (BMI), family history of AGA, severity of disease were recorded. Informed consent were obtained by each patient for the study. The research was performed in accordance with the principles outlined in the Declaration of Helsinki and approved by the Health Research Ethics Committee of University of Sumatra Utara/H. Adam Malik General Hospital, Medan, Indonesia.

Assessment of androgenetic alopecia

Androgenetic alopecia was classified according to the Hamilton-Norwood scale. Two trained dermatologists blinded to observe subject's hair pattern from two perspectives (side and top), compared the subject's hair pattern with the Hamilton-Norwood baldness scale and selected the best matching stage of the scale through consensus. Subjects were then classified into AGA stages I, II, and IIa, III, IIIa, III vertex, IV, IVa, V, Va, VI and VII, according to the Hamilton-Norwood scale (FIGURE 1). Subjects were then classified into one of three groups to facilitate analysis as mild (AGA grade I and II), moderate (AGA grade IIA, III, IIIA, III vertex, and IV), and severe (AGA grade IVA, V, Va VI and VII), according to the Hamilton-Norwood scale.

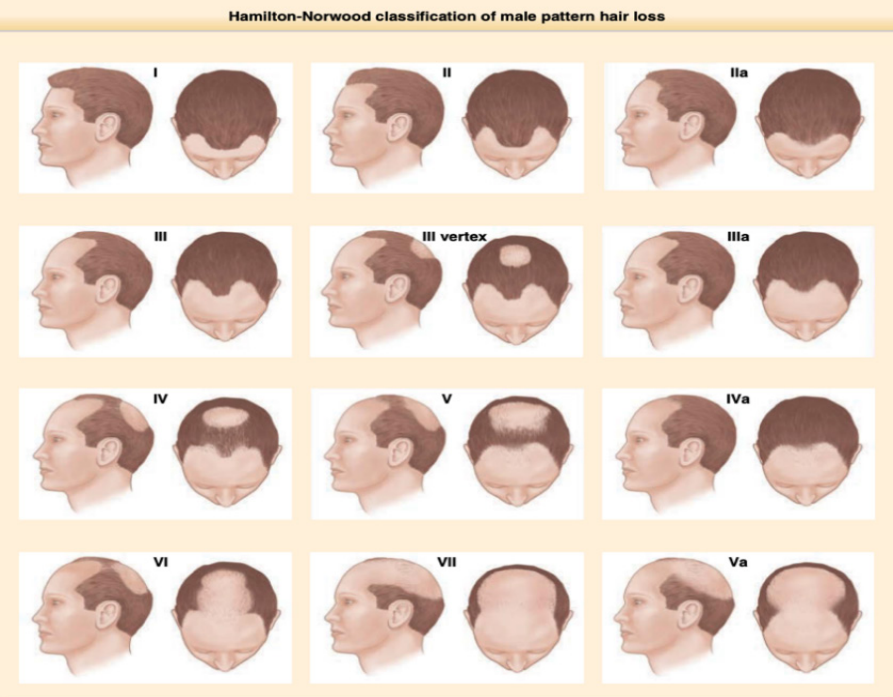

FIGURE 1. The Hamilton-Norwood scale for male AGA.[1]

Assessment of the QoL using the Hair-Specific Skindex- 29

Quality of life was measured by using the Hair-Specific Skindex-29 scale. This scale was originally developed by Chren *et al.*[10] and modified to assess the QoL of patients with AGA. The words 'skin' and 'skin condition' on the Skindex-29 were changed to 'scalp' or 'AGA', respectively, and the Skindex-29 itself was renamed as the Hair-Specific Skindex-29.[10] The Hair-Specific Skindex-29 is a questionnaire that consists of three scales: a symptom scale (7 items), a function scale (12 items), and an emotion scale (10 items) as shown in TABLE 1. Each question will be answered by the patients numerically ranging from 0 (never bothered) to 5 (always bothered). Each answer will be transformed to a linear scale, ranging from 0 (never bothered) to 100 (always bothered). The scale score was the average score from the responded items and the global score was the mean of the sums of each scale. A scale score was the average score from the responded items and a global score was the mean of the sums of each scale. A high score indicates severely impaired QoL, and a low score reflects mild damage in the QoL.[11] Hair-Specific Skindex-29 score was classified into mild (≤ 25), moderate (≤ 32), or severe (≤ 44) impairment of QoL based on Prinsen *et al.*[12]

