SKIN

RESEARCH LETTER

Beyond the Follicle: Exploring Psychiatric Comorbidities in Androgenetic Alopecia

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ABSTRACT

Androgenetic alopecia (AGA) is commonly treated with finasteride a 5-alpha-reductase inhibitor. Post-finasteride syndrome (PFS) is a constellation of neuropsychiatric and sexual adverse events following finasteride. Further complicating the formal diagnosis of PFS, baseline risk of psychiatric comorbidities in AGA remains unclear as the androgens responsible for AGA also play a key role in regulating mood, behavior, and neural plasticity. This systematic review characterizes the prevalence and types of psychiatric conditions in patients with AGA to contextualize potential vulnerability to PFS.

Following PRISMA guidelines and PROSPERO registration, we conducted a systematic review of PubMed and Cochrane Library through February 2025 for studies reporting psychiatric comorbidities in AGA patients. Twenty-six studies met inclusion criteria, encompassing five psychiatric domains: anxiety/depression, schizophrenia or psychotic disorders, obsessive-compulsive traits, personality disorders, and general psychological distress.

Depression and anxiety were consistently elevated in AGA patients versus controls, with symptom severity correlating with alopecia extent. Depression was more prevalent in women (55%) than men (3%). Whereas men exhibited higher rates of anxiety (78%) and aggression (22%) compared to women 41% and 4%, respectively. Personality disorders were also more frequent in AGA, though causality and directionality remain uncertain. Data on schizophrenia and obsessive–compulsive traits were inconsistent.

Patients with AGA appear to have elevated baseline psychiatric vulnerability that may overlap with or predispose to PFS-like symptoms. Mental health screening prior to finasteride initiation may be beneficial. A personalized approach to AGA treatment is essential to optimize outcomes and minimize harm.

INTRODUCTION

Systemic finasteride is currently the only approved treatment for Androgenetic alopecia (AGA). Finasteride is a competitive 5-alpha-reductase inhibitor that blocks the conversion of testosterone to dihydrotestosterone. Recently, post-finasteride syndrome (PFS) has emerged as

a condition that encompasses a range of neuropsychiatric and sexual adverse events following finasteride. Symptoms ranging from suicidal thoughts to paresthesia can appear as early as after treatment initiation and persist years after discontinuation of treatment.1 Further complicating the formal diagnosis of PFS, baseline risk of psychiatric comorbidities in AGA remains unclear as the androgens responsible for AGA also play a key role in regulating mood, behavior, and neural plasticity.2 Given the assumption that PFS may attribute to 5-alpha reductase inhibition, we investigated whether preexisting psychiatric comorbidities in men with AGA may act as confounding or predisposing factors for the development of PFS symptoms.

METHODS

To better characterize the relationship between baseline psychiatric symptoms and AGA and contextualize PFS risk in AGA patients, we conducted a systematic review following PRISMA guidelines and registered with PROSPERO (CRD42025645809). A systematic search of PubMed and Cochrane Library was completed through February 2025 by four reviewers (**Supplemental Figure 1**). We included studies reporting psychiatric disorders in AGA patients and excluded non-English, animal, and unspecified alopecia studies. Controls were defined as individuals without AGA as reported in each study and 6 studies had no control group.

RESULTS

Twenty-six articles were identified revealing psychiatric comorbidity groups: anxiety/depression, schizophrenia or psychotic disorders, obsessive-compulsive traits, personality disorders, and general psychological distress (**Supplemental Tables 3, 4**).

Most included studies assessed psychiatric conditions diagnosed after the onset of AGA based on cross-sectional or post-treatment evaluations. None of the studies specifically included or evaluated patients with a confirmed diagnosis of post-finasteride syndrome (PFS).

