

# Quality of Life and Its Association with Androgenetic Alopecia Patients in Shanghai: A Cross-Sectional Study

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**Background:** Health-related quality of life (HRQoL) of androgenetic alopecia patients has become increasingly important, but the influencing factors associated with the different domains are poorly understood.

**Objective:** This study aimed to investigate the influencing factors in HRQoL of androgenetic alopecia patients and identify its strongly associated domains.

**Patients and Methods:** We enrolled 170 androgenetic alopecia patients. HRQoL was measured using the World Health Organization Quality of Life Brief Version (WHO-BREF), and Hairdex.

**Results:** HRQoL was significantly impaired in patients <30 years, (WHO-BREF:  $P=0.022$ , Hairdex:  $P=0.004$ ), less educated (WHO-BREF:  $P=0.021$ , Hairdex:  $P=0.003$ ), single patients (Hairdex:  $P=0.023$ ), and urban residence (Hairdex:  $P=0.043$ ). By domains, those <30 years were impaired by physical health ( $P=0.038$ ) and psychological ( $P=0.030$ ) by WHO-BREF, and symptoms ( $P=0.002$ ) and emotions ( $P=0.002$ ) by Hairdex. Singles were impaired by symptoms ( $P=0.020$ ), and emotions ( $P=0.009$ ) by Hairdex. Less-educated individuals had impaired all domains in the WHO-BREF and Hairdex, except for physical health. Women had impaired symptoms ( $P=0.013$ ) and stigmatization ( $P=0.041$ ) in Hairdex.

**Conclusion:** Androgenetic alopecia is associated with significantly reduced HRQoL in young, less educated, and single patients. Dermatologists should inquire about Quality of Life and appropriately support androgenetic alopecia patients.

**Keywords:** quality of life, androgenetic alopecia, WHO-BREF, Hairdex

## Introduction

In clinical practice, alopecia is considered a relatively mild skin disease by physicians.<sup>1</sup> However, many patients regard hair loss as a crucial problem leading to distress in their daily lives, as well as depression, anxiety, and social phobia. Hairs play an important role in an individual's self-image, self-confidence, and social behavior.<sup>2</sup>

Androgenetic alopecia (AGA) is a well-known cause of hair loss, affecting both men and women. In AGA excessive activation of androgen receptors leads to follicular miniaturization through a progressively shorter anagen phase which ultimately results into thinner and shorter hair follicles that may not even penetrate through the epidermis.<sup>3</sup> The analysis of pathological specimens had showed a decreased 5:0 ratio of anagen to telogen hair from the normal 12:1 ratio.<sup>4,5</sup> In men, AGA is accompanied by a bi-temporal recession of the frontal hairline, followed by diffuse thinning at the vertex. AGA causes diffuse thinning in the crown region in women; however, the frontal hairline is often retained.<sup>6</sup> The

incidence and prevalence of AGA vary with age and ethnicity. Approximately 30% of men experience AGA by age 30 and 50% by 50 years.<sup>7</sup> Among women, 12% experience AGA by age 30, and up to 41%, by 70 years.<sup>8</sup>

Physicians and patients use various criteria to measure the severity of alopecia. Dermatologists use the different pathological markers and symptoms of the disease to assess androgenetic alopecia, while patients focus on their quality of life (QoL) impact. The effect of lifestyle factors has a great influence on the behavioral patterns which contribute to the occurrence and severity of AGA. Thus, there is an inevitable requirement to understand how AGA impacts patients' quality of life while determining its severity which can be helpful for AGA patients.<sup>9,10</sup>

Previous studies have reported that AGA can cause psychosocial difficulties, including low self-esteem, altered self-image, and fewer social engagements. In patients with AGA due to continuous disease progression, quality of life (QOL) gets impaired. Therefore, in such circumstances along with traditional treatment, psychosocial management is very important.<sup>11–13</sup> However, previous studies have focused on evaluating QOL in only male AGA patients. In order to have a better understanding of the quality of life (QoL) in AGA patients we assessed using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF)<sup>14,15</sup> which is a generic instrument and the Hairdex<sup>16</sup> Questionnaire which is a Hair and Scalp specific instrument. In this cross-sectional survey, the goal was to evaluate the socio-demographic variants affecting health-related QOL (HRQoL) in AGA patients in Shanghai and investigate the domain factors that influence their HRQoL.