TABLE 1. Hair specific Skindex-29.[11]

Questions
1. My scalp hurts (Sx).
2. My alopecia affects how well I sleep (Fx).
3. I worry that my alopecia may be serious (Em).
4. My alopecia makes it hard to work or do hobbies (Fx).
5. My alopecia affects my social life (Fx).
6. My alopecia makes me feel depressed (Em).
7. My scalp burns or stings (Sx).
8. I tend to stay at home because of my alopecia (Fx).
9. I worry about getting scars from my alopecia (Em).
10. My scalp itches (Sx).
11. My alopecia affects how close I can be with those I love (Fx).
12. I am ashamed of my alopecia (Em).
13. I worry that my alopecia may get worse (Em).
14. I tend to do things by myself because of my alopecia (Fx).
15. I am angry about my alopecia (Em).
16. Water bothers my scalp (bathing, washing hands) (Sx).
17. My alopecia makes showing affection difficult (Fx).
18. My scalp is irritated (Sx).
19. My alopecia affects my interactions with others (Fx).
20. I am embarrassed by my alopecia (Em).
21. My alopecia is a problem for the people I love (Fx).
22. I am frustrated by my alopecia (Em).
23. My scalp is sensitive (Sx).
24. My alopecia affects my desire to be with people (Fx).
25. I am humiliated by my alopecia (Em).
26. My scalp bleeds (Sx).
27. I am annoyed by my alopecia (Em).
28. My alopecia interferes with my sex life (Fx).
29. My alopecia makes me tired (Fx).

Sx: symptom; Fx: function; Em: emotion

Statistical analysis

Univariate and multivariate logistic regression tests were conducted to determine the relationship between AGA type, age, BMI, smoking habits, and smoking >100 cigarettes in 6 months with quality of life based on the assessment of the Skindex-29 score at a significance level of 5%. Spearman's correlation test was used to determine the relationship between AGA type, age and BMI with Skindex scores in the form of continuous variables with a significance level of 5%.

RESULTS

Patient's characteristics

This study included 67 male patients with androgenetic alopecia. Patients were predominantly age group 31-50 years (50.7%), followed by age group >50 years (46.3%) and the lowest was age group ≤ 30 years (3%), with mean age 49.60 years. Based on body mass index, most of subjects were categorized into grade I obese (32.8%), followed by overweight (28.4%), and normoweight (26.9%), with mean BMI 24.93 kg/cm^2. There were 28 patients (41.8%) with father's AGA history. About 62.7% subjects were smoking and 41.8% subjects were smoking >100 cigarettes in last 6 months. We found that 16.4% subjects have hypertension and 3% subjects with diabetes mellitus as concomitant diseases.

Mean Skindex-29 scores of 67 male subjects were 34.63 ± 9.73, with lowest score was 29 and highest score was 91. Based on Skindex-29 scores, most of subjects severity were moderate in 39 cases (58.2%) and severe in 28 cases (41.8%). Based on Noorwood-Hamilton scale, the types of AGA in this study were

predominantly type II (25.4%), followed by type III (16.4%), IVA (11.9%), and VI (11.9%). The characteristics of subjects with AGA in the study population were shown in TABLE 2.

TABLE 2. The characteristics of male AGA subjects.

