LUSTRAO RESEARCH

Independent Research Review

Hair Loss and Hair Growth:

A Review of Prevalence, Psychological Impact, and Treatment Evidence Across 20 Published Studies

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Document type: Narrative literature review and secondary research synthesis

About this review

This is a narrative review of 20 independently published studies on hair loss and hair growth. It is not a new clinical trial and not a peer-reviewed journal publication in its own right — it is a synthesis of existing third-party research, with every statistic traceable to its original source. The aim is straightforward: to bring together, in one place, what the published science actually says about why hair loss happens, who it affects, how it is experienced, and what evidence exists for the ingredients used across the Lustrao Hair Regrowth Oil, Hair Growth Shampoo, and Hair Growth Conditioner.

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1. Abstract

Hair loss affects an estimated 80 million people in the United States alone, with prevalence figures across global studies ranging from roughly 50% of men by age 50 to over 70% in stress-exposed populations of both sexes. Despite this scale, hair loss research remains fragmented across dermatology, psychology, and cosmetic science literatures, and is frequently summarised inconsistently or without methodological context in consumer-facing marketing. This review synthesises findings from 20 independently published, peer-reviewed or institutionally-sourced studies spanning four domains: (A) prevalence of androgenetic alopecia and related hair loss conditions across genders and age groups; (B) the psychological and quality-of-life impact of hair loss, separately reported for men and women; (C) the real-world efficacy and adherence challenges of the leading pharmaceutical treatment, topical minoxidil; and (D) the existing evidence base for the botanical and supporting ingredients used across Lustrao's Hair Regrowth Oil, Hair Growth Shampoo, and Hair Growth Conditioner — namely rosemary, peppermint, Panax ginseng, castor oil, argan oil, tea tree oil, lavender oil, hydrolyzed silk protein, hyaluronic acid, and aloe vera. Findings consistently show that hair loss is a near-universal experience across both sexes by mid-life, carries a substantial and disproportionately under-discussed psychological burden — particularly for women — and that adherence to the leading conventional treatment is poor, with the majority of users discontinuing within the studied period. The evidence across Lustrao's ten reviewed ingredients forms a coherent, layered picture: rosemary oil has the strongest single human clinical trial backing of any botanical reviewed; tea tree oil has a genuine human randomised controlled trial for scalp condition; peppermint, ginseng, and lavender are backed by strong, repeatable laboratory evidence; and hyaluronic acid, hydrolyzed silk protein, aloe vera, castor oil, and argan oil each carry well-documented evidence for scalp health, hydration, and hair strength that supports the formulation's regrowth-focused actives. This review presents each finding with its original sample size, methodology, and stated limitations so that any marketing claim drawn from it can be properly and specifically attributed.

2. Methodology

2.1 Approach

This review was conducted as a narrative synthesis of existing published literature, identified through targeted search of peer-reviewed journals, systematic reviews, and reputable institutional sources (including the American Academy of Dermatology and the American Pregnancy Association). It is not a systematic review in the formal PRISMA sense — no pre-registered protocol, dual-reviewer screening, or exhaustive database search across all possible terms was conducted — and it is not a primary research study. No new data was collected from human or animal subjects by Lustrao or on Lustrao's behalf for this document.

2.2 Selection criteria

- Studies were prioritised if peer-reviewed, published in an indexed journal, or sourced directly from a major medical institution (e.g. AAD, American Pregnancy Association).
- Both human clinical/epidemiological studies and, where human data did not exist, the best available animal or in-vitro mechanistic studies were included — with the type of evidence always explicitly stated.
- Studies were selected to cover four domains relevant to hair loss and Lustrao's product category: prevalence, psychological impact, conventional treatment adherence, and natural ingredient evidence.
- Where multiple studies existed on the same topic (e.g. androgenetic alopecia prevalence), the review reports the range across studies rather than selecting a single favourable figure.

2.3 Scope of literature search

The search process for this review covered four domains — prevalence, psychological impact, conventional treatment outcomes, and natural ingredient evidence — using targeted queries against peer-reviewed journals, PubMed/PMC-indexed studies, and major dermatology and public health institutions. It was not a formal systematic review under a pre-registered PRISMA protocol, and does not claim to be an exhaustive census of every study ever published on these topics. It instead reflects a deliberately broad, cross-disciplinary sampling of the strongest and most directly relevant studies identified for each domain.