## Materials and Methods

### Participants

This cross-sectional study was conducted from January 2021 to January 2022 at the Shanghai Tongji Hospital affiliated with Tongji University. This study was conducted as a face-to-face survey. Patients aged 18–60 years and diagnosed with AGA through clinical examination by a dermatologist were included in the study. The stages of hair loss were measured by using the Hamilton-Norwood scale<sup>17</sup> (H-N scale) for males and the Sinclair scale<sup>18</sup> for females by dermatologists. The severity of the disease was classified as mild (H-N scale Type I–Type II and Sinclair Type I), moderate (H-N scale Type IIa–Type III vertex, Sinclair Type II), or severe (H-N scale Type IV–VII, Sinclair Type III–V). HRQoL was assessed using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF)<sup>14,15</sup> and the Hairdex Questionnaire.<sup>16</sup> All participants provided informed consent before participation and gave instructions on how to fill in the study questionnaires. Patients with known mental disorders were excluded from this study. The study was approved by the ethics committee of Shanghai Tongji Hospital (ID: K-2022-001).

### QoL Instruments

World Health Organization Quality of Life Brief Version (WHOQOL-BREF).

The WHOQOL-BREF ([Supplementary 1](#)) is the most popular generic instrument for assessing QoL. The questions were grouped into four domains: psychological, social, environmental, and physical. Individual questions were rated on a five-point Likert scale. Subsequently, the scores were converted to a 0–100 scale. Domain scores are scaled in a positive direction (ie, higher scores denote a higher quality of life).<sup>14,15</sup>

#### Hairdex

The Hairdex ([Supplementary 2](#)) is a specific health-related QoL measurement tool designed to determine the specific impact of hair loss on patients' QoL. It consists of 48 items and is divided into five categories: symptoms, functioning, emotion, self-confidence, and stigmatization. Each question is scored on a scale of 0 to 4, with a higher score associated with poorer QOL.<sup>16</sup>

### Analysis

All data analyses were performed using SAS version 9.4 (SAS Institute, Inc., Cary, NC, U.S.A). The normality of the distribution was verified using the Shapiro–Wilk test. Continuous variables that satisfied normality were presented as the mean ± standard deviation (SD), and those that were not satisfied were presented as medians (IQR). Categorical variables

were presented as frequencies (percentages). The box plots are used to describe the distribution of different domains of the Hairdex score and WHO-BREF score among AGA patients.

The *t*-test and Mann–Whitney *U*-test were used to compare differences in WHO-BREF, and Hairdex scores according to sex, age group, relationship status, place of birth, and family history. ANOVA and Kruskal–Wallis tests were used to investigate the association between polytomous variables (education level, duration of AGA, and severity of disease) and WHO-BREF, and Hairdex scores. We analyzed their associations with potential risk factors in an identical manner.

Multiple linear regression analysis was performed using WHO-BREF, or Hairdex scores and their sub-domains as the dependent variable, whereas independent variables included sex, age group, relationship status, place of birth, family history, education level, AGA duration, and disease severity.  $P < 0.05$  was considered statistically significant, and all *P*-values were two-tailed.