Dermographic characteristics	n (%)	Mean (SD)	Median (Min – Max)
Age			
▪ ≤ 30 years	2 (3)	49.60 (10.32)	49 (29 – 70)
▪ 31 – 50 years	34 (50.7)		
▪ > 50 years	31 (46.3)		
Body mass index (BMI)			
▪ Underweight	1 (1.5)	24.93 (3.95)	24.39 (16.26 – 37.76)
▪ Normoweight	18 (26.9)		
▪ Overweight	19 (28.4)		
▪ Obese I	22 (32.8)		
▪ Obese II	7 (10.4)		
Father's history with AGA			
▪ Yes	28 (41.8)		
▪ No	39 (58.2)		
Smoking habits			
▪ Yes	42 (62.7)		
▪ No	25 (37.3)		
Smoking >100 cigarettes in last 6 months			
▪ Yes	28 (41.8)		
▪ No	39 (58.2)		
Hypertension			
▪ Yes	11 (16.4)		
▪ No	56 (83.6)		
Type 2 diabetes mellitus			
▪ Yes	2 (3)		
▪ No	65 (97)		
Skindex-29 scores			
▪ Mild	0 (0)		
▪ Moderate	39 (58.2)	34.63 (9.73)	32 (29 – 91)
▪ Severe	28 (41.8)		
Type of AGA (Noorwood-Hamilton scale)			
▪ I	4 (6)		
▪ II	17 (25.4)		
▪ IIA	3 (4.5)		
▪ III	11 (16.4)		
▪ III vertex	5 (7.5)		
▪ IV	2 (3)		
▪ IVA	8 (11.9)		
▪ V	1 (1.5)		
▪ VA	5 (7.5)		
▪ VI	8 (11.9)		
▪ VII	3 (4.5)		

Hair spesific Skindex-29 domains and global score

Based on the symptoms domain, the mean value was 8.9 with the lowest score of 7 and the highest score of 27. For the emosions domain, the mean value was 11.42 with the lowest score of 10 and the highest score of 28. Meanwhile, the function domain showed a mean value of 14.46 with the lowest score of 12 and the highest score of 91. The mean value of total score was 34.36 with the lowest total score was 29 and the highest score was 91, showed in TABLE 3.

The category of Skindex-29 score

TABLE 4 presented the results of the categorization of the Skindex-29 score. Most of them showed moderate in 39 subjects with a mean Skindex-29 score of 29.92 (SD = 1.2) and severe in 28 subjects with a mean Skindex-29 score of 41.48 (SD = 12.37).

Univariate and multivariate logistics regression

The results of the analysis using the univariate logistic regression test as listed in TABLE 5 showed that there was no significant relation between the independent variable with the quality of life of AGA patients based on the Skindex-29 score assessment (p>0.05).

TABLE 3. Skindex-29 Quality of Life: subscales domain and global score

Domain	n	Mean (SD)	Median (Min – Max)
Symptoms	67	8.9 (3)	8 (7 – 27)
Emotions	67	11.42 (3.06)	10 (10 – 28)
Function	67	14.46 (4.42)	13 (12 – 36)
Overall	67	34.63 (9.73)	32 (29 – 91)

TABLE 4. The category of Skindex-29 scores

Skindex-29 score	n	Mean (SD)	Median (Min – Max)
Moderate	39	29.92 (1.20)	29 (29 – 32)
Severe	28	41.18 (12.37)	36.5 (33 – 91)

TABLE 5. Univariate logistics regression results of AGA type, age, BMI, and smoking behaviour with Skindex-29 scores.

Variables	OR	95% CI	p
AGA type	1.153	0.982 – 1.353	0.082
Age			
▪ ≤ 30 years	0	0	0.999
▪ 31 – 50 years	1.818	0.671 – 4.926	0.240
▪ > 50 years	Ref		
BMI	0.617	0.371 – 1.029	0.064
Smoking habits	1.125	0.411 – 3.079	0.819
Smoking >100 cigarettes in last 6 months	1.387	0.518 – 3.709	0.515

In TABLE 6, the results of a multivariate analysis between AGA type, age, BMI, smoking habits and smoking more than 100 cigarettes in 6 months with quality of life based on the assessment with a Skindex-29 score. The results of the analysis showed that there was a significant relationship between AGA type with the quality of life. The AGA type variable did not show a significant relationship with quality of life when analyzed bivariately (p = 0.082). However, when analyzed together with other variables (multivariate analysis) it showed significant results (p = 0.041, OR = 1.219, 95% CI = 1.008 - 1.475). It meaned that each 1 unit increase in AGA type will increase the odds of quality of life in a more severe direction by 1.219 times.

There was no significant relationship between other independent variables such as age, BMI, smoking habits and smoking >100 cigarettes in 6 months with the quality of life of AGA patients as assessed by the Skindex-29 score, showed in TABLE 6.

