Citation:
Frith, H and Jankowski, G (2023) Psychosocial impact of androgenetic alopecia on men: A systematic review and meta-analysis. Psychology, Health and Medicine. pp. 1-21. ISSN 1354-8506 DOI: https://doi.org/10.1080/13548506.2023.2242049

Link to Leeds Beckett Repository record:
https://eprints.leedsbeckett.ac.uk/id/eprint/9899/

Document Version:
Article (Published Version)

Taylor & Francis
Taylor & Francis Group

Psychology, Health & Medicine

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cphm20

# Psychosocial impact of androgenetic alopecia on men: A systematic review and meta-analysis

Hannah Frith & Glen S. Jankowski

**To cite this article:** Hannah Frith & Glen S. Jankowski (2023): Psychosocial impact of androgenetic alopecia on men: A systematic review and meta-analysis, Psychology, Health & Medicine, DOI: 10.1080/13548506.2023.2242049

**To link to this article:** https://doi.org/10.1080/13548506.2023.2242049

PSYCHOLOGY, HEALTH & MEDICINE
https://doi.org/10.1080/13548506.2023.2242049

Taylor & Francis
Taylor & Francis Group

# Psychosocial impact of androgenetic alopecia on men: A systematic review and meta-analysis

Hannah Frith[a] and Glen S. Jankowski[b]

[a]School of Psychology, University of Surrey, Guildford, UK; [b]Department of Psychology, Leeds Beckett University, Leeds, UK

**ABSTRACT**

The adverse psychosocial impact of androgenetic alopecia (AGA) is often framed as an essential motivation for developing efficacious treatments to halt hair loss or promote regrowth, especially since AGA is common among men but does not result in physically harmful or life-limiting consequences. Yet, empirical evidence documenting the impact of AGA on men's psychological wellbeing and quality of life is patchy and has not previously been subject to systematic review. This systemic review and meta-analyses aim to integrate and evaluate evidence regarding the psychosocial impact of AGA on men. A database and manual reference search identified English-language articles which reported: 1) empirical research; of ii) psychosocial distress (mental health, depression, anxiety, self-esteem, or quality of life); and iii) data separately for male AGA participants. Screening of 607 articles resulted in 37 (6%) for inclusion. PRISMA guidelines, the (modified) AXIS quality assessment tool, and independent extraction were deployed. Heterogeneity in measures and study aims, moderate study quality ($M = 7.37$, SD = 1.31), probable conflicts of interest (78%) and biased samples (68%) suggest that results should be treated cautiously. Meta-analyses revealed no impact on depression (pooled $M = 8.8$, 95% CI = 6.8–10.8) and moderate impact on quality of life (pooled $m = 9.12$, 95% CI = 6.14–12.10). Men with AGA were found to have average or better mental health compared to those without AGA. Overall, there was limited evidence of a severe impact on mental health and quality of life for men experiencing hair loss, with most studies evidencing (at best) a moderate impact. Good dermatological care includes accurately educating about the psychosocial impact of AGA on men, taking care not to overstate levels of distress, and screening for distress using validated measures which have clear clinical thresholds.

**ARTICLE HISTORY**
Received 16 January 2022
Accepted 24 July 2023

**KEYWORDS**
androgenetic alopecia; quality of life; psychosocial; anxiety; depression

## Background

Androgenetic alopecia (AGA), typically known as male pattern baldness, refers to the loss of head hair that many men experience during their lifetimes, although women also experience AGA. Whether AGA comprises a medical condition is contested. Some

**CONTACT** Hannah Frith h.frith@surrey.ac.uk School of Psychology, University of Surrey, Guildford, Surrey GU2 7XH, UK

regard AGA as a medical (versus cosmetic) condition requiring treatment (British Association of Hair Restoration Surgeons, 2019), although it results in no physically harmful or life-limiting consequences, as some acknowledge (e.g. Gonul et al., 2018; Tang et al., 2000). Nonetheless, a range of options for preventing the progression of hair loss, or stimulating hair regrowth, have been developed, including hair transplants and drug, laser or plasma therapies. Yet, there is often a lack of high-quality evidence to support these interventions, compliance with treatment is often poor, and men may be dissatisfied with treatment outcomes (see Gupta et al., 2019; Kanti et al., 2018 for overviews).

Consequently, the adverse *psychosocial* impact of AGA is increasingly framed as a rationale for developing efficacious treatments while alleviating psychosocial distress is a suggested measure of treatment success. Researchers, practitioners and professional bodies often assert that AGA has profound psychosocial impact. Patient information from the British Association of Dermatologists notes that '*Hair loss may cause significant psychological difficulties*' (2016, p.1), and the European Dermatology Forum (EDF) advises professionals that: '*patients diagnosed with androgenetic alopecia undergo significant impairment in their quality of life*' (Blumeyer et al., 2011, s1). Whilst the first cites no evidence to support their position, the EDF guidance relies on just two, heavily cited, studies (Alfonso et al., 2005; Cash et al., 1993) whose results provide mixed support for their assertion. This reflects inconsistency within the extant research; some studies report high psychosocial impact with lowered self-esteem and impaired social interactions (e.g. Budd et al., 2000; Cash, 2009), while others report little to no impact, especially if baldness is accepted (Kranz, 2011). To date, there have been no systematic reviews integrating this evidence.

This is a serious omission as psychosocial factors may mediate the impact of baldness among men (including help-seeking, expectations of treatment and treatment compliance), while medical treatments may exacerbate psychosocial harm (Rahimi-Ardabili et al., 2006). There is a disconnection, then, between the emphasis placed on the psychological impact of hair loss, and the absence of information about psychological interventions in medical curriculums and training (British Association of Hair Restoration Surgeons, 2019; Edelson, 2018). Accurate information about the psychosocial impact of baldness is important for professionals, individual men considering interventions, and policy makers needing to regulate such interventions. This review addresses the question: What, according to published evidence adopting any design, is the psychosocial impact of baldness on men?

## Method

The study protocol (registered 10/11/20 https://osf.io/uvzp9) conforms to the 2009 Prisma statement (Moher et al., 2009).

### *Search strategy*

Electronic databases (PsycInfo, APA PsycArticles, Psychology and Behavioral Sciences Collection, APA PsycBooks, MEDLINE, CINAHL Full-Text) were systematically searched combining terms for AGA (e.g. 'androgenic alopecia' OR 'androgenetic alopecia' OR 'male pattern bald*' OR 'male pattern hair loss'), men (male or men or man or males) and psychosocial outcomes (e.g. 'quality of life' OR wellbeing OR well-being OR 'health-related quality of life' OR 'life satisfaction' OR 'subjective well-being' OR distress OR 'mental health' OR 'self-esteem' OR depression OR 'mental illness'). No dates or other limiters were applied; reference lists of included papers were manually screened.

### Eligibility criteria

Inclusion criteria applied were: i) empirical research; ii) recruiting male AGA participants; iii) reporting psychosocial outcomes for male AGA participants separately or based on a majority (≥70%) male AGA sample; and (iv) English-language only. Studies were independently screened by authors in three stages (1) title & keywords, (2) title, keywords and abstract and (3) full text. Pilot screening of studies ($n = 119$) allowed clarification of coding uncertainties. At each stage, authors reviewed coding and resolved remaining uncertainties.

### Data extraction

Study characteristics (e.g. geographic location, study design), population characteristics (e.g. sample size, sample type, demographics, hair loss assessment), psychosocial measures, and data relevant to the review question were extracted.

### Narrative analysis

Due to the heterogeneity of stated aims and psychosocial measures used, a narrative review is presented (Davis & Callender, 2018).

### Meta analyses

Where ≥3 independent studies adopted the same measure meta-analyses are reported (Rencz et al., 2016) – i.e. studies using the Dermatology Quality of Life Index (DQLI, Finlay & Khan, 1994), and the Beck Depression Inventory (BDI, Beck et al., 1961). Sample sizes, means and standard deviations were extracted (baseline scores for intervention studies). Where unreported, standard deviations were calculated based on the average of others (following Weir et al., 2018). Study subgroups were treated as independent samples. Incomplete data was requested for two studies but was unavailable. Substantial heterogeneity was detected among both measures (DQLI: $p < 0.001$, I2 = 100%; BDI: $p < 0.001$, I2 = 89%). Poor reporting (e.g. of demographics) impeded investigation into heterogeneity, thus random effect meta-analyses were conducted, and cautious interpretation is recommended (Boland et al., 2017).

### Risk of bias

A modified version of the AXIS tool was employed to assess quality using 14 criteria: (1) clear aims; (2) representative sample; (3) unbiased selection process; (4) reported the number of non-responders; (5) used trialled, piloted or published measures; (6) replicable methods section including basic sample information and details of measures deployed; (7); described basic data adequately; (8) reported a > 74% response rate; (9) reported demographics of non-responders; (10) ethical approval; (11) reported all results appearing in the methods; (12) discussion and conclusion justified by the results; (13) noted ≥ 1 study limitation; and, (14) no conflict of interest (Downes et al., 2016). Studies scored 1 for each criterion met and were categorized as Low (0–5), Moderate (6–10) or High quality (11–14).

## Results

After duplicates were removed 670 articles were, of which 37 met the inclusion criteria (see Figure 1).