## Results

### Demographic and Clinical Characteristics

The study included 170 clinically diagnosed participants with AGA where the response rate was 100%. The majority of participants were men (63.53%), less than 30 years old (66.47%), single (70.59%). The mean age was 28.99 and the standard deviation (SD) was 6.79 with a male: female ratio of 1.7:1. (Table 1)

**Table 1** Patient Social and Demographic Characteristics

Variables	N (%)
Sex	
Female	62(36.47)
Male	108(63.53)
Age Mean (SD)	28.99(6.79)
<=30	113(66.47)
>30	57(33.53)
Education	
High School	15(8.82)
Junior College	34(20.00)
Bachelor	88(51.76)
Master or above	33(19.41)
Relationship status	
Single	120(70.59)
Married	50(29.41)
Place of Birth	
Urban	99(58.24)
Rural	71(41.76)
Family History	
Absent	56(32.94)
Present	114(67.06)
Duration of AGA	
Less than 1 year	38(22.35)
1–5 years	101(59.41)
More than 5 years	31(18.24)
Severity of disease	
Mild	64(37.65)
Moderate	95(55.88)
Severe	11(6.47)

## Quality of Life Impairment in AGA

Participants aged < 30 years showed significantly worse HRQoL in the WHO-BREF and Hairdex (P=0.022, P=0.004), and high school qualifications had significantly worse HRQoL impairment in the WHO-BREF and Hairdex (P=0.021, P=0.003). Single individuals showed significantly worse HRQoL in the Hairdex (P=0.023) than married individuals. Furthermore, Hairdex showed that participants born in rural regions had significantly worse HRQoL (P =0.043). (Table 2)

Among domains, the most impaired domain in WHO-BREF was physical health with a Mean of 53.029, SD 11.99 whereas the least impaired domain was the environment with a Mean of 62.818, SD 15.284. On the Hairdex scale, the most impaired domain was Emotions with a Mean of 13.529 and SD 9.402 and the least impaired domain was Symptoms with a Mean of 5.835 and SD 4.074. (Figure 1)

## Multivariate Linear Regression Analysis of Factors Influencing Domains in AGA Patients

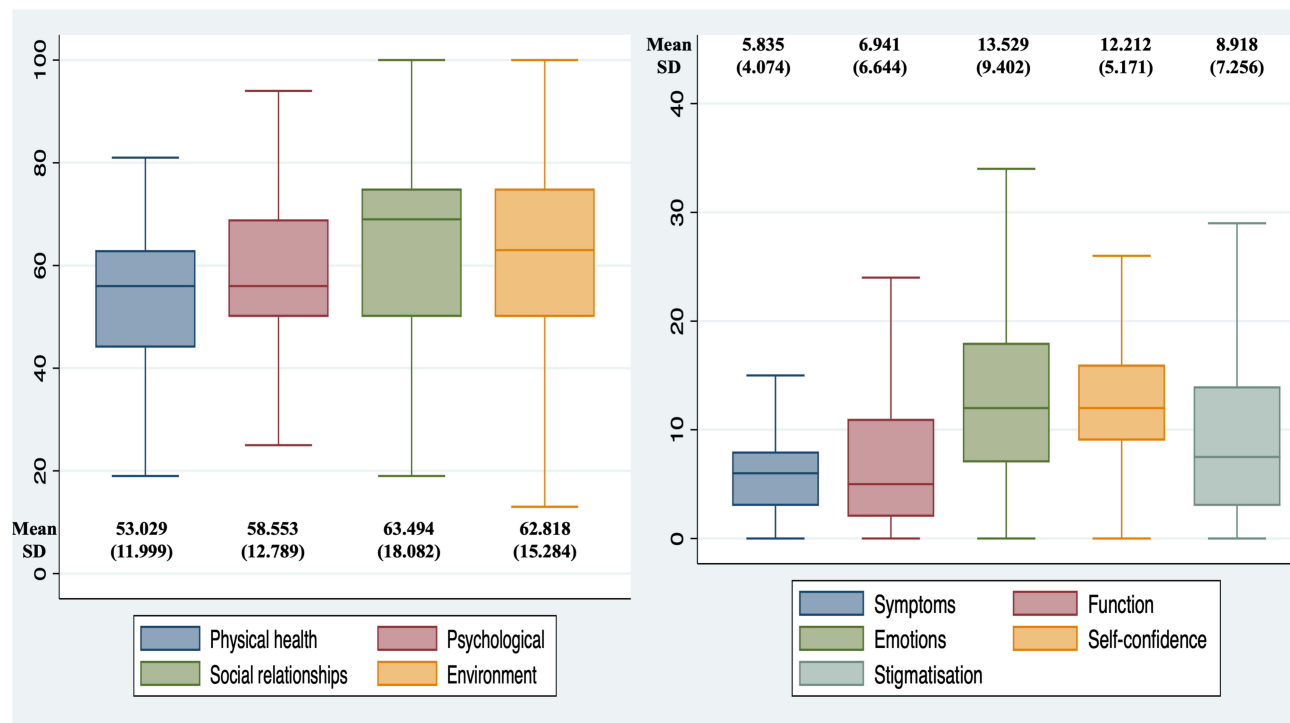
In the WHO-BREF domain, patients older than 30 years had better psychological QoL (P=0.004). The participant's masters and above were associated with better QoL in psychological (P=0.000), social relationship (P=0.002), and