TABLE 6. Multivariate logistics regression results of AGA type, age, BMI, and smoking behaviour with Skindex-29 scores.

Variables	OR	95% CI	p
AGA type	1.219	1.008 – 1.475	0.041
Age			
▪ ≤ 30 years	0	0	0.999
▪ 31 – 50 years	1.850	0.585 – 5.853	0.295
▪ > 50 years	Ref		
BMI	0.608	0.347 – 1.065	0.082
Smoking habits	0.545	0.106 – 2.812	0.469
Smoking >100 cigarettes in last 6 months	1.876	0.387 – 9.087	0.434

Spearman's correlation between AGA type, age, and BMI with Skindex-29 score

The data were distributed normally (p > 0.05). By using the Spearman's correlation test, it showed that there was a weak significant positive correlation between the AGA type and the Skindex-29 score (p = 0.020, r = 0.282), showed in TABLE 7. The resulting positive correlation value indicated that every increase in AGA type will be directly increased the Skindex-29 score in AGA patients in this study.

TABLE 7. The Spearman's correlation between AGA type, age, and BMI with Skindex-29 score

	Skindex-29 score	
	r	p
AGA type	0.284	0.020
Age	-0.092	0.457
BMI	-0.150	0.227

DISCUSSION

The present study was evaluated for type of AGA and quality of life in males with AGA. Predominantly, 50.7% subjects in this current study belonged to 31-50 years of age and 46.3% subjects belonged to >50 years of age, with mean age 49.6 years. These findings are important to show that AGA is also part of degenerative diseases. The incidence of AGA gradually increases with age.[9] Similar result was reported by Krupa *et al.*[13] where the prevalence of AGA in an Indian population males aged 30-50 years was 58%. Han *et al.*[11] also reported 46.8% of male AGA belonged to 31-50 years of age and 26.6% belonged to >50 years of age. Meanwhile, Bade *et al.*[9] reported 50% male AGA belonged to 21-30 years of age with mean age of 30.6 years.

Positive father history with AGA was found in 41.8% subjects. Esen Salman *et al.*[14] reported that the frequency of AGA in men with family history of AGA (78.28%) was significantly higher than in men without family history of AGA (39.6%) (p=0.0001). They also reported that AGA frequency in fathers, brothers and second-degree relatives of men with AGA were significantly higher than without AGA (p=0.0001).[14] Chumlea *et al.*[15] reported that men whose fathers had hair loss were 2.5 times as likely to have had some level of hair loss compared to men whose fathers had no hair loss.

Several reports have shown the correlation of lifestyle factors such as obesity, smoking, and concomitant systemic diseases with hair loss.[9,14,16] In our study, most of subjects were grade I obese (32.8%) and followed by overweight (28.4%). Yang *et al.*[17] reported that higher BMI was significantly associated with greater severity of hair loss in men with male-pattern AGA, especially in those with early-onset AGA. In male-pattern AGA with severe alopecia (grade V-VII) had higher BMI than those with mild to moderate alopecia (grade I-IV) (25.1 vs 22.8 kg/m^2, p = 0.01).[17] Meanwhile, Esen Salman *et al.*[14] reported 12% men with AGA were obese and 46% men were overweight. The link between male-pattern AGA and obesity remains unclear. The presence of insulin resistance and up-regulation of insulin-like growth factor-1 in obese subjects are leading to an increased conversion of testosterone to dihydrotestosterone, the principle androgen responsible for male-pattern baldness.[17,18]

In this present study, about 62.7% subjects were smoking and 41.8% subjects were smoking >100 cigarettes in last 6 months. Su *et al.*[19] reported that smokers were at increased risk of having moderate or severe AGA (Norwood types ≥ IV) (OR, 1.61; 95% CI, 1.05-2.46). There were statistically significant positive associations between moderate or severe AGA and smoking status (OR, 1.77; 95% CI, 1.14-2.76), current cigarette smoking of 20 cigarettes or more per day (OR, 2.34; 95% CI, 1.19-4.59), and smoking intensity (OR, 1.78; 95% CI, 1.03- 3.07).[19]