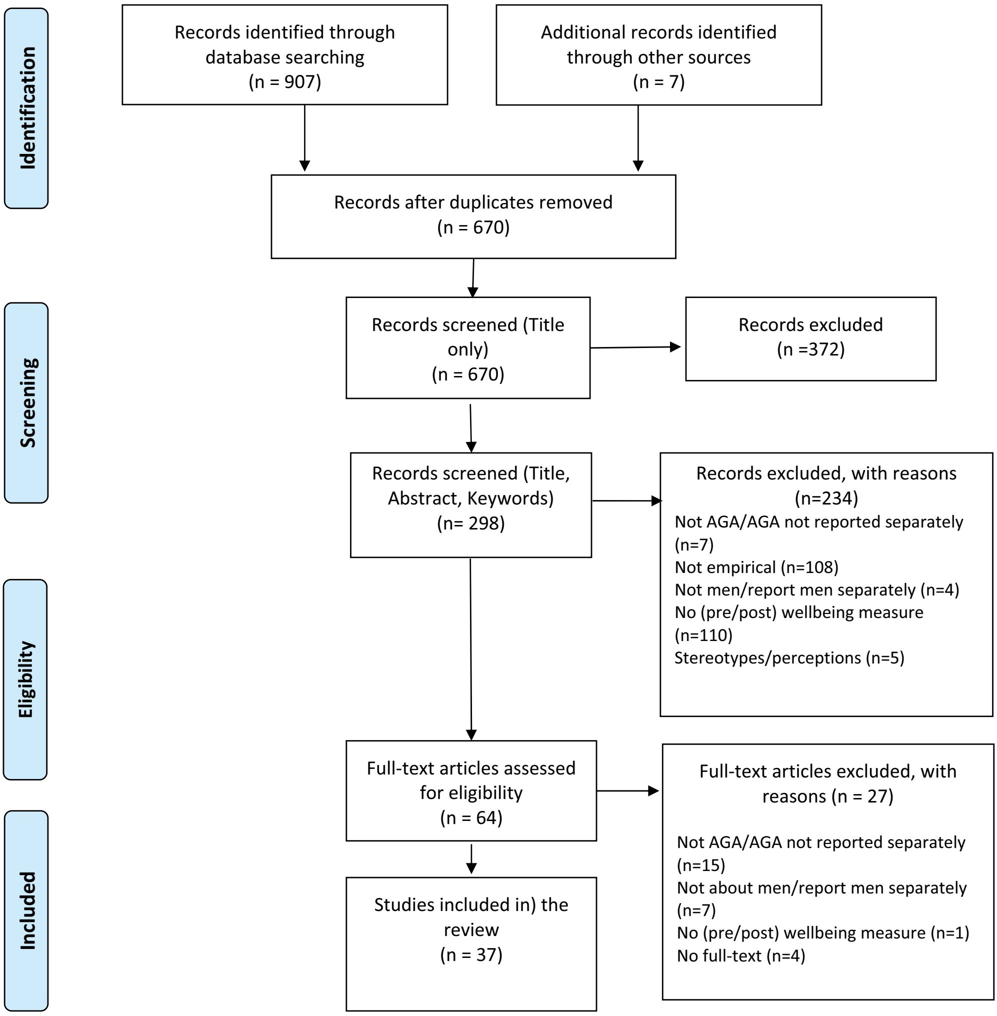

Figure 1. PRISMA diagram depicting the results of the systematic search strategy.

### Study characteristics and risk of bias

Recruiting men from 21 different countries, these studies typically had a cross-sectional design ($n = 30$), with two adopting prospective observational designs (Bade et al., 2016; Gupta et al., 2019), three reporting intervention studies with no control group (Rahimi-Ardabili et al., 2006, Lui et al., 2018; Yamazaki et al., 2011), and two randomized controlled trials (Passchier et al., 1988; Van der Donk et al., 1991) (see Table 1). A total of 10 620 AGA men were included, with sample sizes ranging from 23–1,761. Participants were aged 15–89 with a mean of 32.72 (SD = 9.26) years. Only one study (Cash et al., 1993) reported participants' ethnicity (78% White), and only five reported class or income levels specifically for their AGA male sample (Bade et al., 2016; Gupta et al., 2019, Lui et al. 2018; Sawant et al., 2010; Karaman et al., 2006) revealing samples with predominantly middle/upper class or moderate/high earners (range 49% –78%; *M* = 65%, SD = 13.82). Where reported, participants were predominantly highly educated (university level or equivalent).

Research quality was variable, with two rated low (Camacho & García-Hernández, 2002; Lulic et al., 2017), and the remaining 35 as moderate quality (*M* = 7.37; SD = 1.31). As not all studies disclosed, if publicly available evidence (i.e. author profiles, affiliations, or funding details) suggested at least one (co)author (or affiliated employer or the study's commercial funders) provided baldness interventions, this was deemed a conflict of interest. Fifteen studies (41%) received funding from commercial companies selling hair loss products/services (e.g. Merck and the Upjohn Company) and a further 14 (38%) likely had at least one (co)author (or affiliated employer) that provided hair loss interventions (full details are reported here: https://docs.google.com/spreadsheets/d/1-qg34Q_ejA7xkHshS-Basb3omvcbe4Q5RUOc90-e3KA/edit?usp=sharing). Except for one (Karaman et al., 2006), studies demonstrated three sample types. Twenty-five (68%) had 'biased' samples (representing 6,240 participants or 59% of the entire sample), consisting of men seeking hair loss products/services who are likely to be more distressed. Twenty-four utilised convenience samples. One recruited a large nationally representative sample but only included men who were 'treatment orientated' (Cash, 2009). Five recruited unbiased representative samples and six recruited non-biased convenience samples (e.g. from a university or airport setting) who were not actively seeking hair loss interventions. The Norwood-Hamilton scale was commonly used to identify hair loss severity – albeit inconsistently. Studies categorised men into mild, moderate or severe hair loss in different ways, and some included men with little or no hair loss within their AGA sample (e.g. 35% of men in Tang et al., 2000 had little or no hair loss), making comparison across studies difficult.

### Evidence of psychosocial impact of AGA for men

The psychosocial impact of AGA was assessed using non-validated ($n = 19$) and/or validated measures of mental health (e.g. self-esteem, anxiety, or depression, $n = 26$), and quality of life ($n = 8$) (indicated with * on Table 2). Despite the limited quality and explanatory power of non-validated measures, these studies are included because they are widely cited, include large multinational samples, and address a wider range of psychosocial issues (e.g. impact of hair loss on sexual attractiveness, help-seeking, concerns

**Table 1.** Summary of sample characteristics, hair loss assessment and quality assessment.

| Study | Location | Balding male participant characteristics (mean age and standard deviation) | Sample type | Hair loss/loss severity assessment[a] | Quality (0–14) |
|---|---|---|---|---|---|
| Alfonso et al. (2005) | Germany, France, Italy, Spain & UK | 729 balding men recruited via market-research or through “‘random digit dialling” (pg. 1830; n.r.) | Nonbiased representative | Self-reported; no measure | 6 |
| Bade et al. (2016) | India | 200 dermatology clinic patients (*M* = 30.6, SD = 8.7)* | Biased convenience | Clinician assessed; Norwood Hamilton Scale (I-VII) | 8 |
| Budd et al. (2000) | France, Germany, Italy & UK | 798 balding men recruited via their households (n.r.) | Nonbiased representative | Self-reported; categorical scale with seven responses (‘a full head of hair’ to ‘I am bald’); Norwoord Hamilton scale (I-VII) | 6 |
| Camacho and García-Hernández (2002) | Spain | 100 dermatology clinic patients (n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (II-VII) | 5 |
| Cash (1992) | US | 103 balding men referred to the study via their hairdressers* | Nonbiased convenience | Self-reported, (adapted) Norwood Hamilton Scale | 6 |
| Cash et al. (1993) | US | 60 dermatology clinic patients (*M* = 31.3, SD = n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (II-VII) | 7 |
| Cash (2009) | US, UK, France, Germany, Spain, Japan & Korea | 604 balding men who were interested in hair loss services/products recruited via market research (*M* = 37.1, SD = 6.6) | Biased representative sample | Self-reported; Norwood Hamilton Scale (II-VII) | 8 |
| Danyal et al. (2018) | Pakistan | 60 participants likely recruited from authors’ institution* | Nonbiased convenience | Clinician assessed; Norwood Hamilton Scale (I-VII) | 9 |
| DeMuro-Mercon et al. (2000) | Norway | 1,761 balding men recruited via their households (n.r.) | Nonbiased representative | Self-reported; categorical scale with seven responses (full head of hair-bald); Norwoord Hamilton scale (I-VII) | 6 |
| Franzoi et al. (1990) | US | 52 balding men at a US airport (*M* = 43, SD = n.r.) | Nonbiased convenience | Self-reported | 8 |
| Ghimire (2018). | Nepal | 120 hair transplant patients (*M* = 31.87, SD = 6.8) | Biased convenience | Clinician assessed | 7 |
| Girman et al. (1998) | US | Approximately 191 balding men[1] recruited via their households (n.r.) | Nonbiased representative | Self-reported; categorical scale with seven responses (full head of hair-bald); Norwoord Hamilton scale (I-VII) | 8 |
| Gonul et al. (2018) | Turkey | 30 hair transplant patients (*M* = 23.47, SD = 5.79) | Biased convenience | Clinician assessed; Hamilton Norwood Scale (I-VI) | 6 |
| Gosselin (1984) | UK | 204 dermatology patients (*M* = 35.14, SD = 11.04)* | Biased convenience | n.r. | 6 |
| Gupta et al. (2019) | India | 200 dermatology patients (*M* = 32.0, SD = n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (I-VII) | 8 |
| Han et al. (2012) | South Korea | 998 dermatology patients (*M* = 41.70, SD = 5.5) | Biased convenience | Clinician assessed | 6 |