**Table 2** Variables Associated with Worse Quality of Life in Androgenetic Alopecia Patients

Variables	WHO-BREF		Hairdex Score	
	Value Mean (SD)	P-value	Value Median (IQR)	P-value
Sex				
Female	235.40(51.38)	p=0.705	47.00(31.00–61.00)	p=0.663
Male	238.46(50.26)		46.50(31.50–67.00)	
Age				
<=30	231.06(49.37)	p=0.022*	52.00(33.00–70.00)	p=0.004*
>30	249.81(50.96)		39.00(30.00–53.00)	
Education				
High School	217.93(56.78)	p=0.021*	64.00(41.00–89.00)	p=0.003*
Junior College	235.47(45.43)		52.00(32.00–68.00)	
Bachelor	232.88(54.25)		48.50(31.00–67.00)	
Master or above	260.03(34.43)		38.00(28.00–47.00)	
Relationship status				
Single	234.28(49.80)	p=0.221	53.56(26.52)	p=0.023*
Married	244.72(52.05)		44.90(20.34)	
Place of Birth				
Urban	236.07(54.13)	p=0.699	44.00(28.00–61.00)	p=0.043*
Rural	239.13(45.38)		50.00(36.00–71.00)	
Family History				
Absent	238.84(51.35)	p=0.788	48.50(32.00–64.50)	p=0.851
Present	236.61(50.35)		44.50(31.00–66.00)	
Duration of AGA				
Less than 1 year	231.87(57.52)	p=0.752	44.50(29.00–71.00)	p=0.572
1–5 years	238.95(47.34)		48.00(32.00–64.00)	
More than 5 years	238.84(52.83)		43.00(31.00–58.00)	
Severity of disease				
Mild	231.47(50.17)	p=0.277	49.50(31.00–63.50)	p=0.805
Moderate	242.72(51.60)		46.00(31.00–64.00)	
Severe	225.18(40.31)		42.00(31.00–79.00)	

**Note:** \*Statistically significant.

**Abbreviations:** WHO-BREF, World Health Organization Quality of Life Brief Version; AGA, Androgenetic Alopecia.



**Figure 1** Domains impact on androgenetic alopecia patients.

environment ( $P=0.000$ ) than that associated with high school. In terms of disease severity, moderate QoL was associated with better psychological ( $P=0.027$ ) and social relationships ( $P=0.043$ ) than mild QoL (Table 3).