Baseline levels of depression/anxiety were significantly elevated in patients with AGA compared to controls (**Tables 1,2**). The severity of anxiety and depressive symptoms tended to increase with the degree of hair loss, potentially reflecting psychosocial distress from visible alopecia in addition to underlying hormonal and genetic predispositions. Specifically, depression was more commonly reported in women with AGA with a prevalence of 55% vs 3% in men whereas situational anxiety and aggressive behavior were more frequently observed in AGA men with rates of 78% vs 41% in women and 22% vs 4% in women, respectively.[3]

For the other four groups of psychiatric comorbidities (schizophrenia, obsessive compulsive tendencies, personality disorders, general psychological distress), the literature varied (**Tables 1,2**). The prevalence of personality disorders is higher in AGA patients compared to the general population; however, the articles have limited insights into the directionality or causality of these associations.[4] The heterogeneity of psychiatric assessment tools capture symptomatology but not formal diagnoses further complicating cross-study interpretation (**Supplementary Table 2**). Data on the relationship between AGA and schizophrenia, obsessive-compulsive disorders, or personality disorders remains limited.[3,4]

Table 1. Psychiatric comorbidities reported in androgenetic alopecia

Psychiatric Domain	Representative Studies (*n*)	% Studies Reporting Significant Association	Direction of Association	Findings
Depression	*9*	67%	↑ in AGA vs controls or AA	Severity correlates with AGA grade higher in women[7,12,16]
Anxiety / Social Anxiety	*8*	75%	↑ in AGA vs controls	Social anxiety particularly elevated in women[3,15]
Psychoticism / Schizophrenia	*4*	50%	Mixed	Higher psychoticism scores (Wang 2018); lower schizophrenia risk in AGA men[10,18]
Obsessive–Compulsive Tendencies	*3*	33%	Mixed / ↓	Lower obsessive-compulsive scores vs controls[10]
Personality Disorders	*1*	100%	↑	Personality disorder prevalence 76% vs 10% general population[21]
General Psychiatric Distress	*6*	50%	Mixed	GHQ-12 higher in women; other scales (DQ, MHI-5) often nonsignificant[23]

Table 2. Psychiatric rating scales and corresponding AGA studies

Psychiatric Assessment	Psychiatric Domain(s)	Interpretation / Scoring	Clinical Studies Using Scale (Study Category)
HADS	Anxiety, Depression	14 items; ≥8 borderline abnormal	Titeca[1] (A), Fong[2] (A)
BDI / BAI	Depression / Anxiety	21 items each; BDI ≥11 mild depression	Kim[5] (A), Tas[7](C), Wells[13] (A), Hirsso[14] (B), Prasanna[16] (A)
SCL-90-R	Global psychopathology, psychoticism, OC traits	90 items; GSI = overall psychological status	Wang[10] (C), Sawant[11](D), Maffei[21](PD), Kheirabadi[18] (C)
GHQ-12	General distress	12 items; score ≥4 abnormal	Tabolli[23] (C)
DQ	General distress	33 items; higher = worse psychological functioning	van der Donk[24](D), Passchier[22] (D)
MHI-5	Mental health status	5 items; higher = better health	Budd[25] (D)

SDS / SAS	Depression / Anxiety	20 items each; SDS ≥53 = depression cutoff	Yu[8] (A)
STAI-Y, SIAS, SPS	Trait / social anxiety	20–40 items; higher = greater anxiety	Russo[15] (C)
PDQ-R	Personality Disorders	Self-report; higher = greater trait pathology	Maffei[21] (D)
UCLA-LS	Loneliness	20 items; higher = greater loneliness	Prasanna[16] (A)

Study Category: A = study with alopecia areata control group; B = study with telogen effluvium control group; C = study contributing to multiple psychiatric domains; D = study contributing to multiple categories (nonsignificant); E = study with androgenetic alopecia. Abbreviations: AGA, androgenetic alopecia; AA, alopecia areata; HADS, Hospital Anxiety and Depression Scale; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; SDS, Self-Rating Depression Scale; SAS, Self-Rating Anxiety Scale; SCL-90-R, Symptom Checklist-90-Revised; GHQ-12, General Health Questionnaire; STAI-Y, State-Trait Anxiety Inventory; SIAS, Social Interaction Anxiety Scale; SPS, Social Phobia Scale; UCLA-LS, University of California, Los Angeles Loneliness Scale; PDQ-R, Personality Disorders Questionnaire–Revised; MHI-5, Mental Health Inventory–5.