(*Continued*)

**Table 1.** (Continued).

| Study | Location | Balding male participant characteristics (mean age and standard deviation) | Sample type | Hair loss/loss severity assessment[a] | Quality (0–14) |
|---|---|---|---|---|---|
| Karaman et al. (2006) | Turkey | 175 balding men[2] recruited from their workplaces (*M* = 34.82, SD = 9.62) | Unreported | Self-reported; Norwood Hamilton Scale (I-VII) | 7 |
| Kranz (2011) | Germany | 160 balding men recruited from author's university (*M* = 24.4, SD = 2.56) | Nonbiased convenience | Self-reported; Norwood Hamilton Scale (II-VII) | 10 |
| Liu et al. (2019) | China | 875 hair transplant patients (*M* = 30.85, SD = n.r.) | Biased convenience | Self-reported; Norwood Hamilton Scale (I-V) | 8 |
| Lulic et al. (2017) | Japan, South Korea, Taiwan, Mexico & Brazil | 835 balding men who had recently received hair loss services/products (n.r.) | Biased convenience | Self-reported | 5 |
| Maffei et al. (1994) | Italy | 64 dermatology patients (n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (III-VII) | 7 |
| Molina-Leyva et al. (2016) | Spain | 190 hair loss forum users (*M* = 26.3, SD = 5.4) | Biased convenience | Self-reported; Norwood Hamilton Scale (I-VII) | 8 |
| Mubki et al. (2019) | Saudi Arabia | 96 dermatology patients (n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (I-VII) | 10 |
| Passchier et al. (2006) | Netherlands | 160 non-hair loss dermatology patients* | Non-biased convenience | Clinician assessed; Norwood Hamilton Scale (II-V) | 6 |
| Passchier et al. (1989) | Netherlands | 201 prospective or current minoxidil users (n.r.) | Biased convenience | Self-reported; Hamilton Scale (blaness pattern) | 7 |
| Passchier et al. (1988) | Netherlands | 85 prospective or current minoxidil users (n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (III or IV) and a balding patch of at least 2.5 cm in diameter | 8 |
| Rahimi-Ardabili et al. (2006) | Iran | 128 dermatology patients (*M* = 25.8, SD = 4.4) | Biased convenience | Clinician assessed | 10 |
| Russo et al. (2019) | Italy | 23 dermatology patients (*M* = 28.39, SD = 11.86) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (I-VI) | 6 |
| Sawant et al. (2010) | India | 37 dermatology patients* | Biased convenience | Clinician assessed; Norwood Hamilton Scale (IIa-VII) | 7 |
| Tabolli et al. (2013) | Italy | 237 dermatology patients (*M* = 31.53, SD = 10.57) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (I-VII) | 7 |
| Tahir et al. (2013) | Pakistan | 53 dermatology patients (n.r.) | Biased convenience | Clinician assessed; Norwood Hamilton Scale (II-VII) | 7 |
| Tang et al. (2000) | Singapore | 161 balding men recruited via their households (n.r.) | Nonbiased representative | Researcher assessed; Norwood Hamilton Scale (I-VII) | 8 |
| Tas et al. (2018) | Turkey | 283 dermatology patients (*M* = 23.16, SD = 6.34) | Biased convenience | Researcher assessed; Norwood Hamilton Scale (II-IVa) | 9 |

(*Continued*)

**Table 1.** (Continued).

| Study | Location | Balding male participant characteristics (mean age and standard deviation) | Sample type | Hair loss/loss severity assessment[a] | Quality (0–14) |
|---|---|---|---|---|---|
| Van der Donk et al. (1991) | Netherlands | 168 prospective or current minoxidil user ($M = 35.0$, SD = n.r.) | Biased convenience | Researcher assessed; Norwood Hamilton (III-IV) discernible balding patch on the vertex of no less than 5 cm and no more than 10 cm. | 9 |
| Wang et al. (2018) | China | 340 dermatology patients[3] (n.r.) | Biased convenience | Researcher assessed; Norwood Hamilton (I-VII) | 8 |
| Wells et al. (1995) | UK | 122 balding men recruited from UK public locations* | Non-biased convenience | Researcher assessed (full head, semi-bald, bald) | 8 |
| Yamazaki et al. (2011) | Japan | 27 prospective or current minoxidil users ($M = 33.8$, SD = n.r.) | Biased convenience | Researcher assessed; Norwood Hamilton (II-IV) | 8 |

Notes: n.r.= no information reported.

[a] The Norwood Hamilton Scale consists of images of balding men depicting different degrees of hair loss (Norwood) and different patterns of balding (Hamilton). Severity of hair loss is graded I = little or no hair loss to VII = severe hair loss.

*The following studies divided their balding male participants into subgroups: Bade into 1) older (>31 years $n = 122$) and 2) younger (21–3, $n = 68$); Cash (1992) into 1) modest balding ($n = 63$) and 2) extensive balding ($n = 40$); Danyal into 1) Mild-Moderate recession ($n = 30$, $M = 22.3$, SD = -) and 2) Moderate-Severe recession ($n = 30$, $M = 23.97$, SD = -); Gosselin into 1) weave ($n = 103$), weave-rejected ($n = 50$) & unconcerned (didn't try weave $n = 51$); Passchier into 1) Completed questionnaire twice (current & retrospective views on hair loss; $n = 80$; age $M = 48.0$, SD = 18.2) and 2) Current questionnaire only ($n = 80$, age $M = 50.0$, SD = 18.0); Sawar into 1) young (15–26 years; $n = 23$) & older (26+ years; $n = 14$); and Wells into 1) semi bald ($n = 60$, age $M = 36.1$, SD = 13.2) and 2) severer bald ($n = 62$, $M = 37.3$, SD = 12.8)

[1] The exact number of balding male participants are not reported in Girman et al. (1998). Authors note however that 30% of their male sample (total sample $N = 273$) were not balding.

[2] Some of Karaman et al. (2006) results are incomplete and only reported for both balding men (70% $n = 175$) and nonbalding men (30% n – 77) together.

[3] Fifteen participants (4%) in Wang's et al. (2018) study were women (total sample $N = 355$) and their results are conflated with male AGA participants ($n = 340$).

about employment). Narrative summaries and meta-analyses are presented. Since many studies employed cross-sectional designs, clinical cut-offs/population norms are used (where available) to aid our interpretation, although studies rarely utilised these themselves (see † on Table 2 for exceptions).

### *Non-validated measures*

Nineteen studies (51%) used non-validated, market research style surveys to assess the psychosocial impact of hair loss on men, either solely or alongside validated measures. Question and response variability renders coherent summary challenging, and findings are necessarily reported descriptively by individual item. Some report relatively high levels of 'concern' about hair loss: 62% of men with moderate or extensive hair loss were 'bothered' by hair loss (Girman et al., 1998); 69% of men with severe hair loss were preoccupied with thoughts about balding (wished for more hair, spent time looking in the mirror) (Cash, 1992); and 96% of men seeking hair loss treatment were at least somewhat concerned by hair loss (Cash, 2009). Others report less concern: 71% of men

**Table 2.** Summary of key findings in relation to the general mental health, anxiety, and depression of balding men. For a more detailed version please see a supplementary file here: https://mfr.osf.io/render?url=https://osf.io/4y2pc/?direct%26mode=render%26action=download%26mode=render.

| Study | Measure | Sample/ Comparisons (Balding unless otherwise stated) | Mean (SD) | Reported results | Interpretation in relation to clinical norms (see notes) |
|---|---|---|---|---|---|
| **General Mental Health** | | | | | |
| Cash et al. (1993) | Psychosocial well-being[a] | Men (*n* = 60)<br>Women (*n* = 96)<br>Non-balding women (*n* = 56) | 4.52 (0.66)<br>3.91 (0.92)<br>4.62 (0.92) | Balding women had poorer psychosocial wellbeing; balding men no different from non-balding women | Not available |
| *Passchier et al. (1988) | Delft Questionnaire[b] | Men (*n* = 85) | 13.4 (7.6) | No significant difference from norm (12.5) | As reported† |
| Maffei et al. (1994) | The Symptom Checklist-90 (SCL-90)[c] | Men (*n* = 64)<br>Women (*n* = 52) | GSI 3.18 (3.40)*<br>GSI 5.72 (5.50)* | No interpretation given on this scale alone | Not available |
| Sawant et al. (2010) | Symptom Check List-90-R (SCL-90-R)[c] | Younger men (*n* = 23)<br>Older men (*n* = 14) | GSI 3.01 (4.51)*<br>GSI 3.44 (5.4)* | No significant differences between the older and younger group | Not available |
| *Tabolli et al. (2013) | Medical Outcomes Study Short Form-12 (SF-12)[d] | Men (*n* = 237)<br>Non-balding men (*n* = 108)<br>Women (*n* = 114) | 45.2 (10.5)<br>47.7 (10.5)<br>38.8 (11.2) | Non-balding men had the best mental wellbeing, and balding men had better wellbeing than balding women | Scores below 50 suggest lower mental wellbeing than for the average American |
| | General Health Questionnaire 12 items (GHQ-12)[e] | Men (*n* = 237)<br>Non-balding men (*n* = 108)<br>Women (*n* = 114) | 12.1 (5.3)<br>10.8 (5.2)<br>16.1 (6.5) | Balding women had higher mental distress than balding men, who had higher distress than non-balding men | Range 0–36; clinical cut-off 12[†] |
| *Wang et al. (2018) | Symptom Check List-90-Revised (SCL-90-R)[c] | Men (*n* = 335)<br>Non-balding controls (*n* = 406) | 1.50 (0.46<br>1.33 (0.40) | Balding men significantly more distressed than controls on the global severity index (GSI) | Not available |
| **Anxiety** | | | | | |
| *Cash et al. (1993) | Self-Consciousness Scale[f] | Men (*n* = 60)<br>Women (*n* = 96)<br>Non-balding women (*n* = 56) | 8.47 (4.27)<br>10.08 (4.64)<br>7.79 (4.16) | Balding women had higher social anxiety, than balding men or non-balding women (who did not differ) | Balding men did not differ from group norms of 8.8 (4.3) |