The Hairdex domains showed that men had better QoL in terms of symptoms ( $P=0.028$ ), worsen QoL in function ( $P=0.027$ ), and stigmatization ( $P=0.039$ ) in comparison to women. Patients aged  $\geq 30$  years had better self-confidence ( $p = 0.049$ ). In education, masters and above was associated with better QoL in all domains (symptoms:  $P=0.018$ , function:  $P=0.001$ , emotions:  $P=0.003$ , self-confidence:  $P=0.006$ , stigmatization:  $P=0.018$ ) compared to that associated with high school, and patients with a positive family history had better QoL in self-confidence ( $P=0.002$ ) than patients with a negative family history. (Table 4)

### Correlation Between Hairdex Score and WHO-BREF Score Among AGA Patients

The observation of correlation between each of Hairdex domains and each of the WHO-BREF domains represented positive correlations between the symptoms and Physical Health ( $r = -0.3278$ ;  $P < 0.001$ ); Psychological ( $r = -0.2664$ ,  $P = 0.0004$ ); Social relationship ( $r = -0.4399$ ;  $P < 0.001$ ); Environment ( $r = -0.4040$ ;  $P < 0.001$ ). Functions and Physical Health ( $r = -0.1712$ ;  $P = 0.0256$ ); Psychological ( $r = -0.2270$ ,  $P = 0.0029$ ); Social relationship ( $r = -0.3367$ ;  $P < 0.001$ ); Environment ( $r = -0.3105$ ;  $P < 0.001$ ). Emotions and Physical Health ( $r = -0.2784$ ;  $P = 0.0002$ ); Psychological ( $r = -0.3204$ ,  $P < 0.001$ ); Social relationship ( $r = -0.4211$ ;  $P < 0.001$ ); Environment ( $r = -0.4143$ ;  $P < 0.001$ ). Self-confidence and Physical Health ( $r = 0.2366$ ;  $P = 0.0019$ ); Psychological ( $r = 0.1996$ ,  $P = 0.0091$ ); Social relationship ( $r = 0.1765$ ;  $P = 0.0213$ ). Stigmatization and Physical Health ( $r = -0.2241$ ;  $P = 0.0033$ ); Psychological ( $r = -0.2170$ ,  $P = 0.0045$ ); Social relationship ( $r = -0.3439$ ;  $P < 0.001$ ); Environment ( $r = -0.3138$ ;  $P < 0.001$ ). However, no correlation was observed between self-confidence and Environment ( $r = 0.1376$ ;  $P = 0.0736$ ). (Table 5)

## Discussion

The purpose of this study was to assess the various factors that have an impact on HRQoL in androgenetic alopecia patients. AGA is considered to be a benign condition with mainly cosmetic effects.<sup>1</sup> However, hair loss's psychological and sociological effects can be considerable. Lower physical attractiveness, low self-esteem, fear of aging, and negative

**Table 3** Variables Associated with Domains of World Health Organization Quality of Life Brief Version (WHOQOL-BREF) in Androgenetic Alopecia Patients

Variables	Physical Health			Psychological			Social Relationships			Environment		
	$\beta$	SE	p-value	$\beta$	SE	p-value	$\beta$	SE	p-value	$\beta$	SE	p-value
Sex												
Male	0.83	1.92	0.664	-0.86	2.04	0.676	-0.95	2.89	0.743	3.29	2.43	0.177
Age												
>30	4.05	1.93	0.038*	4.50	2.05	0.030*	4.59	2.93	0.119	4.79	2.46	0.054
Education												
Junior College	1.36	3.73	0.716	4.80	3.86	0.216	3.85	5.54	0.488	9.73	4.59	0.036*
Bachelor	-0.13	3.36	0.969	5.81	3.48	0.097	5.25	4.99	0.294	7.64	4.14	0.067
Master or above	3.22	3.75	0.391	12.28	3.88	0.002*	12.74	5.56	0.023*	16.05	4.61	0.001*
Relationship status												
Married	3.36	2.01	0.096	0.80	2.16	0.710	5.14	3.03	0.092	2.16	2.58	0.403
Place of Birth												
Rural	2.25	1.86	0.230	0.28	1.99	0.887	1.88	2.82	0.504	-0.05	2.38	0.983
Family history												
Yes	-0.60	1.96	0.762	-3.22	2.08	0.123	-0.35	2.96	0.905	1.09	2.50	0.665
Duration of AGA												
1-5 years	1.92	2.29	0.404	0.35	2.45	0.886	3.80	3.45	0.272	3.13	2.92	0.285
More than 5 years	0.84	2.91	0.773	0.01	3.11	0.997	4.76	4.38	0.279	2.22	3.71	0.550
Severity of disease												
Moderate	2.90	1.93	0.136	2.64	2.07	0.203	5.32	2.91	0.069	2.24	2.48	0.368
Severe	-2.09	3.90	0.592	-1.93	4.17	0.644	-0.37	5.87	0.951	-1.38	5.00	0.782