DISCUSSION

Finasteride remains a common treatment for AGA, even as PFS has emerged as a condition detrimental to patient quality of life. While PFS remains a multifactorial entity, it is important to distinguish medication-related symptoms from preexisting psychiatric comorbidities observed in AGA. With the plethora of debilitating physical and mental symptoms associated with PFS, careful risk assessment must be done when prescribing.

Our findings suggest that psychological symptoms attributed to PFS may, in part, reflect underlying psychiatric predisposition. Based on available studies the prevalence of depression, anxiety, and personality disorders appears higher in AGA patients, clinicians should consider mental health screening when appropriate prior to initiating finasteride, which could exacerbate baseline neuropsychiatric symptoms.[1] A personalized, patient-centered approach with a focus on education of the risks involved with finasteride is essential to ensuring its safe and effective use in AGA management.

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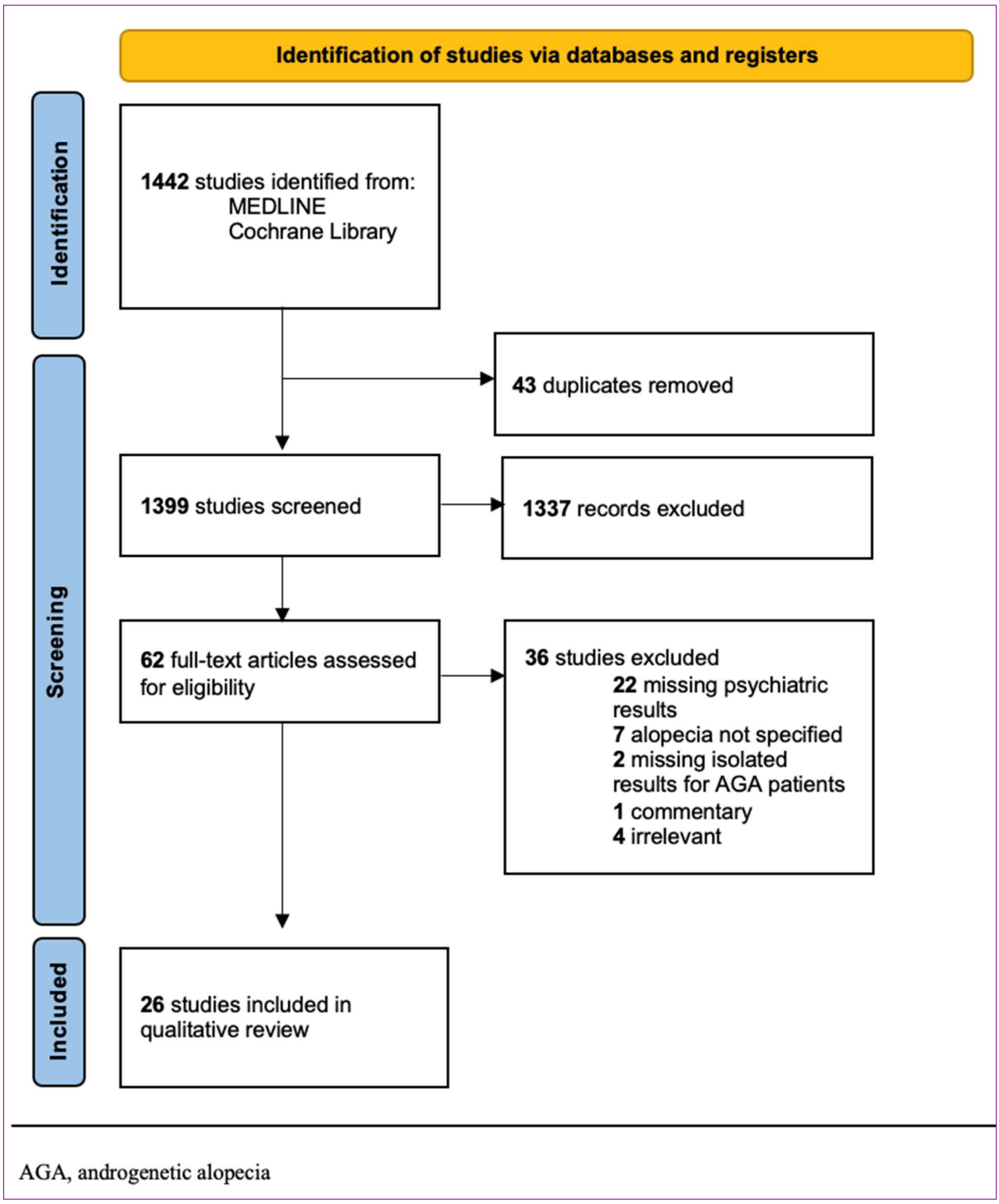
SUPPLEMENTAL FILES