(*Continued*)

**Table 2.** (Continued).

| Study | Measure | Sample/ Comparisons (Balding unless otherwise stated) | Mean (SD) | Reported results | Interpretation in relation to clinical norms (see notes) |
|---|---|---|---|---|---|
| *Danyal et al. (2018) | Hamilton Anxiety Rating Scale (HAM-A)[g] | Non-balding men ($n = 30$)<br>Men mild-moderate hair loss ($n = 30$)<br>Men moderate-severe hair loss ($n = 30$) | 12.46 (1.63)<br>20.23 (1.40)<br>15.46 (1.08) | Men with mild-moderate hair loss (not severe) had higher anxiety than non-balding men | A mean of 20.23 indicates moderate anxiety |
| *Donk et al (Van der Donk et al., 1991). | The Self-Report Inventory of Social Anxiety & Assertiveness[h] | Men ($n = 168$) | 64.3 (17.6) (Discomfort)<br>110.5 (16.3) (Frequency) | No significant difference in social discomfort or frequency between balding men & group norms (66.9 & 112.6) | As stated[†] |
| *Passchier et al. (1988) | Self-Report Inventory of Social Anxiety & Assertiveness[h] | Men ($n = 85$) | 65.3 (21.2) (Discomfort)<br>112.9 ± 18.5 (Frequency) | There was no difference between balding men & group norms on social discomfort (66.9) or frequency (112.6) | As stated† |
| *Rahimi-Ardabili et al. (2006) | Hospital Anxiety and Depression Scale (HADS)[i] | Men ($n = 128$) | 6.24 (3.17) | 60.9%, 28.9% & 10.2% of sample showed normal, mild or moderate anxiety | Mean is within the normal range (0–7)[†] |
| *Russo et al. (2019) | Trait Anxiety Inventory (STAI Y)[j] | Men ($n = 23$)<br>Women ($n = 57$) | 42.8 (5.97)<br>49.4 (9.94) | Balding women had higher anxiety than balding men | Slightly elevated scores compared to norm (34.9); outside range for diagnosed anxiety (47–61) |
| | Social Phobia (SPS) for psychosocial anxiety[k] | Men ($n = 23$)<br>Women ($n = 57$) | 18.0 (6.14)<br>25.4 (9.91) | Balding women have higher social phobia scores than balding men | Scores higher than controls (12.5); below clinical threshold for Social anxiety disorder (24) |
| | Social Interaction Anxiety Scale (SIAS)[l] | Men ($n = 23$)<br>Women ($n = 57$) | 15.2 (4.07)<br>21.5 (9.19) | Balding women have higher social anxiety than balding men | Scores below control group mean (19.9), & cut off for social anxiety disorder (34) |
| *Tas et al. (2018) | Beck Anxiety Inventory (BAI)[m] | Men ($n = 283$)<br>Women ($n = 70$) | 5.95 (3.83)<br>11.93 (4.85) | Women were significantly more anxious than men | Male mean well below the clinical threshold (11)[†] |
| *Yamazaki et al. (2011) | State-Trait Anxiety Inventory (STAI)[n] | Men ($n = 27$) | 45.0 (11.5) State anxiety<br>45.5 (11.2) Trait anxiety | Scores for healthy volunteers are state = 36.6 (8.88) & trait 38.5 (9.42) | Higher anxiety scores than norms for healthy volunteers[†] |

(*Continued*)

**Table 2.** (Continued).

| Study | Measure | Sample/ Comparisons (Balding unless otherwise stated) | Mean (SD) | Reported results | Interpretation in relation to clinical norms (see notes) |
|---|---|---|---|---|---|
| **Depression** | | | | | |
| *Danyal et al. (2018) | Zung Self-Rating Depression scale (SDS)$^{o}$ | Men no hair loss ($n = 30$) | 38.43 (1.26) | No significant difference was observed in SDS scores between groups | Mean scores fall within the normal range (25–49) |
| | | Men mild-moderate hair loss ($n = 30$) | 38.3 (1.16) | | |
| | | Men moderate-severe hair loss ($n = 30$) | 35.3 (0.8) | | |
| *Rahimi-Ardabili et al. (2006) | Hospital Anxiety & Depression Scale (HADS)$^{i}$ | Balding men ($n = 128$) | 4.04 (2.52) | n.r. | Mean score falls within the normal range (<7) |
| | Beck Depression Inventory$^{p}$ | | 12.11 (7.50) | 46.9%, 18.0% & 3.9% of sample were within ranges for normal, mild & moderate depression respectively | Mean score indicates moderate depression† |
| *Tas et al. (Tas et al., 2018) | Beck Depression Inventory$^{p}$ | Men ($n = 283$) | 8.82 (5.07) | Balding women more depressed than balding men | Scores fall within the normal range (<10) & well short of clinical cut off (17)$^{\dagger}$ |
| | | Women ($n = 70$) | 14.74 (4.44) | | |
| *Wells et al. (1995) | Beck Depression Inventory$^{p}$ | Non-balding ($n = 60$) | 4.78 (4.65) | There is an association between increasing hair loss and depression | Mean scores fall within the normal range (<10) & well short of clinical cut off (17) |
| | | Semi-bald ($n = 60$) | 6.28 (6.03) | | |
| | | Bald ($n = 62$) | 8.00 (6.19) | | |
| **Self-Esteem** | | | | | |
| *Danyal et al. (2018) | RSES$^{q}$ | mild to moderate hair loss | 16.46 (1.7) | Men with mild-moderate or moderate-severe hair loss have lower self-esteem than non-balding men | Assuming scoring from 0–30 mean for all groups are in the normal range (15–25) |
| | | moderate to severe hair loss | 17.3 (1.0) | | |
| | | men without hair loss | 21.63 (0.7) | | |
| *Krantz (Kranz, 2011) | RSES | Men ($n = 160$) | 4.08 (7.29) | As distress re: hair loss increased, self-esteem decreased | Mean fall below normal range (<15) |
| *Liu et al. (2019) | RSES | Pre hair graft | 29.79 (5.75) | Balding men had higher self-esteem post hair graft, especially those with higher pre-operative self-esteem | Pre hair graft scores within the normal range (26–29); post-operatively within high self-esteem range (30–40) |
| | | Post hair graft | 31.35 (5.27) | | |
| *Tas et al. (2018) | RSES | Men ($n = 283$) | 15.76 (5.33) | Men has significantly higher self-esteem than women | Men's scores are within the normal range for self-esteem (15–25)† |
| | | Women ($n = 70$) | 11.57 (2.88) | | |
| Donk et al. (1991) | Dutch measure based on the RSES | Before use of minoxidil gel | 35.8 (n.r.) | No difference in self-esteem before & after 6 months use of minoxidil gel | Not available |
| | | After 6 months use of minoxidil gel | 36.3 (3.7) | | |

(*Continued*)

**Table 2.** (Continued).

| Study | Measure | Sample/ Comparisons (Balding unless otherwise stated) | Mean (SD) | Reported results | Interpretation in relation to clinical norms (see notes) |
|---|---|---|---|---|---|
| Passchier et al. (1988) | Dutch measure based on the RSES[r] | Men taking minoxidil with controls | n/a | Men taking minoxidil showed greater improvements in self-esteem | Not available |
| Wells et al. (1995) | Modified version of the RSES[s] | Bald (*n* = 62)<br>Semi-bald (*n* = 60)<br>No hair loss (*n* = 60) | 41.08 (9.99)<br>41.75 (9.82)<br>44.13 (8.90) | psychological distress to increase with increasing degrees of hair loss | Not available |
| Cash (1992) | TSBI[t] | No hair loss (*n* = 42)<br>Low hair loss (*n* = 63)<br>High hair loss (*n* = 40) | n/a<br>n/a<br>n/a | For men distressed by balding (*n* = 103) self-esteem decreased as number of negative events re: hair loss increased | Not available |
| *Cash et al. (1993) | TSBI | Men (*n* = 60)<br>Women (*n* = 92)<br>Non-balding women (*n* = 56) | 58.8 (9.1)<br>54.5 (11.6)<br>59.4 (9.1) | Balding men had higher self-esteem than balding & non-balding women | Scores for all three groups were higher than norm for male undergraduates (40.45) |
| Gosselin (1984) | Items from Eysenck &Wilson (1976) | Retaining hair weave<br>Tried/not retaining weave<br>no treatment/ concern | 19.49 (6.74)<br>17.12 (7.11)<br>20.67 (6.50) | No interpretation offered | Not available |

Denotes studies which studies using validated assessments that compare AGA men to non-AGA male participants or where there are published norms available that can be used for comparison.