**Note:** \*Statistically significant.**Abbreviation:** AGA, Androgenetic Alopecia.

**Table 4** Variables Associated with Domains of Hairdex Scale in Androgenetic Alopecia Patients

Variables	Symptoms			Function			Emotions			Self-Confidence			Stigmatization		
	<i>B</i>	<i>SE</i>	<i>p-value</i>	$\beta$	<i>SE</i>	<i>p-value</i>	$\beta$	<i>SE</i>	<i>p-value</i>	$\beta$	<i>SE</i>	<i>p-value</i>	$\beta$	<i>SE</i>	<i>p-value</i>
Sex															
Male	-1.60	0.64	0.013*	1.96	1.05	0.063	-1.27	1.50	0.397	-0.05	0.83	0.954	2.36	1.15	0.041*
Age															
>30	-2.00	0.65	0.002*	-1.84	1.07	0.089	-4.70	1.49	0.002*	1.05	0.84	0.211	-2.20	1.17	0.062
Education															
Junior College	-1.21	1.23	0.328	-2.74	2.00	0.174	-2.73	2.84	0.337	1.88	1.58	0.236	-2.66	2.23	0.234
Bachelor	-0.56	1.11	0.616	-3.41	1.81	0.061	-3.81	2.56	0.138	2.85	1.42	0.047	-4.09	2.01	0.043
Master or above	-3.27	1.23	0.009*	-6.59	2.01	0.001*	-8.67	2.85	0.003*	4.25	1.59	0.008*	-5.33	2.24	0.018*
Relationship status															
Married	-1.64	0.68	0.017*	-1.79	1.11	0.110	-3.70	1.56	0.019*	0.01	0.87	0.989	-1.53	1.22	0.212
Place of Birth															
Rural	0.67	0.63	0.292	1.91	1.03	0.064	2.65	1.45	0.070	-0.97	0.80	0.230	2.08	1.12	0.066
Family history															
Yes	0.47	0.67	0.478	-0.67	1.09	0.536	0.20	1.54	0.895	2.26	0.83	0.007*	0.49	1.19	0.680
Duration of AGA															
1-5 years	0.09	0.78	0.912	1.52	1.26	0.231	1.73	1.79	0.337	0.65	0.99	0.509	1.34	1.38	0.335
More than 5 years	-1.04	0.99	0.294	0.07	1.61	0.965	0.45	2.28	0.844	-0.10	1.26	0.937	-0.19	1.76	0.914
Severity of disease															
Moderate	-0.46	0.66	0.486	-0.22	1.08	0.838	-0.35	1.53	0.819	-0.25	0.84	0.768	0.13	1.17	0.910
Severe	-1.46	1.33	0.275	1.49	2.18	0.496	0.59	3.09	0.850	-2.32	1.69	0.172	2.89	2.37	0.225

Note: \*Statistically significant.

Abbreviation: AGA, Androgenetic Alopecia.