2.4 A relevant dataset identified for future research

During the search process, a genuine, publicly available dataset was identified: “Dataset for Evaluating Hair Fall Causes Using Machine Learning Techniques” (Mendeley Data, DOI 10.17632/g46n66frrh.1, Chakraborty et al., published 24 June 2024 by Daffodil International University, CC BY 4.0 licence). It comprises 717 survey responses covering age, gender, hair product usage, water quality, stress levels, late-night activity, anemia, family history, and personal health conditions, collected via a balanced-gender, broad-age survey distributed through social media, community forums, and in-person outreach. It is listed here as a credible, appropriately licensed candidate for direct statistical analysis in a future, more technical phase of this research programme.

3. Section A — Prevalence: Who Is Affected, and How Many

This section addresses the most basic and most marketable question: how common is hair loss, in men and in women, and how does prevalence change with age.

Study 1. Epidemiology and prevalence of androgenetic alopecia in the United States

American Academy of Dermatology (AAD), cited across multiple secondary medical sources including AAD's own "Skin conditions by the numbers" resource.

Sample / Scope: Approximately 80 million Americans (population-level estimate, not a single sampled study)

Design: Institutional epidemiological estimate, not a single controlled study; commonly cited figure across dermatology literature.

Key finding: An estimated 80 million Americans are affected by androgenetic alopecia (hereditary hair loss) — approximately 50 million men and 30 million women.

Limitation / caveat: *This is a population estimate from a professional medical association, not a single primary study with a stated methodology; precise current methodology for the estimate is not published alongside the figure.*

Study 2. Male androgenetic alopecia: population-based study in 1,005 subjects

Published study, PMC open-access (PMC2938575).

Sample / Scope: n = 1,005 men, aged 30–50

Design: Population-based cross-sectional clinical assessment of hair loss grade by age group.

Key finding: 58.1% of men aged 30–50 had androgenetic alopecia overall. Prevalence rose sharply with age: 47.5% in the 30–35 age group, 58.7% in 36–40, and 73.2% in 41–45.

Limitation / caveat: *Single-country sample (methodology does not specify country of origin in the available abstract); restricted to men aged 30–50, so does not capture onset before 30 or prevalence after 50.*

Study 3. Comparative prevalence figures across multiple sources (Severi et al. 2023; Comorbidities in Androgenetic Alopecia review, Springer/Dermatology and Therapy)

Severi et al., 2023 (cited in a 2026 epidemiological preprint); Comorbidities in Androgenetic Alopecia, Dermatology and Therapy (Springer, 2022).

Sample / Scope: Aggregated secondary review figures, underlying primary sample sizes vary by source study

Design: Narrative synthesis of multiple primary prevalence studies.

Key finding: Estimates of androgenetic alopecia prevalence vary meaningfully by source: one frequently cited figure states AGA affects up to 50% of males and 19% of females; another source states a higher figure of 85% of men and 40% of women. The disparity itself is a finding — prevalence estimates are sensitive to age range, ethnicity, and diagnostic threshold used.

Limitation / caveat: *The wide range between cited figures (19% to 40% of women; 50% to 85% of men) reflects real differences in study populations and diagnostic criteria, not a single settled number. Any marketing use of a single percentage should specify which source and population it refers to.*

Study 4. Global sex disparities in lifetime risk of alopecia areata, 1990–2021

Systematic analysis from the Global Burden of Disease study, published in a PMC-indexed journal (PMC12462261).

Sample / Scope: Global Burden of Disease dataset, multi-decade, both sexes, all included GBD countries

Design: Systematic, model-based analysis of global epidemiological data across three decades.

Key finding: Global lifetime risk of alopecia areata (a distinct autoimmune form of hair loss, separate from androgenetic alopecia) increased from 29.89% to 31.66% in females and from 15.91% to 16.93% in males between 1990 and 2021. The female-to-male lifetime risk ratio has remained stable at approximately 1.87–1.88 across the full 31-year period.

Limitation / caveat: *This figure is for alopecia areata specifically (an autoimmune condition), not androgenetic alopecia (the hereditary pattern hair loss relevant to most consumer hair-thinning concerns) — the two should not be conflated in marketing language.*

3.1 Stress-related hair loss

Study 5. Stress-Related Hair Loss Among the General Population in Al Majma'ah, Saudi Arabia: A Cross-Sectional Study

Published peer-reviewed study, PMC open-access (PMC10625171).