Studies on the association between diabetes mellitus and hypertension with AGA have reported conflicting results.[14,19,20-25] Su *et al.*[19] reported 27.2% male AGA with hypertension and 13.8% male AGA with diabetes mellitus. Meanwhile Ozbas Gok *et al.*[20] reported that there was no significant difference in the rate of metabolic syndrome (included diabetes mellitus) between AGA and control groups (p = 0.135). AGA group had significantly high systolic blood pressure levels than control group (p <0.05). Meanwhile in our study, about 16.4% subjects have hypertension and 3% subjects with diabetes mellitus as concomitant diseases. However, this result should be interpreted carefully because of very small number of patients.

In our study, the types of AGA based on Noorwood-Hamilton classification were predominantly type II (25.4%), followed by type III (16.4%), IVA

(11.9%), and VI (11.9%). Ozbas Gok *et al.*[20] reported that from total of 74 AGA patients, 24 patients (32.4%) were in stage II, 26 patients (35.1%) were in stage III, 17 patients (23%) were in stage III verex, 1 patients (1.4%) was in stage V, and 6 patients (8.1%) were in stage VII according to Hamilton-Norwood classification. Meanwhile Salman *et al.*[14] reported the most common type was type III vertex (24.1%) whereas the least common type was IIIA (0.5%). Type II was the most common type in men aged between 17-29. Type III vertex was the most common type in men aged 30-69 and frequency of type VII increased with age in this group. Type VII was the most common type in men over 70 years.[14]

In our study, the impacts of AGA toward QoL were predominantly moderate in 39 patients (58.2%) and severe in 28 patient (41.8%) using hair specific Skindex-29 scoring. Mean Skindex-29 score was 34.63 ± 9.73. Regardless of the extent of the reported psychosocial consequences of alopecia, each investigator used different tools, such as the Skindex-16, the Skindex-29, and the Dermatology Life Quality index and the brief COPE. Between these tools, the Skindex scale was recently used to measure the QoL of patients with hair loss.[7] Only few studies that reported the impact of AGA toward QoL using hair specific Skindex-29. A multicenter study reported mean global hair specific Skindex-29 score of the AGA patients was 27.3±19.1 (moderate). They also reported that QoL was more damaged if the patient had severe alopecia, a longer duration of AGA, younger age, had received previous non-medical hair care, and visited the hospital for AGA treatment.[11] Jun *et al.*[26] also reported mean composite hair specific Skindex-29 between AA and AGA was moderate (35.7 vs 34.3, respectively). They also reported that AGA patients whose onset age was ≤ 20s and with a disease duration of 1-5 months were more likely to experience lower symptomatic QoL. The differences in the results of this study with other studies may be influenced by age, onset age, disease duration, and previous treatment of the study subjects. Further investigations are needed to determine the effect of these factors on QoL in AGA patients.

We also reported that there were a relationship between AGA type and QoL ($p = 0.041$, OR = 1.219, 95% CI = 1.008-1.475) and also a weak significant positive correlation between AGA type and QoL ($p = 0.020$, $r = 0.282$) in our study. Our findings were consistent with a multicenter study by Han *et al.*[11] have reported that the QoL from the hair specific Skindex-29 score correlated with a severe type AGA ($p < 0.05$). The global hair specific Skindex-29 also significantly correlated with severe type AGA and younger age (< 30 years) ($p < 0.01$).[11] Meanwhile, Jun *et al.*[6] reported that AA and AGA have a significant negative impact on patient QoL. The results suggest that patients with AGA have a significantly decreased QoL.

CONCLUSION

In conclusion, patients experienced moderate to severe impact on QoL due to AGA. Thus, every increased in the type of AGA will impact patient's QoL. It is important that as a clinician, we should consider our AGA patient's psychosocial impact, so that we could offer relevant treatment for the hair loss and also for their emotional distress due to AGA. However, further research is needed to better understand the impacts of AGA and to improve treatment on self-image, psychological functioning and QoL.

ACKNOWLEDGEMENT

We would like to thank Dr. dr. Taufik for his assistances in statistical analysis.

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