[†] Denotes studies which used clinical/population norms to aid interpretation of their results.

NB: References for all measures and for clinical interpretation of scores are included in Supplement S1. Paper by DeMuro-Mercon et al (2000) not listed in general mental health because they did not report the results of the mental health measures they used; Cash (1992) not listed in the anxiety summary because did not report means on the Self-Consciousness Scale; Carmacho & García-Hernández (2002) not listed as relied on a non-validated assessment of anxiety & depression interpreted from behaviour; Kranz (2011) used the RSES but did not report means or SDs for balding men so is not included here; Gosselin (1984) used items from a validated measure of self-esteem. *GIS scores calculated by averaging the means from the subscale means reported. However, it is not possible to offer a clinical interpretation because the raw scores reported in both papers include scores greater than 4 which do not reflect the scoring system for this measure.

[a] Questionnaire reported in Cash et al (1986) – no further information provided.

[b] The Delft Questionnaire (Appels, 1975) measures general psychological maladjustment.

[c] The Symptom Checklist 90 (SCL-90; Derogatis et al., 1973) & Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1973) are identical except adjusted wording on two questions: 90-items assessing psychological distress (somatization, obsessive – compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, & psychoticism); 5-point response (from 'not at all = 0' to 'extremely = 4'); GSI (the mean score of all items) is considered to be the best representation of an overall psychological distress dimension.

[d] Medical Outcomes Study Short Form-12 (SF-12; Ware et al., 1998): 12-items regarding health status; dichotomous (yes/no), ordinal (excellent to poor), or frequency (always to never) responses; a Physical Component Summary (PCS-12) & a Mental Component Summary (MCS-12) score; higher scores=better QoL; scores transformed (X = 50 & SD = 10) for comparison with American 'standards'. Scores above or below 50 are above or below the mean of the general American population.

[e] General Health Questionnaire 12 items (GHQ-12; Goldberg, 1972)(): measures psychological distress & detects depressive or anxiety disorders; responses 0–3; range 0–36; higher = higher distress. Includes group norms.

[f] The self-consciousness scale (Fenigstein et al., 1975): 22 items (23 before revision by Scheier & Carver, 1985) assessing public self-consciousness [7 items], private self-consciousness [9 items] & social anxiety [6 items]; 4-point scale response (0='Not at all like me' & 3='a lot like me'). Cash et al (1993) used 13 items (public self-consciousness & social anxiety).

with moderate or extensive hair loss were not ‘bothered’ by hair loss (DeMuro-Mercon et al., 2000) and most men did not report adverse psychological effects (only 21% felt depressed) when they realized they were losing their hair (Alfonso et al., 2005). Although highlighting a wide range of potential concerns regarding hair loss, limited conclusions can be drawn from this data.

## *Impact on mental health*

Results of studies using validated measures (*n* = 28) are reported in Table 2. Here we summarise the findings of those studies using validated measures to compare male AGA

---

Only scores social anxiety reported here. Range 0–18; higher scores = greater social anxiety. Group norms from a student population are X = 8.8, sd = 4.3 for men (Scheier & Carver, 1985).

[g] The Hamilton Anxiety Rating Scale (HAM-A; Hamilton, 1959): 14 items measuring anxiety; five-point scale response indicating how disabling each symptom is; 0–4 (‘None’ to ‘Grossly Disabling’ respectively); range 0–56; higher scores = higher anxiety. Clinical interpretation: <7 no/minimal anxiety mild anxiety = 8–14; moderate = 15–23; severe 24 (Matza et al., 2010)

[h] The Self-Report Inventory of Social Anxiety & Assertiveness (IOA; Dam-Baggen & Kraimat, 2000 later the Inventory of Interpersonal Situations): two scales (‘Overall discomfort during contact with others’ & ‘Overall frequency of contact with others’); 35 items describing responses in social situations; 5-point response (1=no discomfort/I never do & 5=very much discomfort/I always do); range 35–175; higher score = higher anxiety. Group norms provided by author.

[i] The Hospital Anxiety & Depression Scale (HADS; Snaith, 2003): 7 items for anxiety, 7 for depression; 4-point response (0–3). For the Persian version anxiety/depression norms: normal (0–7), mild (8–10), moderate (11–15), & severe (16–21) (Montazeri et al, 2003).

[j] The Trait Anxiety Inventory (STAI_Y; Spielberger et al., 1983): 20 items assessing anxiety as a personality trait; 4-point response (1= ‘Almost Never’ to 4=‘Almost Always’); range 20–80; higher scores = greater anxiety. Clinical interpretation: working men = 34.9 (SD 9.2); typical scores for people with diagnosed anxiety 47–61 (1983 manual, Version Y p68).

[k] The Social Phobia Scale (Mattick & Clarke, 1998): 20-items assessing fear of being scrutinised or observed during routine activities; 5-point response (0= ‘Not at all characteristic or true of me’ & 4= ‘Extremely characteristic or true of me’); range 0–80; higher scores = greater anxiety. Clinical interpretation: 12.5 (11.5) = without anxiety (controls); 49.0 (15.6) typical of clients; >24 cut off for social anxiety disorder (Heimberg et al., 1992).

[l] The Social Interaction Anxiety Scale (SIAS, Mattick & Clarke, 1998): 20 items; 5-point response (0= ‘Not at all characteristic or true of me’ & 4= ‘Extremely characteristic or true of me’); range 0–80; higher scores = greater anxiety. Clinical interpretation: < 19.9 (14.2) + no anxiety (controls), 32.8 (14.8) typical of clients; >34 cut off for social anxiety disorder (Heimberg et al., 1992).

[m] The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988); 21-items each with four statements describing increasing levels of severity & questions that quantify the physiological aspect of anxiety; range 0–63; higher scores = higher anxiety. Clinical interpretation, Turkish version: 0–7 = minimal anxiety; 8–15 = mild anxiety; 16–25 = moderate anxiety; 26–63 severe anxiety; cut-off for clinically relevant subthreshold anxiety is 11 (Ulusoy et al., 1998).

[n] The State-Trait Anxiety Inventory (STAI; Japanese version, Nakazato & Shimonaka, 1989): 20 items assessing state anxiety (i.e. fluctuating & context dependent), 20 items assessing trait anxiety (i.e. stable personality trait); 4-point response (1–4); higher scores indicate higher anxiety. Clinical interpretation: state and trait anxiety scores for healthy volunteers were 36.6 ± 8.88 and 38.5 ± 9.42, respectively.

[o] The Zung Self-Rating Depression scale (SDS: Zung, 1988): 20-items used to screen for depression; 4-point response (1=a little of the time, 2=some of the time, 3=good part of the time, 4=most of the time); range 25–100; high score = greater intensity of depression. Clinical interpretation: 25–49 Normal Range; 50–59 Mildly Depressed; 60–69 Moderately Depressed; 70 & above Severely Depressed.

[p] The Beck Depression Inventory (BDI; Beck et al., 1961): 21-items assessing symptoms of depression; 4-point response (0 = absent, 3 = severe); range 0–63. Clinical interpretation Turkish Version: 0–10 normal range; 11–16 moderate depression; 31–40 severe depression, & 40–63 very serious depression; cut-off 17 (Hisli, 1988). Persian Version: ≤ 9 = normal range; 10–15 minimal depression; 16–31 = mild depression; 32–47 moderate depression; > 47 severe depression (Montazeri et al., 2003).

[q] The Rosenberg Self-Esteem Inventory (RSES; Rosenberg, 1965): 10 items; 4-point response (0–3 or 1–4); range 0–30 or 10–40. Clinical interpretation: 15–25 (or 26–29) = normal range; below 15 = low self-esteem; above 25 (or 30–40) = high self-esteem.

[r] Developed using factor analysis on a translation of Rosenberg’s self-esteem scale (Sanders, 1977); 9 items; 5-point response.

[s] Developed from the RSES (Russell & Hulson, 1992): 10 items, high scores = high self-esteem.

[t] The Texas Social Behavior Inventory (TSBI; Helmreich & Stapp, 1974): 16 items; 5-point response (0–4); range 0–64; higher scores = higher self-esteem. No clinical cut-offs.

participants to non-AGA male participants or where there are published norms for comparison are available ($n = 15$; as indicated by * in Table 2). These 15 studies included 28 ‘comparable assessments’ (as multiple measures were used within studies) enabling conclusions to be drawn about the potential negative impact of hair loss on men compared to non-balding men.

General mental health (three studies, 4 assessment): Three assessments indicated general mental health is worse for AGA men compared to non-AGA men (Tabolli et al., 2013; Wang et al., 2018), with two of these tentatively indicating clinically significant levels of distress. The fourth assessment indicated no difference in the mental health AGA compared to men without hair loss according to population norms (Passchier et al., 1988).

Anxiety (eight studies, 13 assessments): Five assessments indicated that anxiety is worse for AGA men compared to non-AGA men or to group norms (although for one study this referred only to men with mild-moderate hair loss and not severe hair loss, Danyal et al., 2018). Yet, for two of these assessments where clinical cut offs were available, AGA men fell well below these thresholds (Russo et al., 2019). The remaining eight assessments indicated levels of anxiety among AGA men that fell well below the relevant clinical thresholds for the measure used (Russo et al., 2019; Tas et al., 2018), or were no different from established norms (Cash et al., 1993; Passchier et al., 1988; Van der Donk et al., 1991).