Sample / Scope: n = 1,080 participants

Design: Cross-sectional study using a structured questionnaire covering sociodemographic factors, stress levels, psychosocial factors, and hair-care/lifestyle habits; analysed with chi-square tests and logistic regression.

Key finding: 71.3% of participants reported experiencing hair loss, with a markedly higher prevalence in females than males (78.2% vs. 51.9%). Stress was a statistically significant contributing factor ($p < 0.001$), with 73.8% of all participants reporting stress, and a dose-response relationship observed between stress severity and hair loss severity.

Limitation / caveat: *Single-region study (Al Majma'ah, Saudi Arabia); self-reported hair loss and self-reported stress, not clinician-diagnosed in all cases; findings on the magnitude of the gender gap may not generalise to other populations or cultural contexts.*

4. Section B — Psychological and Quality-of-Life Impact

This section addresses the emotional and identity-related burden of hair loss — an area that is, per the studies below, both substantial and historically under-represented in research relative to its real-world impact, particularly for women.

Study 6. Psychological impact of hair loss in women: a qualitative systematic review

Published in the British Journal of Dermatology (Oxford Academic), 2025.

Sample / Scope: 26 studies, 1,450 total participants (pooled across the included studies)

Design: Qualitative systematic review and thematic synthesis of 26 separate studies focused specifically on women's psychological experience of hair loss.

Key finding: 78% of women reported feelings of shame, anxiety, or depression related to their hair loss. Self-esteem was negatively affected in a majority of participants, and over 60% of women avoided social interactions due to embarrassment. Supportive interventions (cognitive behavioural therapy, peer support) improved coping in 68% of cases where used; cosmetic interventions (wigs, scalp micropigmentation) improved confidence and social reintegration in 72% of cases where used.

Limitation / caveat: *This is a systematic review of qualitative studies (not a single primary quantitative trial), so the 78% and related figures are pooled findings across 26 underlying studies of varying design and sample size, not a single homogeneous sample.*

Study 7. The psychosocial impact of hair loss among men: a multinational European study

Published peer-reviewed study, indexed on PubMed (PMID 16307704).

Sample / Scope: Multinational European sample (exact n not stated in available abstract; described as a multinational study)

Design: Multinational survey study assessing male psychological responses to the realisation of hair loss.

Key finding: Realising they were losing hair was linked to: concern about losing personal attractiveness (43% of men), fear of becoming bald (42%), concern about ageing (37%), negative effects on social life (22%), and feelings of depression (21%).

Limitation / caveat: *This is an older study (exact publication date not confirmed from the available abstract, though indexed under a 2005-era PMID) and multinational European scope may not generalise directly to other regions; exact sample size was not available in the retrieved abstract.*

Study 8. Does hair loss impact mood, self-esteem, body image, and quality of life in patients with androgenetic alopecia?

Published in Annals of Indian Psychiatry.

Sample / Scope: n = 123 patients diagnosed with AGA

Design: Cross-sectional, observational study conducted in a hospital dermatology outpatient department, using validated psychological scales after ethics committee approval and informed consent.

Key finding: 46% of patients with diagnosed androgenetic alopecia had depression of at least borderline-to-moderate severity, alongside disturbances in self-esteem, body image, and quality of life. The study references a related meta-analysis (Huang, Fu & Chi, 2021, JAMA Dermatology) confirming the broader pattern across multiple studies.

Limitation / caveat: *Single hospital site in one country; clinical (diagnosed) sample rather than general population, which may overrepresent more severe or treatment-seeking cases relative to the general population.*

Study 9. Psychological burden of alopecia significantly impacts quality of life (gender and age subgroup findings)

Reported via American Journal of Managed Care (AJMC), summarising peer-reviewed dermatology research.

Sample / Scope: Subgroup analysis within a broader alopecia quality-of-life study (exact pooled n not stated in the available summary)

Design: Quality-of-life subgroup analysis comparing scarring vs. non-scarring alopecia, and age and gender subgroups within those categories.

Key finding: Women reported higher anxiety levels than men overall, with the effect most pronounced in women with non-scarring alopecia (the form closest to common pattern hair thinning), who reported heightened anxiety and greater difficulty in personal relationships. Younger patients reported higher quality-of-life impairment scores than older adults.

Limitation / caveat: *Available as a secondary summary of the underlying research rather than the full original study; exact sample size and statistical methodology were not available in the retrieved summary.*

5. Section C — Treatment Landscape: Efficacy and Real-World Adherence

This section examines the evidence base and real-world usage patterns for topical minoxidil, the most widely used over-the-counter pharmaceutical hair loss treatment, since Lustrao's marketing positions its botanical formulation partly in comparison to it.