**Table 5** Correlation Between Hairdex Score and WHO-BREF Score Among AGA Patients

Hairdex \ WHO-BREF	Physical Health r, P-value	Psychological r, P-value	Social Relationship r, P-value	Environment r, P-value
Symptoms	-0.3278, <0.001	-0.2664, 0.0004	-0.4399, <0.001	-0.4040, <0.001
Functions	-0.1712, 0.0256	-0.2270, 0.0029	-0.3367, <0.001	-0.3105, <0.001
Emotions	-0.2784, 0.0002	-0.3204, <0.001	-0.4211, <0.001	-0.4143, <0.001
Self-Confidant	0.2366, 0.0019	0.1996, 0.0091	0.1765, 0.0213	0.1376, 0.0736
Stigmatization	-0.2241, 0.0033	-0.2170, 0.0045	-0.3439, <0.001	-0.3138, <0.001

effects on social life are all caused by hair loss.<sup>19</sup> The ability to perform everyday tasks according to one's age and primary social role is referred to as one's quality of life (QoL).<sup>14</sup> Previous studies have reported that in patients with AGA due to continuous disease progression, quality of life (QOL) gets impaired. Therefore, psychosocial management is very important in such circumstances along with traditional treatment.<sup>11-13</sup>

In AGA QoL assessment has become more and more important, and to assess how the disease has affected people's quality of life, many different indices that are often measured by self-report questionnaires are used.<sup>20</sup> In order to evaluate the impact of androgenetic alopecia on QOL we used a twenty six-item World Health Organization Quality of Life Brief Version (WHOQOL-BREF)<sup>14,15</sup> which is a generic instrument and a forty eight item Hairdex<sup>16</sup> Questionnaire which is a disease-specific instrument. The advantage of using both generic and disease-specific instruments is that they are sensitive enough to distinguish specific aspects of a disease's impact on the QOL. Our study showed that androgenetic alopecia is associated with reduced HRQoL in young, less educated, and single patients. The most impacted domain in WHO-BREF was physical health with a mean of 53.01 and in the Hairdex emotion domain with a mean of 13.52 followed by self-confidence with a mean of 12.21. Similarly, a study conducted by Abolfotouh et al also reported that hair follicle disorders significantly impact emotions rather than other domains.<sup>21</sup>

In modern times appearances are used as a measurement of attractiveness and sexuality for many people, and visible hair loss can have a major negative impact, particularly in some women, on self-perceptions of feminine characteristics and attractiveness.<sup>22</sup> Our findings indicated that there was no significant difference between the sexes in QoL. However, Russo et al reported that females with AGA had more impaired QoL than men.<sup>23</sup> This might be due to female dominance in their study. At the same time, the multivariate linear regression model proved that women have worsened QoL in terms of symptoms (P=0.013) and men have worsened QoL in stigmatization (P=0.041) of the Hairdex domain.

Our analyses revealed that AGA patients aged < 30 years were more impaired with lower QoL in WHO-BREF with a Mean of 231.06 and Hairdex with a Median of 52.00, specifically with the physical health (P=0.038) and psychological domain (P=0.030) in WHO-BREF, and symptoms (P=0.002) and emotion (P=0.002) domains in Hairdex. This indicates hair loss symptoms impact physical health and create a psychological and emotional negative impact on age <30 years. Additionally, the results confirm with those of recent studies examining QoL in AGA patients, which found that young AGA patients had lower QoL.<sup>1,10,11,24,26-28</sup> These findings suggest that older AGA patients might have an improved coping mechanism compared with younger patients with AGA. However, Gonal et al demonstrated that QoL is not affected by patient age. They concluded that cultural and traditional beliefs might influence the perception of hair loss in different communities.<sup>25</sup>

Education was found to have a positive effect on Quality of life and well-being through income and health.<sup>29</sup> Similarly, our analyses determined that less education was associated with a lower QoL in WHO-BREF with a Mean of 217.93 and Hairdex with a Median of 64.00. In the WHO-BREF, three domains (psychological, social relationship, environment) showed statistically impaired QoL in the less-educated patients, and the most impaired domain was the environment (P=0.001). In the Hairdex, all domains (symptoms, function, emotions, self-confidence, stigmatization) showed impaired QoL, and the most impaired domain was function (P=0.001). This indicates that QoL in AGA patients were more influenced by education level and a higher level of education provides better QoL.