Depression (four studies, 5 assessments): Only one assessment indicated depression is worse for AGA men with some experiencing mild (18%) or moderate (3.9%) depression, although 46% scored within the normal range (Rahimi-Ardabili et al., 2006). The remaining four assessments indicate that depression is not worse as scores were within the normal range and well short of clinical cut-offs (Danyal et al., 2018; Rahimi-Ardabili et al., 2006; Tas et al., 2018; Wells et al., 1995). A random effect meta-analysis of three studies (Wells et al. had two samples listed as ‘a’ and ‘b’ in Figure 2) using the Beck Depression Inventory (scale range 0–63), revealed a pooled mean of 8.8 (95% CI = 6.8–10.8) which is within the normal range (<10).

Self-esteem (10 studies, 6 assessments): Three assessments indicated self-esteem is worse among AGA men compared to non-AGA men or group norms (Danyal et al.,

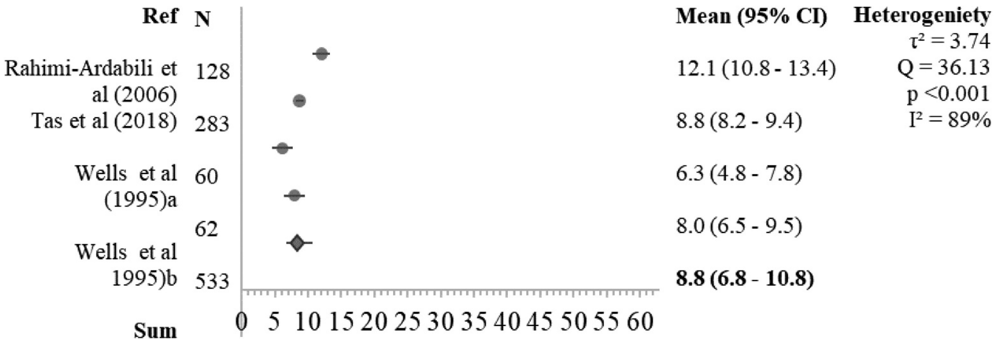

**Figure 2.** Meta- analysis male balding psychosocial impact studies using the BDI (Beck, 1967).

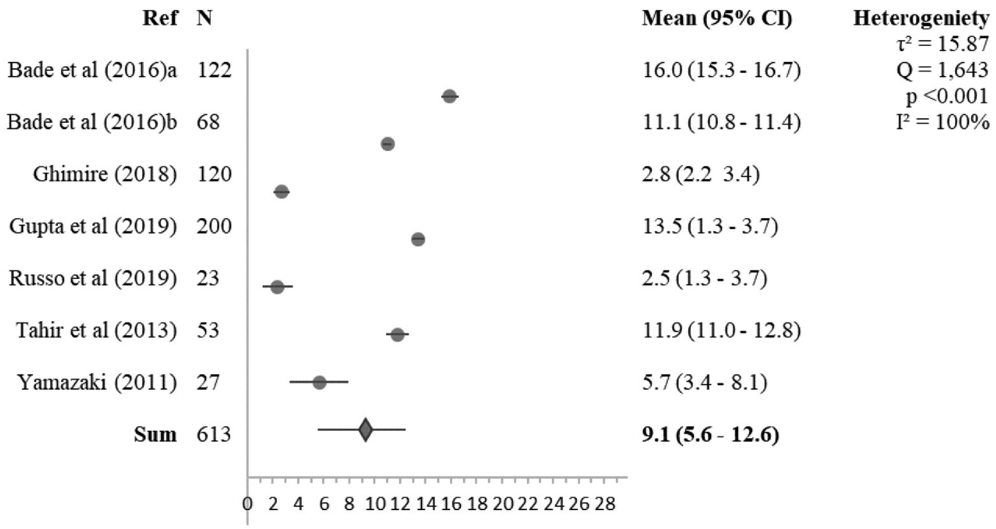

**Figure 3.** Meta- analysis of balding psychosocial impact studies using the DQLI (Finlay & Khan, 1994).

2018; Kranz, 2011; Wells et al., 1995), although scores reported by Danyal et al were within the normal range. Three assessments indicate that the self-esteem of AGA men is within the normal range or higher than group norms (Cash et al., 1993, Lui et al., 2018; Tas et al., 2018).

Overall, there is little convincing evidence that AGA men are, on average, depressed, anxious, have low self-esteem or experience poor mental health. Of 28 assessments of mental health, 12 (43%) indicated that AGA men had poorer mental health, and 16 (57%) indicated that AGA men had average or better mental health, compared to non-AGA men or group norms.

### *Impact on quality of life*

Quality of Life (QoL) (eight studies, 9 assessments): Seven assessments used the DLQI, and all indicated that QoL is worse for AGA men compared to published norms (Hongbo et al., 2005). Four of these showed a very large negative impact, two showed a very small impact, and one a moderate impact on QoL (see Figure 3; Gonul et al., 2018 substantially modified the measure substantially and was excluded). The random effect meta-analysis of these studies (Bade, 2016 had two samples listed as ‘a’ and ‘b’) revealed a pooled mean of 9.12 (95% CI = 6.14–12.10) indicating a moderate impact on QoL.

Two assessments using Hair-specific Skindex-29 (Han et al., 2012) indicate QoL is moderately (Molina-Leyva et al., 2016) or mildly (Franzoi et al., 1990) worse for AGA men, compared to clinical norms (Prinsen et al., 2011). Overall, the research suggests that for men, on average, AGA has a mild to moderate impact on quality of life.

## Discussion

This is the first systematic review and meta-analysis of the psychosocial impact of AGA on men. Despite claims that AGA has a strong impact on men's psychosocial wellbeing, the published evidence demonstrates limited support for this position. Overall, men with AGA experience a mild to moderate impact on their quality of life but are unlikely to experience clinically significant levels of anxiety, depression, or poor mental health.

Even when distress was indicated, several factors suggest this may be overstated. Firstly, study participants are typically actively seeking hair loss products, services, or advice and may be more distressed. Research with representative samples of AGA men report that between 75–95% have not used nor sought hair loss treatments (Alfonso et al., 2005; DeMuro-Mercon et al., 2000; Kranz, 2011; Tang et al., 2000). Secondly, psychosocial impact may be overstated when studies report that AGA men have elevated levels of distress relative to non-AGA men but fail to report whether scores fall within clinically normal ranges (and are therefore not evidence of distress). Finally, the high proportion of probable conflicts of interest (78%) is concerning. A recent systematic review found that commercially funded research is significantly more favourable to commercial intervention (Lundh et al., 2017), and some have argued that such conflicts may lead to the overinflation of distress so as to satisfy commercial interests (Jankowski & Frith, 2022; Moynihan et al., 2002).

The findings of this review must be interpreted cautiously due to the poor quality and heterogeneity of the research, the variety of different measures used, across different cultural contexts, and because the primary research focus was often not on assessing psychosocial impact of AGA on men. Moreover, as only published evidence was included, studies reporting non-significant results are likely to be missed given publication bias. Finally, while assessing clinically meaningful changes in distress is an important aid to clinical decision-making, it is significantly under-developed in dermatology (Hongbo et al., 2005). Finding appropriate cut offs/norms is difficult especially when measures are being used in difficult cultural contexts and with populations different from those for which they were originally designed and validated (as was often the case in these studies). Future research should adopt more robust research designs, use validated measures which enable clinically meaningful comparisons, and recruit representative samples.

Standards for dermatological and surgical interventions advocate for good patient care (NICE: National Institute of Clinical Excellence, 2018). Overinflating psychological distress may contribute to the medicalisation of AGA and support the use of medical interventions for psychological ills (Jankowski & Frith, 2022). However, it is important to note the relatively large standard deviations in some studies suggest considerable individual variation in distress, meaning that some men may be highly distressed by hair loss. Future research is needed to identify these men, and the determinants of their distress, to ensure that interventions are directed at those most in need or mostly likely to benefit. This might include the use of psychological interventions for men who experience significant distress – such as the CBT-programme FaceIt@Home should this prove effective for AGA men (Bessell et al., 2012). Good patient care also includes informing men of the option not to undergo any intervention (NICE, 2020) This may be appealing if men are made aware that the distress around AGA is overstated and that most men with

AGA do not seek to slow the progression the progression of hair loss or to promote hair regrowth.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID

Hannah Frith http://orcid.org/0000-0003-1244-0495

## Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article (and/or) its supplementary materials which are available at the Open Science Framework (doi: 10.17605/OSF.IO/RZP47). These include the PRISMA study protocol of the systematic review and other associated files here: https://osf.io/rzp47/?view_only=ea64dbef2787485a83e18ef0671721a7

## References

Alfonso, M., Richter-Appelt, H., Tosti, A., Viera, M. S., & García, M. (2005). The psychosocial impact of hair loss among men: A multinational European study. *Current Medical Research and Opinion*, *21*(11), 1829–1836. https://doi.org/10.1185/030079905X61820

Appels, A. (1975). *Screenen als methode voor preventie in de geestelijke gezondheidszorg* (pp. 229–231). Swets & Zeitlinger.