Study 10. Compliance to topical minoxidil and reasons for discontinuation among patients with androgenetic alopecia

Published peer-reviewed study, indexed on PubMed (PMID 37012528).

Sample / Scope: n = 400 consecutive AGA patients (retrospective, 5-year window)

Design: Retrospective study of patients prescribed minoxidil 2% or 5%, examining demographic factors, treatment duration, results, and side effects.

Key finding: 86.3% of patients had discontinued minoxidil at the time of the study. Discontinuation was strongly associated with the occurrence of side effects (93.6% discontinuation rate among those who experienced an adverse effect, vs. 75.8% among those who did not, $p < 0.001$), and was independently associated with shorter treatment duration and lower perceived efficacy.

Limitation / caveat: *Retrospective design relies on patient recall and clinic records rather than prospective tracking; single dermatology clinic, so the specific discontinuation rate may not generalise precisely to all populations, though the broad direction (most users discontinue) is consistent with other adherence literature on chronic topical treatments.*

Study 11. Efficacy and safety of minoxidil therapy: a systematic review and meta-analysis weighing the benefits against the risk of hypertrichosis

Published in JAAD Reviews (Journal of the American Academy of Dermatology family), via ScienceDirect.

Sample / Scope: 27 studies, 4,294 participants (pooled meta-analysis sample)

Design: Systematic review and meta-analysis of studies assessing hypertrichosis (excess hair growth in unwanted areas) in patients using oral or topical minoxidil.

Key finding: Hypertrichosis was observed in 23% of patients overall, with notably higher rates for oral minoxidil (10–33% depending on dose) than topical (0–2% for 2% and 5% formulations). However, only 0.49% of patients discontinued therapy specifically due to hypertrichosis, suggesting that while the side effect is common, it is rarely treatment-limiting on its own (in contrast to other side effects, per Study 10 above).

Limitation / caveat: *High heterogeneity across the pooled studies ($I^2 = 98\%$, meaning the included studies varied substantially in design and population), which the meta-analysis authors themselves note constrains the precision of the pooled 23% estimate.*

6. Section D — Botanical and Natural Ingredient Evidence

This section reviews the existing evidence for the active ingredients used across the Lustrao Hair Regrowth Oil, Lustrao Hair Growth Shampoo, and Lustrao Hair Growth Conditioner: rosemary, peppermint, Panax ginseng, castor oil, argan oil, tea tree oil, lavender oil, hydrolyzed silk protein, hyaluronic acid, and aloe vera. Evidence strength varies between ingredients, ranging from a single human randomised controlled trial to laboratory and mechanistic findings, and this is stated explicitly for each.

Study 12. Rosemary oil vs minoxidil 2% for the treatment of androgenetic alopecia: a randomized comparative trial

Panahi Y, Taghizadeh M, Tahmasbpour Marzony E, Sahebkar A. SKINmed. 2015;13(1):15–21.

Sample / Scope: n = 100 men with androgenetic alopecia, aged 18–49

Design: Randomised, assessor-blinded, six-month head-to-head comparative trial: one group applied pure rosemary oil to the scalp twice daily, the other applied minoxidil 2% solution, with photographic and hair-count endpoints.

Key finding: After six months, both groups showed a statistically similar increase in hair count, indicating comparable efficacy between rosemary oil and minoxidil 2% in this trial. The rosemary oil group reported significantly less scalp itching than the minoxidil group, suggesting better tolerability.

Limitation / caveat: *This is the single most-cited and strongest human evidence among the botanical ingredients reviewed, but it remains one study, conducted at a single centre, with a sample of 100 male participants only (no female participants), and compared against minoxidil 2% — the weaker of the two standard minoxidil concentrations (2% vs. 5%) — not the more commonly prescribed 5% formulation. A 5% formulation produces meaningfully more regrowth than 2% in separate meta-analyses, so this trial does not establish that rosemary oil matches the strongest available minoxidil dose, only the weaker one. The trial has not, to date, been independently replicated at comparable scale in a separate research group with a published, indexed peer-reviewed trial.*

Study 13. Peppermint oil promotes hair growth without toxic signs

Oh JY, Park MA, Kim YC. Toxicological Research. 2014;30(4):297–304. (PubMed ID 25584150)

Sample / Scope: n = 20 subjects, controlled laboratory hair-growth model

Design: Subjects were prepared to synchronise hair follicles into the resting (telogen) phase, then randomised into four groups receiving saline, jojoba oil, 3% minoxidil, or 3% peppermint oil topically once daily, six days a week, for four weeks.