Supplemental Figure 1. PRISMA diagram demonstrating article selection process



Supplemental Table 1. Human studies on anxiety and/or depression in patients with androgenetic alopecia

Author (year)	Study Type (LOE)	Study Participants			Psychiatric Outcome Scale	Psychiatric Outcomes
		AGA, n (% men)	Control Group(s)	Age (year)		
Titeca et al. (2019)[1]	CS (3)	20 (23%)	Patients w/o any dermatological disorder (n=1359) AA patients (n=37)	41-42[a]	HADS	*Higher HADS anxiety ($p < 0.001$) and depression ($p = 0.02$) scores in AGA and AA patients compared to controls *HADS-depression scores higher ($p=0.02$), but HADS-anxiety scores lower ($p<0.01$) in AGA patients compared to AA patients
Kim Fong et al. (2017)[2]	CS (3)	101 (59%)	None	29[c]	HADS	*HADS-anxiety and depression scores higher in: - women compared to men ($p<0.001$) - patients ages < 40 y compared to ≥40 y patients ($p<0.001$) - patients with AGA <4 compared to those with AGA ≥4 years - patients who adopted coping strategies compared to those that did not ($p<0.002$)
Cash et al. (1993)[3]	CS (3)	156 (38%)	Women w/o AGA (n=56)	31-37[a]	13-item Self-Consciousness Scale - social anxiety subscale	*Social anxiety in women w/ AGA higher compared to women w/o AGA ($p<0.05$) *Social anxiety in women w/ AGA higher compared to men w/ AGA ($p<0.05$)
Cash et al. (1992)[4]	CS (3)	103 (100%)	Men w/o AGA (n=42)	30[c]	Social anxiety scale	*Social anxiety and stress attributed to AGA not correlated ($p >0.05$)

Kim et al. (2021)[5]	CS (3)	267 (100%)	None	60% of patients <30	BDI	*Depression correlated with excessive difficulties in social life and interpersonal relationships in men w/AGA (p=0.011)
He et al. (2022)[6]	CS (3)	49 (78%)	Patients without AGA (n=9178)	18.2[a]	GAD-2, PHQ-2	*Depressive (p=0.580) and anxiety (p=0.222) symptom burden no different between individuals with AGA compared to controls
Tas et al. (2018)[7]	CS (3)	353 (80%)	None	23-32[a]	BAI, BDI	*BAI and BDI higher in women w/ AGA compared to men w/AGA (p=0.0001)
Yu et al. (2016)[8]	CS (3)	212 (63%)	AA patients (n=130)	30-32[a]	SDS, SAS	*Clinical depression (17% vs.15%, p=0.036) and anxiety more prevalent (19% vs. 14%, p=0.023) in AGA patients compared to AA patients
Van der Donk et al. (1991)[9]	CS (3)	58 (0%)	Women w/o AGA (n=48) Men w/ AGA from prior study	29-35[a]	Self-rating scale for depression, trait anxiety scale	*Depression or trait anxiety scores no different between women w/AGA and women w/o AGA (p > 0.05)
Wang et al. (2018)[10]	CS (3)	355 (96%)	Patients w/o alopecia (n=406)	17-40[b]	SCL-90-R	*Depression (p<0.001) and phobic anxiety (p<0.001) scores higher in AGA patients compared to controls
Sawant et al. (2010)[11]	CS (3)	37 (100%)	None	15-50[b]	SCL-90-R	*Depression (p=0.825), phobic anxiety (p=0.378), and anxiety (p=0.762) scores no different between younger (15-25 y) and older (26-50 y) men with AGA