Bade, R., Bhosle, D., Bhagat, A., Shaikh, H., Sayyed, A., & Shaikh, A. (2016). Impact of androgenic alopecia on the quality of life in male subjects: Results of an observational study from tertiary care hospital. *Journal of Medical Science and Clinical Research*, *4*(10), 12900–12907. https://doi.org/10.18535/jmscr/v4i10.05

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting & Clinical Psychology*, *56*(6), 893–897. https://doi.org/10.1037/0022-006X.56.6.893

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*(6), 561–571. https://doi.org/10.1001/archpsyc.1961.01710120031004

Beck, A. T., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). Beck depression inventory (BDI). *Archives of General Psychiatry*, *4*(6), 561–571. https://doi.org/10.1001/archpsyc.1961.01710120031004

Bessell, A., Brough, V., Clarke, A., Harcourt, D., Moss, T. P., & Rumsey, N. (2012). Evaluation of the effectiveness of Face IT, a computer-based psychosocial intervention for disfigurement-related distress. *Psychology, Health & Medicine*, *17*(5), 565–577. https://doi.org/10.1080/13548506.2011.647701

Blumeyer, A., Tosti, A., Messenger, A., Reygagne, P., Del Marmol, V., Spuls, P. I., Trakatelli, M., Finner, A., Kiesewetter, F., Trüeb, R., Rzany, B., & Blume-Peytavi, U. (2011). Evidence-based

(S3) guideline for the treatment of androgenetic alopecia in women and in men. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*, *9*, S1–S57. https://doi.org/10.1111/j.1610-0379.2011.07802.x

Boland, A., Cherry, G., & Dickson, R. (Eds.). (2017). *Doing a systematic review: A student's guide*. Sage.

British Association of Hair Restoration Surgeons. (2019). HTS for MPHL/FPHL should not be considered cosmetic surgery: Position statement. *2019*. 3. https://www.bahrs.co.uk/about-us/position-statements/

Budd, D., Himmelberger, D., Rhodes, T., Cash, T. E., & Girman, C. J. (2000). The effects of hair loss in European men: A survey in four countries. *European Journal of Dermatology*, *10*(2), 122–127.

Camacho, F. M., & García-Hernández, M. J. (2002). Psychological features of androgenetic alopecia. *Journal of the European Academy of Dermatology and Venereology*, *16*(5), 476–480. https://doi.org/10.1046/j.1468-3083.2002.00475.x

Cash, T. F. (1986). The great American shape-up: Body-image survey report. *Psychology Today*, *20*, 30–37.

Cash, T. F. (1992). The psychological effects of androgenetic alopecia in men. *Journal of the American Academy of Dermatology*, *26*(6), 926–931. https://doi.org/10.1016/0190-9622(92)70134-2

Cash, T. F. (2009). Attitudes, behaviors, and expectations of men seeking medical treatment for male pattern hair loss: Results of a multinational survey. *Current Medical Research and Opinion*, *25*(7), 1811–1820. https://doi.org/10.1185/03007990903005201

Cash, T. F., Price, V. H., & Savin, R. C. (1993). Psychological effects of androgenetic alopecia on women: Comparisons with balding men and with female control subjects. *Journal of the American Academy of Dermatology*, *29*(4), 568–575. https://doi.org/10.1016/0190-9622(93)70223-G

Dam-Baggen, C. M. J., & Kraaimaat, F. W. (2000). Inventarisatielijst Omgaan met Anderen. Retrieved Dec 17, from https://www.pearsonclinical.nl/ioa-inventarisatielijst-omgaan-met-anderen

Danyal, M., Shah, S. I. A., Hassan, M. S. U., & Qureshi, W. (2018). Impact of androgenetic alopecia on the psychological health of young men. *Pakistan Journal of Medical & Health Sciences*, *12*(1), 406–410.

Davis, D. S., & Callender, V. D. (2018). Review of quality of life studies in women with alopecia. *International Journal of Women's Dermatology*, *4*(1), 18–22. https://doi.org/10.1016/j.ijwd.2017.11.007

DeMuro-Mercon, C., Rhodes, T., Girman, C. J., & Vatten, L. (2000). Male-pattern hair loss in Norwegian men: A community-based study. *Dermatology*, *200*(3), 219–222. https://doi.org/10.1159/000018386

Derogatis, L. R., Lipman, R. S., & Covi, L. (1973). SCL-90: An outpatient psychiatric rating scale - Preliminary report. *Psychopharmacology Bulletin*, *9*, 13–28.

Downes, M. J., Brennan, M. L., Williams, H. C., & Dean, R. S. (2016). Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open*, *6*(12), e011458. https://doi.org/10.1136/bmjopen-2016-011458

Edelson, M. (2018). Of hair loss and heartbreak. *Hopkins Medicine*. https://www.hopkinsmedicine.org/news/publications/hopkins_medicine_magazine/features/spring-summer-2018/of-hair-loss-and-heartbreak

Eysenck, H. J., & Wilson, G. D. (1976). *Know Your own Personality*. Penguin.

Finlay, A. Y., & Khan, G. (1994). Dermatology life quality index (DLQI)—a simple practical measure for routine clinical use. *Clinical and Experimental Dermatology*, *19*(3), 210–216. https://doi.org/10.1111/j.1365-2230.1994.tb01167.x

Franzoi, S. L., Anderson, J., & Frommelt, S. (1990). Individual differences in men's perceptions of and reactions to thinning hair. *The Journal of Social Psychology*, *130*(2), 209–218. https://doi.org/10.1080/00224545.1990.9924571

Ghimire, R. B. (2018). Impact on quality of life in patients who came with androgenetic alopecia for hair transplantion surgery in a clinic. *Journal of Nepal Medical Association*, *56*(212), 763–765. PMID: 30387465. https://doi.org/10.31729/jnma.3500

Girman, C. J., Rhodes, T., Lilly, F. R. W., Guo, S. S., Siervogel, R. M., Patrick, D. L., & Chumlea, W. C. (1998). Effects of self-perceived hair loss in a community sample of men. *Dermatology*, *197* (3), 223–229. https://doi.org/10.1159/000018001

Goldberg, D. (1972). *The Detection of Psychiatric Illness by Questionnaire*. Oxford University Press.

Gonul, M., Cemil, B. C., Ayvaz, H. H., Cankurtaran, E., Ergin, C., & Gurel, M. S. (2018). Comparison of quality of life in patients with androgenetic alopecia and alopecia areata. *Anais brasileiros de dermatologia*, *93*(5), 651–658. https://doi.org/10.1590/abd1806-4841.20186131

Gosselin, C. (1984). Hair loss, personality and attitudes. *Personality and Individual Differences*, *5* (3), 365–369. https://doi.org/10.1016/0191-8869(84)90077-1

Gupta, S., Goyal, I., & Mahendra, A. (2019). Quality of life assessment in patients with androgenetic alopecia. *International Journal of Trichology*, *11*(4), 147–152. https://doi.org/10.4103/ijt.ijt_6_19

Han, S. H., Byun, J. W., Lee, W. S., Kang, H., Kye, Y. C., Kim, K. H., Kim, D. W., Kim, M. B., Kim, S. J., Kim, H. O., Sim, W. Y., Yoon, T. Y., Huh, C. H., Hwang, S. S., Ro, B. I., & Choi, G. S. (2012). Quality of life assessment in male patients with androgenetic alopecia: Result of a prospective, multicenter study. *Annals of Dermatology*, *24*(3), 311–318. https://doi.org/10.5021/ad.2012.24.3.311

Helmreich, R., & Stapp, J. (1974). Short forms of the Texas Social Behavior Inventory (TSBI), an objective measure of self-esteem. *Bulletin of the Psychonomic Society*, *4*(5), 473–475. https://doi.org/10.3758/BF03334260

Hongbo, Y., Thomas, C. L., Harrison, M. A., Salek, M. S., & Finlay, A. Y. (2005). Translating the science of quality of life into practice: What do dermatology life quality index scores mean? *Journal of Investigative Dermatology*, *125*(4), 659–664. https://doi.org/10.1111/j.0022-202X.2005.23621.x

Jankowski, G. S., & Frith, H. (2022). Psychology's medicalization of male baldness. *Journal of Health Psychology*, *27*(9), 2161–2180.