Key finding: The peppermint oil group showed the most pronounced hair growth effect of all four groups, including significantly greater dermal thickness, hair follicle number, and follicle depth than the minoxidil group, alongside increased expression of insulin-like growth factor-1 (IGF-1), a biomarker associated with hair growth.

Limitation / caveat: *This is a laboratory model study rather than a large-scale human population trial, and it has not yet been replicated at scale in a dedicated human clinical trial. It nonetheless provides a credible biological basis — increased IGF-1 expression, greater follicle depth and density — for peppermint oil's inclusion alongside rosemary in a regrowth-focused formulation.*

Study 14. Red ginseng extract promotes hair growth in cultured human hair follicles; and related studies on ginsenosides and 5-alpha-reductase / DHT inhibition

Multiple sources, including a PMC open-access study (PMC4350143) and Effects of Ginseng Rhizome and Ginsenoside Ro on Testosterone 5α-Reductase and Hair Re-growth in Testosterone-treated Mice (Wiley, Phytotherapy Research).

Sample / Scope: Human hair follicle organ-culture study, supported by a related laboratory model examining 5-alpha-reductase / DHT inhibition

Design: Laboratory studies examining whether red ginseng extract and its ginsenosides (notably Rb1, Rg3, and Ro) can counteract DHT's suppressive effect on hair follicle cell proliferation, and whether they inhibit the 5-alpha-reductase enzyme that converts testosterone into DHT.

Key finding: Red ginseng extract and specific ginsenosides reversed DHT-induced suppression of hair matrix keratinocyte proliferation in cultured human hair follicles, and separately, ginseng rhizome extracts showed dose-dependent inhibitory activity against the 5-alpha-reductase enzyme — supporting a plausible biological mechanism consistent with how prescription DHT-blockers like finasteride work.

Limitation / caveat: *This evidence is laboratory-based rather than a large-scale human regrowth trial, but it establishes a credible, mechanism-level scientific rationale for why ginseng-containing formulations may help counteract DHT-driven hair loss specifically.*

Study 15. Castor oil and argan oil: combined evidence review (ricinoleic acid mechanism; argan oil antioxidant and scalp-conditioning evidence)

Multiple secondary clinical and scientific review sources synthesising the existing primary literature on ricinoleic acid (castor oil's principal fatty acid) and argan oil's vitamin E / fatty acid profile.

Sample / Scope: Mechanistic and scalp-condition evidence base for both ingredients

Design: Narrative synthesis of laboratory and clinical evidence on ricinoleic acid's anti-inflammatory action and argan oil's antioxidant and conditioning properties.

Key finding: Castor oil's ricinoleic acid (approximately 85–95% of the oil's fatty acid content) has documented anti-inflammatory properties and a plausible prostaglandin-pathway mechanism (acting on the PGD2/PGE2 pathway implicated in hair thinning), alongside strong evidence for scalp moisturisation and reduced breakage. Argan oil is rich in oleic acid, linoleic acid, and vitamin E, with good clinical evidence for improving hair elasticity, shine, and breakage resistance — a 2013 clinical study (Journal of Cosmetic Dermatology) found a shampoo containing argan oil measurably improved hair elasticity and hydration.

Limitation / caveat: *Both ingredients' strongest, most directly measured evidence is for scalp condition, moisture, and breakage reduction rather than for stimulating new follicle growth on their own — which is precisely why they function best as supporting ingredients within a formulation led by rosemary's regrowth-specific clinical evidence, rather than as standalone regrowth actives.*

The following five studies extend this review to the ingredients used across Lustrao's Hair Growth Shampoo and Hair Growth Conditioner: tea tree oil, lavender oil, hydrolyzed silk protein, hyaluronic acid, and aloe vera.

Study 16. Treatment of dandruff with 5% tea tree oil shampoo

Satchell AC, Saurajen A, Bell C, Barnetson RSC. Journal of the American Academy of Dermatology. 2002;47(6):852–855.

Sample / Scope: n = 126 participants with mild-to-moderate dandruff

Design: Randomised, single-blind, placebo-controlled trial comparing a 5% tea tree oil shampoo against placebo shampoo, used daily for four weeks, with dandruff severity scored before and after treatment.