Camacho et al. (2002)[12]	CS (3)	200 (50%)	None	NR	Clinical evaluation for depression, adaptive/ situational anxiety based on behavior	*Depression more prevalent in women w/AGA women compared to men w/ AGA (55% vs 3%) *Adaptive/situational anxiety more prevalent in men w/AGA compared to women w/ AGA (78% vs 41%)
Wells et al. (1995)[13]	CS (3)	122 (100%)	Patients w/o alopecia (n=60)	37[a]	BDI	*Depression ($p<0.05$) associated with AGA independent of age ($p>0.05$)
Hirsso et al. (2005)[14]	CS (3)	105 (0%)	Women w/o AGA (n=225)	63[d]	BDI ≥	*Depressive symptom prevalence (BDI 10) no different between women w/ AGA (22%) and controls (17%), p=0.311)
Russo et al. (2018)[15]	CS (3)	80 (29%)	AA patients (n=27) TE patients (n=36)	23-46[a]	STAI-Y, SIAS, SPS	*Trait anxiety ($p =0.015$), social phobia ($p = 0.042$), social anxiety ($p = 0.011$) higher in women w/ AGA compared to men w/ AGA
Prasanna et al. (2023)[16]	CS (3)	100 (100%)	None	18-24	BDI, UCLA-LS	*BDI showed a statistically significant association between the severity of AGA and the severity of depression ($p<0.001$)

LOE, level of evidence; CS, cross-sectional study; AGA, androgenic alopecia; AA, alopecia areata; w/, with; w/o, without; HADS, Hospital Anxiety and Depression Scale; BDI, Beck Depression Inventory; GAD-2, Generalized Anxiety Disorder Scale; PHQ-2, Patient Health Questionnaire; BAI, Beck Anxiety Inventory; SDS, self-rating depression scale; SAS, self-rating anxiety scale; SCL-90-R, Symptoms Checklist-90; STAI-Y, State Trait Anxiety Inventory; SIAS, Social Interaction Anxiety Scale; SPS, Social Phobia Scale; UCLA-LS, University of California, Los Angeles - Loneliness Scale

[a]mean age of all patients or lowest to highest mean reported for subgroups; [b]age range of patients; [c]median age; [d]patients same age

Supplemental Table 2. Human studies on schizophrenia, obsessive compulsive tendencies, personality disorders, and general psychiatric distress in patients with androgenetic alopecia.

Author (year)	Study Type (LOE)	Patent Characteristics			Psychiatric Outcome Scale	Psychiatric Outcomes
		AGA, n (% men)	Control Group(s)	Age Range (year)		
Schizophrenia/psychoticism: Evidence contradictory and limited						
Wang et al. (2018)[10]	CS (3)	355 (96%)	Patients w/o alopecia (n=406)	17-40[b]	SCL-90-R	*Psychoticism ($p<0.001$) scores higher in AGA patients compared to controls
Sawant et al. (2010)[11]	CS (3)	37 (100%)	None	15-50[b]	SCL-90-R	*Psychoticism scores no different ($p=0.643$) between younger (15-25 y) and older (26-50 y) men with AGA
Wu et al. (2014)[17]	CS (3)	98 (76%)	Patients w/o schizophrenia from a national database (n=30,996)	52-54[a]	Epidemiology of skin diseases in schizophrenia patients	*Schizophrenia patients showed higher prevalence of AGA (29%, evaluated by dermatologist) compared to controls (1% identified from physician provided ICD codes)
Kheirabadi et al. (2013)[18]	CS (3)	98 (100%)	Men w/o history of mental illness (n=95)	32-33[a]	AGA severity in schizophrenia patients	*Schizophrenia risk decreased (8.6 folds) in men w/ AGA (Hamilton Scale 3 or higher)
Obsessive Compulsive Tendencies: Evidence limited						
Wang et al. (2018)[10]	CS (3)	355 (96%)	Patients w/o alopecia (n=406)	17-40[b]	SCL-90-R	*Obsessive–compulsive scores ($p<0.001$) lower in AGA patients compared to controls
Sawant et al. (2010)[11]	CS (3)	37 (100%)	None	15-50[b]	SCL-90-R	*Obsessive-compulsive scores no different ($p=0.55$) between younger (15-25 y) and older (26-50 y) men with AGA
Sánchez-Dueñas et al. (2022)[19]	CR (5)	3 (100%)	N/A	29-42[b]	Clinical evaluation	*Three cases of AGA coexisting with trichoscopic findings of trichoteiromania
Gleeson et al. (1993)[20]	CR (5)	1 (100%)	N/A	36[d]	Interviewed by two psychiatrists	*Obsessive but not psychotic
Personality Disorders: Evidence limited						