Kanti, V., Messenger, A., Dobos, G., Reygagne, P., Finner, A., Blumeyer, A., Trakatelli, M., Tosti, A., Del Marmol, V., Piraccini, B. M., Nast, A., & Blume-Peytavi, U. (2018). Evidence-based (S3) guideline for the treatment of androgenetic alopecia in women and in men–short version. *Journal of the European Academy of Dermatology and Venereology*, *32*(1), 11–22. https://doi.org/10.1111/jdv.14624

Karaman, G. C., Dereboy, Ç., Dereboy, F., & Çarman, E. (2006). Androgenetic alopecia: Does its presence change our perceptions? *International Journal of Dermatology*, *45*(5), 565–568. https://doi.org/10.1111/j.1365-4632.2005.02522.x

Kranz, D. (2011). Young men's coping with androgenetic alopecia: Acceptance counts when hair gets thinner. *Body Image*, *8*(4), 343–348. https://doi.org/10.1016/j.bodyim.2011.06.006

Liu, F., Miao, Y., Li, X., Qu, Q., Liu, Y., Li, K., Feng, C., & Hu, Z. (2019). The relationship between self-esteem and hair transplantation satisfaction in male androgenetic alopecia patients. *Journal of Cosmetic Dermatology*, *18*(5), 1441–1447. https://doi.org/10.1111/jocd.12839

Lulic, Z., Inui, S., Sim, W. Y., Kang, H., Choi, G. S., Hong, W., Hatanaka, T., Wilson, T., & Manyak, M. (2017). Understanding patient and physician perceptions of male androgenetic alopecia treatments in Asia–Pacific and Latin America. *The Journal of Dermatology*, *44*(8), 892–902. https://doi.org/10.1111/1346-8138.13832

Lundh, A., Lexchin, J., Mintzes, B., Schroll, J. B., & Bero, L. (2017). Industry sponsorship and research outcome. *Cochrane Database of Systematic Reviews*, (22), Art. No:MR000033. https://doi.org/10.1002/14651858.MR000033.pub3

Maffei, C., Fossati, A., Rinaldi, F., & Riva, E. (1994). Personality disorders and psychopathologic symptoms in patients with androgenetic alopecia. *Archives of Dermatology*, *130*(7), 868–872. https://doi.org/10.1001/archderm.1994.01690070062009

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy*, *36*(4), 455–470. https://doi.org/10.1016/S0005-7967(97)10031-6

Matza, L. S., Morlock, R., Sexton, C., Malley, K., & Feltner, D. (2010). Identifying HAM-A cutoffs for mild, moderate, and severe generalized anxiety disorder. *International Journal of Methods in Psychiatric Research*, *19*(4), 223–232. https://doi.org/10.1002/mpr.323

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Med*icine*, *6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Molina-Leyva, A., Caparros-DelMoral, I., Gomez-Avivar, P., Alcalde Alonso, M., & Juan Jimenez-Moleon, J. (2016). Psychosocial impairment as a possible cause of sexual dysfunction among young men with mild androgenetic alopecia: A cross-sectional crowdsourcing web-based study. *Acta dermatovenerologica Croatica*, *24*(1), 42–42. https://hrcak.srce.hr/156544

Moynihan, R., CG, P., Heath, I., & Henry, D. (2002). Selling sickness: The pharmaceutical industry and disease mongeringCommentary: Medicalisation of risk factors. *British Medical Journal*, *324* (7342), 886–891. https://doi.org/10.1136/bmj.324.7342.886

Mubki, T. F., Dayel, S. A. B., AlHargan, A. H., AlGhamdi, K. M., & AlKhalifah, A. I. (2019). Quality of life and willingness-to-pay in patients with androgenetic alopecia. *Egyptian Journal of Dermatology and Venerology*, *39*(1), 31–36. https://doi.org/10.4103/ejdv.ejdv_33_18

Nakazato, K., & Shimonaka, Y. (1989). The Japanese state-trait anxiety inventory: Age and sex differences. *Perceptual and Motor Skills*, *69*(2), 611–617. https://doi.org/10.2466/pms.1989.69.2.611

National Institute of Clinical Excellence. (2018) Scenario: Management: Alopecia, androgenetic - male. cks.nice.org.uk. Retrieved July , 2018. https://cks.nice.org.uk/topics/alopecia-androgenetic-male/management/management/

Passchier, J., Erdman, J., Hammiche, F., & Erdman, R. A. (2006). Androgenetic alopecia: Stress of discovery. *Psychological Reports*, *98*(1), 226–228. https://doi.org/10.2466/pr0.98.1.226-228

Passchier, J., Rijpma, S. E., Dutrée-Meulenberg, R. O. G. M., Verhage, F., & Stolz, E. (1989). Why men with hair loss go to the doctor. *Psychological Reports*, *65*(1), 323–330. https://doi.org/10.2466/pr0.1989.65.1.323

Passchier, J., Van der Donk, J., Dutrée-Meulenberg, R. O. G. M., Stolz, E., & Verhage, F. (1988). Psychological characteristics of men with alopecia androgenetica and effects of treatment with topical minoxidil an exploratory study. *International Journal of Dermatology*, *27*(s6), 441–446. https://doi.org/10.1111/j.1365-4362.1988.tb00005.x

Prinsen, C. A., Lindeboom, R., & De Korte, J. (2011). Interpretation of Skindex-29 scores: Cutoffs for mild, moderate, and severe impairment of health-related quality of life. *Journal of Investigative Dermatology*, *131*(9), 1945–1947. https://doi.org/10.1038/jid.2011.138

Rahimi-Ardabili, B., Pourandarjani, R., Habibollahi, P., & Mualeki, A. (2006). Finasteride induced depression: A prospective study. *BMC Clinical Pharmacology*, *6*(1), 1–6. https://doi.org/10.1186/1472-6904-6-7

Rencz, F., Gulacsi, L., Péntek, M., Wikonkal, N., Baji, P., & Brodszky, V. (2016). Alopecia areata and health-related quality of life: A systematic review and meta-analysis. *British Journal of Dermatology*, *175*(3), 561–571. https://doi.org/10.1111/bjd.14497

Rosenberg, M. (1965). *Society and the adolescent child*. Princeton University Press.

Russell, R. J. H., & Hulson, B. (1992). Physical and psychological abuse of heterosexual partners. *Personality & Individual Differences*, *13*(4), 457–473. https://doi.org/10.1016/0191-8869(92)90075-Z

Russo, P. M., Fino, E., Mancini, C., Mazzetti, M., Starace, M., & Piraccini, B. M. (2019). HrQoL in hair loss-affected patients with alopecia areata, androgenetic alopecia and telogen effluvium: The role of personality traits and psychosocial anxiety. *Journal of the European Academy of Dermatology and Venereology*, *33*(3), 608–611. https://doi.org/10.1111/jdv.15327

Sanders, G. J. E. M. (1977). *Met gewone en bijzondere van de homosexuele leefsituatie* (pp. 194–195). van Loghum Slaterus.

Sawant, N., Chikhalkar, S., Mehta, V., Ravi, M., Madke, B., & Khopkar, U. (2010). Androgenetic alopecia: Quality-of-life and associated lifestyle patterns. *International Journal of Trichology*, *2*(2), 81–85. https://doi.org/10.4103/0974-7753.77510

Scheier, M. F., & Carver, C. S. (1985). The Self-Consciousness Scale: A Revised Version for Use with General Populations. *Journal of Applied Social Psychology*, *15*(8), 687–699. https://doi.org/10.1111/j.1559-1816.1985.tb02268.x

Snaith, R. P. (2003). The hospital anxiety and depression scale. *Health and Quality of Life Outcomes*, *1*(1), 1–4. https://doi.org/10.1186/1477-7525-1-29

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Consulting Psychologists Press.

Tabolli, S., Sampogna, F., DiPietro, C., Mannooranparampil, T. J., Ribuffo, M., & Abeni, D. (2013). Health status, coping strategies, and alexithymia in subjects with androgenetic alopecia. *American Journal of Clinical Dermatology*, *14*(2), 139–145. https://doi.org/10.1007/s40257-013-0010-3

Tahir, K., Aman, S., Nadeem, M., & Kazmi, A. H. (2013). Quality of life in patients with androgenetic alopecia. *Annals of King Edward Medical University*, *19*(2), 150–150. https://doi.org/10.21649/akemu.v19i2.500

Tang, P. H., Chia, H. P., Cheong, L. L., & Koh, D. (2000). A community study of male androgenetic alopecia in Bishan, Singapore. *Singapore Medical Journal*, *41*(5), 202–205. https://scholarbank.nus.edu.sg/handle/10635/31824

Tas, B., Kulacaoglu, F., Belli, H., & Altuntas, M. (2018). The tendency towards the development of psychosexual disorders in androgenetic alopecia according to the different stages of hair loss: A cross-sectional study. *Anais brasileiros de dermatologia*, *93*(2), 185–190. https://doi.org/10.1590/abd1806-4841.20185658

Van der Donk, J., Passchier, J., Dutree-Meulenberg, R. O. G. M., Stolz, E., & Verhage, F. (1991). Psychologic characteristics of men with alopecia androgenetica and their modification. *International Journal of Dermatology*, *30*(1), 22–28. https://doi.org/10.1111/j.1365-4362.1991.tb05874.x

Wang, X., Xiong, C., Zhang, L., Yang, B., Wei, R., Cui, L., & Xing, X. (2018). Psychological assessment in 355 Chinese college students with androgenetic alopecia. *Medicine*, *97*(31), e11315. https://doi.org/10.1097/MD.0000000000011315

Ware, J., Kosinski, M., & Keller, S. (1998). *SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales* (3rd ed.). QualiMetric Incorporated.

Weir, C. J., Butcher, I., Assi, V., Lewis, S. C., Murray, G. D., Langhorne, P., & Brady, M. C. (2018). Dealing with missing standard deviation and mean values in meta-analysis of continuous outcomes: A systematic review. *BMC Medical Research Methodology*, *18*(1), 1–14. https://doi.org/10.1186/s12874-018-0483-0

Wells, P. A., Willmoth, T., & Russell, R. J. (1995). Does fortune favour the bald? Psychological correlates of hair loss in males. *British Journal of Psychology*, *86*(3), 337–344. https://doi.org/10.1111/j.2044-8295.1995.tb02756.x

Yamazaki, M., Miyakura, T., Uchiyama, M., Hobo, A., Irisawa, R., & Tsuboi, R. (2011). Oral finasteride improved the quality of life of androgenetic alopecia patients. *The Journal of Dermatology*, *38*(8), 773–777. https://doi.org/10.1111/j.1346-8138.2010.01126.x