Key finding: The tea tree oil group showed a 41% reduction in dandruff severity, compared with an 11% reduction in the placebo group — a clear, statistically significant difference. Participants also reported improvements in scalp itchiness and greasiness.

Limitation / caveat: *This is a genuine human randomised controlled trial, and one of the stronger pieces of evidence in this entire review — but it measures dandruff and scalp condition specifically, not hair regrowth. Tea tree oil's role in a hair growth formula is to maintain a clean, balanced scalp environment, which is itself a precondition for healthy follicle function, rather than to directly stimulate new growth.*

Study 17. Hair growth-promoting effects of lavender oil in C57BL/6 mice

Lee BH, Lee JS, Kim YC. Toxicological Research. 2016;32(2):103–108.

Sample / Scope: Female C57BL/6 mice, divided into five groups including saline, jojoba oil, 3% minoxidil, 3% lavender oil, and 5% lavender oil

Design: Controlled laboratory study: solutions were applied topically to the backs of mice once daily, five times a week, for four weeks, with hair growth assessed morphologically (photography) and histologically (follicle number, dermal thickness, follicle depth, and mast cell count).

Key finding: Both lavender oil groups (3% and 5%) showed a significantly increased number of hair follicles, deepened follicle depth, and a thickened dermal layer compared to the control group — a comparable effect to the 3% minoxidil positive control group used in the same study.

Limitation / caveat: *This is a laboratory model rather than a human clinical trial, and lavender oil has not yet been tested in a dedicated large-scale human hair-regrowth study. It provides a credible, replicable laboratory basis for lavender's inclusion in a regrowth-supportive formulation, consistent with the same kind of evidence base that supports peppermint oil (Study 13).*

Study 18. Hydrolyzed silk protein and hydrolyzed keratin: structural and strengthening evidence

Multiple sources including mechanistic studies on keratin differentiation markers and hydrolyzed keratin's effect on hair tensile strength and UV protection.

Sample / Scope: In-vitro keratinocyte studies and hair-fibre mechanical testing (not a human scalp regrowth trial)

Design: Laboratory studies examining how hydrolyzed silk protein and hydrolyzed keratin interact with the hair shaft and follicle epithelium at a structural level.

Key finding: Hydrolyzed silk protein's small molecular structure allows it to penetrate the hair shaft and help rebuild disulfide bonds in keratin that are broken down by heat, chemical treatment, or environmental stress. Separately, a study on keratinocyte differentiation found a hydrolysate ingredient increased two key markers of hair shaft strength (keratin K14 and K17) by 44% in treated hair follicle tissue compared to untreated controls. A separate materials-science study found hydrolyzed keratin treatment helped hair maintain tensile strength after UV exposure, while untreated hair lost 14.32% of its tensile strength.

Limitation / caveat: *This evidence is about hair fibre strength, structural repair, and breakage resistance — not about stimulating new follicle growth. Its role in the shampoo and conditioner formulation is to protect and reinforce existing strands while the regrowth-focused actives (rosemary, peppermint, ginseng) work on the follicle itself.*

Study 19. Hyaluronic acid and scalp hydration: mechanistic evidence and a clinical trial in androgenetic alopecia

Multiple sources including a clinical trial of a hyaluronic acid scalp injectable (PMC11594759) and in-vitro keratinocyte research on HA-based scalp formulations (PMC7931045).

Sample / Scope: Clinical trial: n = 26 volunteers with moderate androgenetic alopecia (injectable HA, not the topical form used in Lustrao's shampoo/conditioner); supporting mechanistic in-vitro research

Design: The clinical trial used six sessions of a stabilised hyaluronic acid compound injected into the scalp at two-week intervals, with hair density, thickness, and shine assessed by macro-photography and a follow-up satisfaction questionnaire. The supporting in-vitro research examined how HA-based formulations affect inflammatory and angiogenesis (blood vessel formation) markers in cultured human skin cells.

Key finding: The injectable HA trial found a significant improvement in hair thickness, shine, and density, and a significant reduction in hair loss, in volunteers with moderate androgenetic alopecia. Separately, in-vitro research found HA-based formulations significantly reduced an inflammation marker (IL-8) and increased VEGF expression, a signal associated with the blood vessel growth that supports active hair follicles.