Maffei et al. (1994)[21]	CS (3)	116 (55%)	None	31[a]	PDQ-R, SCL-90	*Personality disorders more prevalent in AGA patients (76%) vs general population (10%), p<0.0001 *Prevalence of personality disorders no different (p=0.79) between women w/AGA (75%) and men w/AGA men (79%)
General Psychiatric Distress/Disturbance: Evidence contradictory						
van der Donk et al. (1991)[9]	CS (3)	58 (0%)	Women w/o AGA (n=48) Men w/ AGA from prior study	29-35[a]	DQ	*DQ score no different between women w/ AGA and women w/o AGA (p > 0.05) *DQ scores higher in women w/ AGA compared to men w/ AGA (p<0.001)
Wang et al. (2018)[10]	CS (3)	355 (96%)	Patients w/o alopecia (n=406)	17-40[b]	SCL-90-R	*Global severity index scores higher in AGA patients compared to controls (p<0.001)
Passchier et al. (1988)[22]	CS (3)	85 (100%)	Patients w/o alopecia (number NR)	18-49[b]	DQ	*DQ scores no different between men w/ AGA and men w/o AGA (p=0.21)
Tabolli et al. (2013)[23]	CS (3)	351 (68%)	Men w/o AGA (n=108)	32-44[a]	GHQ-12	*GHQ-12 higher in women w/ AGA compared to men w/ AGA (p<0.001) *GHQ-12 higher in men w/ AGA compared to men w/o AGA (p=0.047)
van der Donk et al. (1991)[24]	CS (3)	168 (100%)	Patients w/o alopecia (number NR)	35[a]	DQ	*DQ scores no different between men w/ AGA and men w/o AGA (p>0.05)
Budd et al. (2000)[25]	CS (3)	798 (100%)	Men w/o alopecia (n=919)	29[a]	MHI-5	*MHI-5 scores no different between AGA patients and published norms for men (p>0.05)
Kivanç-Altunay et al. (2003)[26]	CS (3)	8 (56%)	Patients w/o alopecia and trichodynia (n=25)	30-41[a]	DSM-IV criteria	*DSM-IV disorder prevalence (including depression, anxiety, and/or obsessive personality disorder) no different between trichodynia group (AGA and TE) and control group (p=1.000)

AA, alopecia areata; AGA, androgenic alopecia; CR, case report; CS, cross-sectional study; w/, with; w/o, without; DQ, Delft Questionnaire; F, female; GHQ-12, General Health Questionnaire; DSM, Diagnostic and Statistical Manual of Mental Disorders; MHI-5, Mental Health Inventory-5; NHIRD, National Health Insurance Research Database; NR, Not Reported; PDQ- R, Personality Disorders Questionnaire-Revised; SCL-90-R, Symptom Checklist-90-R; TE, telogen effluvium; y, year
[a]mean age of all patients or lowest to highest mean reported for subgroups; [b]age range of patients; [c]median age; [d]patients same age