The analyses of results revealed that single patients had a highly impaired QoL than married patients on the Hairdex scale with a Median of 53.56. Symptoms and emotions were highly impaired domains in the Hairdex scale. Similar to our results, Elsaie et al reported that single patients with AGA had poor QoL compared to that of married individuals.<sup>12</sup> Hence, this proves that being single has a greater influence on QoL by AGA. The reason might be that single patients have more need to socialize and make friends, so their quality of life is more affected than that of married people.

In our study results on the place of birth, there was an adversely affected impact on QoL in rural populations by the Hairdex scale. However, Elsaie et al reported no statistically significant association between urban and rural patients with AGA.<sup>12</sup> This may be due to the urban living environment and economic development being better compared to rural regions in China. Furthermore, awareness and knowledge regarding AGA is lacking in rural regions.

The current study found that 67.07% of patients had a positive family history of hair loss, and the results showed that the presence or absence of family history in AGA had no significant difference in the total score of the questionnaires. Similar to our results, Elsaie et al found no significant association between the presence or absence of family history.<sup>12</sup> However, our analysis in the linear regression of the Hairdex domain revealed that patients with a positive family history had better self-confidence. This suggests that people with a positive family history of AGA have an early awareness of the disease, so their quality of life is less affected.

Our analysis of the disease duration revealed no statistically significant differences found among groups. Similar to our results, previous studies have shown that the longer the condition of AGA, the greater the impact on QoL. However, no statistically significant difference was found among the groups in any of the studies.<sup>1,10,12,25,27</sup> This suggests that duration of AGA has no effect on the QoL.

In our analysis of the disease severity, no statistically significant difference was found in QoL among groups by the total score. Regarding the commonest type/grade of presentation in male patients by Hamilton-Norwood scale<sup>17</sup> Type III Vertex is the most common type with 51.85% and in female by Sinclair Sclae<sup>18</sup> Type I is the most common type with 66.12%. Similarly, Xu et al study showed in shanghai Type III Vertex as the commonest type of presentation in men and Type I as the commonest type of presentation in women.<sup>30</sup> However, some studies have shown different results. A study in an Indian population by Sehgal VN et al showed type II and III as the commonest presentation.<sup>31</sup> A Chinese study by Wang et al<sup>32</sup> which included multiple cities in China showed type IV as the commonest type, while the Korean study by Paik et al<sup>33</sup> showed type III as the commonest type. A study of a Turkish population by Salman KE et al showed Type III was found to be the more prevalent type.<sup>34</sup>

Although this study drew several important conclusions, it had several limitations. First, it was limited by its small sample size. Second, our study was conducted in a single tertiary hospital-based design, which limits the generalizability of our results. Third, all the questionnaires were self-reported. In these cases, reporting biases might have acted as confounding factors.

## Conclusion

Our findings demonstrate that there was no significant QoL difference between the gender in AGA. Patients aged less than 30 years, single, and less educated have negatively impacted QoL. As per domains, women have worsened QoL in terms of symptoms and men have worsened QoL in stigmatization. Emotions, symptoms, physical health, and psychological domains were the most impaired domains in age less than 30 years and single patients with AGA. Physical health and self-confidence domains are most significantly affected in those aged above 30 years. Less-educated patients suffer in all domains in Hairdex and WHO-BREF, except for the physical health domain. Dermatologists should inquire about QoL in patients with AGA, identify the factors, provide appropriate support to raise awareness and understanding of AGA in patients, and consider ways to improve patients QoL when discussing treatment options.

## Data Sharing Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Compliance with Ethics Guidelines

The present study was conducted in accordance with the World Medical Association Declaration of Helsinki. This study was approved by the Ethics Committee of Tongji Hospital affiliated with Tongji University (ID K-2022-001). Copyright permission is not required to reproduce the Hairdex Questionnaire. All registry participants provided written informed consent and authorization prior to participating.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors declare no conflict of interest in this work.

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