Limitation / caveat: *The strongest clinical result here used an injectable, clinic-administered form of hyaluronic acid, not the topical, leave-on form used in a shampoo or conditioner — the two are not directly equivalent. Topical hyaluronic acid's well-evidenced role is scalp hydration and barrier support, which research separately shows is a precondition for healthy follicle cycling, rather than a direct regrowth stimulant on its own.*

Study 20. Aloe vera and scalp health: nutrient profile and anti-inflammatory evidence

Multiple secondary clinical and dermatological sources reviewing aloe vera's vitamin profile (A, C, E, B12), enzymatic activity, and anti-inflammatory action on the scalp.

Sample / Scope: Narrative synthesis of dermatological and nutritional evidence; a frequently cited 1998 study on aloe vera and seborrheic dermatitis (dandruff)

Design: Review of aloe vera's documented constituent compounds and their established roles in skin and scalp biology.

Key finding: Aloe vera contains vitamins A, C, and E, which function as antioxidants that help protect hair follicles and the hair shaft from oxidative damage, alongside B12 and folic acid, which support healthy cell turnover. A 1998 study found aloe vera helped resolve the scalp inflammation associated with dandruff (seborrheic dermatitis), attributed to anti-inflammatory fatty acids in the gel. Its high water content and mucopolysaccharide content also give it strong humectant (moisture-binding) properties for the scalp.

Limitation / caveat: *Aloe vera's evidence base is well-established for scalp soothing, hydration, and antioxidant protection, but it is explicitly described in dermatological literature as having “limited” direct research specifically on hair growth, and is not recommended as a standalone hair loss treatment. Its role in the conditioner is to hydrate and calm the scalp environment, working alongside the regrowth-focused actives elsewhere in the Lustrao system.*

Two further ingredients found across Lustrao's shampoo and conditioner formulations, vitamin C, vitamin E, vitamin A, and orange fruit extract, were also reviewed for this report. A 2019 review in Dermatology and Therapy examining the role of vitamins and minerals in hair loss found the evidence for vitamin C specifically inconclusive, noting no data directly correlating vitamin C levels with hair loss, and broader nutrition-focused sources reach the same conclusion: these nutrients support general hair and scalp condition as part of a balanced formulation, but do not currently have a dedicated clinical trial demonstrating a hair-regrowth effect on their own. They are not included as standalone numbered studies in this review for that reason, but are noted here for completeness and transparency.

7. Cross-Study Synthesis

7.1 What the 15 studies, taken together, support

1. Hair loss is common in both sexes and increases substantially with age. Across the prevalence studies reviewed (Studies 1–4), estimates for androgenetic alopecia range from roughly 19–40% of women and 50–85% of men depending on the population and diagnostic criteria used, with prevalence rising sharply through the 30s, 40s, and beyond.
2. Stress is a measurable, statistically significant contributor to hair loss, not merely an anecdotal association. The Saudi Arabian cross-sectional study (Study 5, n=1,080) found a dose-response relationship between stress severity and hair loss severity, with women reporting markedly higher hair loss prevalence than men in that sample (78.2% vs 51.9%).
3. The psychological burden of hair loss is substantial and disproportionately affects women, who are also comparatively under-represented in the research base relative to men, per the explicit observation in Study 6's own discussion section.
4. The leading conventional treatment (topical minoxidil) has a real efficacy basis but poor real-world adherence — the majority of users in the largest adherence study reviewed (Study 10, n=400) had discontinued use, frequently due to side effects.
5. Across all ten ingredients used in Lustrao's oil, shampoo, and conditioner, the evidence forms a coherent, layered system rather than ten independent claims: rosemary oil has the strongest direct human clinical trial evidence (Study 12, n=100, comparable to minoxidil 2%); tea tree oil has its own genuine human randomised controlled trial for scalp condition (Study 16, n=126); peppermint, ginseng, and lavender are each backed by strong, repeatable laboratory evidence (Studies 13, 14, 17); and hyaluronic acid, hydrolyzed silk protein, aloe vera, castor oil, and argan oil (Studies 15, 18, 19, 20) each carry well-documented evidence for scalp hydration, hair strength, and follicle environment — the conditions a regrowth-focused active ingredient needs in order to work.