Supplemental Table 4. Psychiatric rating scales to assess disorders in patients with androgenetic alopecia

Instrument	Description	Studies Utilizing Instrument
Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI)	-Items: 21; self-reported -Assess depression (BDI) and anxiety (BAI) -Scores range from 0-63 -BDI: 11-16 mild depression; 17-20 borderline clinical depression; 21-30 moderate depression; 31-40 severe depression, 40-63 very serious depression -BAI: 0-7 minimal anxiety, 8-15 mild anxiety, 16-25 moderate anxiety, 26-63 severe anxiety	Kim et al. (2021) Tas et al. (2018) Wells et al. (1995) Hirsso et al. (2005) Prasanna et al. (2023)
Delft Questionnaire	-Items: 33 -Screens for general unspecified psychological problems	van der Donk et al. (1991) van der Donk (1991) Passchier et al. (1988)
Generalized Anxiety Disorder Scale (GAD-2)	-First 2 items of the GAD-7 -Assesses anxiety -Scores range from 0-6 -Scores of ≥3 indicative of clinically relevant anxiety disorder	He et al. (2022)
General Health Questionnaire (GHQ-12)	-Items: 12; self-reported -Measures psychological distress and/or non-psychotic psychiatric disorders (mainly depressive or anxiety disorders) -If used to measure psychological distress: Likert-type scale of 0-3, with scores range from 0-36 -If used to measure non-psychotic psychiatric disorders: scale 0-1 with scores ranging from 0-12 and score of 4 considered GHQ-positive	Tabolli et al. (2013)
Hospital Anxiety and Depression Scale (HADS)	-Items: 14; self-reported -7 items assess anxiety and 7 items assess depression -Anxiety and depression subscale scores range from 0-21 -Score interpretation: 0-7 normal, 8-10 borderline case, 11-21 a case	Titeca et al. (2019) Kim Fong et al. (2017)
Mental Health Inventory-5 (MHI-5)	-Items: 5; self-reported -Assesses general mental health -Scores ranged from 5-30 -Scores standardized to scale ranging between 0-100 -Higher scores indicate better mental health	Budd et al. (2000)
Patient Health Questionnaire (PHQ-2)	-First 2 items of the PHQ-9 -Assesses depression -Scores range from 0-6 -Scores of ≥3 indicative of depression	He et al. (2022)

Self-rating depression scale (SDS) and Self-rating anxiety scale (SAS)	-Items: 20; self-reported -Likert-type scale of 1-4 -Assesses symptoms over the last week -Scores range from 20-80 -SDS: cut-off score of 53 -SAS: cut-off score of 50	Yu et al. (2016)
Social Interaction Anxiety Scale (SAIS)	-Items: 20; self-reported -Measures social anxiety -Scores range from 0-80 -Suggested cut-off score of 34	Russo et al. (2018)
Social Phobia Scale (SPS)	-Items: 20; self-reported -Measures symptoms of social phobia -Scores range from 0-80 -Suggested cut-off score of 24	Russo et al. (2018)
State Trait Anxiety Inventory (STAI_Y)	-Items: 40; self-reported -20 items assessing trait anxiety and 20 items assessing state anxiety, self-reported -Trait and state anxiety scores range from 20–80 -Higher score indicates greater anxiety	Russo et al. (2018)
Symptoms Checklist-90 (SCL-90)	-Items: 90; self-reported -Covers somatization, obsessive–compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism -Rated on a 5-point Likert scale -Assess symptoms from past day and past week -Provides scores for three global indices: global severity index (GSI), positive symptom total (PST), and positive symptom distress index (PSDI) -GSI: considered to be best assessment of overall psychological status	Wang et al. (2018)[10] Sawant et al. (2010) Maffei et al. (1994)
University of California, Los Angeles - Loneliness Scale (UCLA-LS)	-Items: 20; self-reported -Assesses feeling of loneliness -Scores range from 20-80 -Likert-type scale of 1-4	Prasanna et al. (2023)[16]