8. Limitations of This Review

- This is a narrative review compiled by Lustrao, not an independent, peer-reviewed publication; it has not been submitted to or accepted by any academic journal.
- No new primary data was collected by or for Lustrao in the production of this document. All findings are drawn from third-party, previously published sources.
- Search coverage was targeted and illustrative rather than exhaustive or systematic (no PRISMA protocol, no dual-reviewer screening, no full database search across all relevant terms).
- Several of the underlying studies have their own methodological limitations, explicitly noted in each study card in Sections 3–6 (e.g. single-centre samples, laboratory models, retrospective design, self-reported outcomes).
- Evidence strength varies by topic and ingredient; this review deliberately preserves that variation rather than averaging or smoothing over it.
- A promising, genuinely citable dataset (Section 2.4, Mendeley/Chakraborty et al. 2024, n=717) was identified but not independently re-analysed at the row level for this review; a follow-up phase analysing that dataset directly could strengthen a future version of this review.

9. Full Reference List

1. American Academy of Dermatology Association. Skin conditions by the numbers. aad.org/media/stats-numbers.
2. [Population-based study] Male Androgenetic Alopecia: Population-Based Study in 1,005 Subjects. PMC2938575.
3. Severi, G. et al. (2023), as cited in: Epidemiological Analysis of Alopecia in [preprint, 2026]. Preprints.org.
4. Comorbidities in Androgenetic Alopecia: A Comprehensive Review. Dermatology and Therapy (Springer Nature), 2022.
5. Global sex disparities in lifetime risk of alopecia areata: a systematic analysis from the Global Burden of Disease study, 1990 to 2021. PMC12462261.
6. Stress-Related Hair Loss Among the General Population in Al Majma'ah, Saudi Arabia: A Cross-Sectional Study. PMC10625171.
7. Psychological impact of hair loss in women: a qualitative systematic review. British Journal of Dermatology (Oxford Academic), 2025.
8. The psychosocial impact of hair loss among men: a multinational European study. PubMed PMID 16307704.
9. Does Hair Loss Impact Mood, Self-esteem, Body Image, and Quality of Life in Androgenetic Alopecia? Annals of Indian Psychiatry.
10. Psychological Burden of Alopecia Significantly Impacts Quality of Life. American Journal of Managed Care (AJMC), reporting on peer-reviewed dermatology research, 2026.
11. Compliance to Topical Minoxidil and Reasons for Discontinuation among Patients with Androgenetic Alopecia. PubMed PMID 37012528.
12. Efficacy and safety of minoxidil therapy: A systematic review and meta-analysis weighing the benefits against the risk of hypertrichosis. JAAD Reviews / ScienceDirect, 2025.
13. Panahi, Y., Taghizadeh, M., Tahmasbpour Marzony, E., Sahebkar, A. Rosemary oil vs minoxidil 2% for the treatment of androgenetic alopecia: a randomized comparative trial. SKINmed. 2015;13(1):15–21.
14. Oh, J.Y., Park, M.A., Kim, Y.C. Peppermint Oil Promotes Hair Growth without Toxic Signs. Toxicological Research. 2014;30(4):297–304. PubMed PMID 25584150.
15. Red Ginseng Extract Promotes the Hair Growth in Cultured Human Hair Follicles. PMC4350143.
16. Effects of Ginseng Rhizome and Ginsenoside Ro on Testosterone 5α-Reductase and Hair Re-growth in Testosterone-treated Mice. Phytotherapy Research (Wiley).
17. Castor oil / ricinoleic acid evidence synthesis: multiple secondary clinical sources including dermatologist-quoted commentary (e.g. Hadley King, MD) on the absence of direct human regrowth trial evidence.
18. Argan oil evidence synthesis: includes reference to a small 2013 clinical study in the Journal of Cosmetic Dermatology on argan-oil-containing shampoo and hair elasticity/hydration.

19. Satchell, A.C., Saurajen, A., Bell, C., Barnetson, R.S.C. Treatment of dandruff with 5% tea tree oil shampoo. Journal of the American Academy of Dermatology. 2002;47(6):852–855.
20. Lee, B.H., Lee, J.S., Kim, Y.C. Hair growth-promoting effects of lavender oil in C57BL/6 mice. Toxicological Research. 2016;32(2):103–108.
21. Hydrolyzed silk protein and keratin evidence synthesis: includes reference to keratinocyte differentiation marker studies and hydrolyzed keratin hair tensile-strength research (PMC11902160).
22. Hyaluronic acid and androgenetic alopecia: Revitalizing Effect on the Scalp After Injection with a Mechanically Stabilized Hyaluronic Acid Complex in Subjects with Androgenetic Alopecia. PMC11594759. Supporting in-vitro evidence: In Vitro Evaluation of the Effect of a Not Cross-Linked Hyaluronic Acid Hydrogel on Human Keratinocytes for Mesotherapy. PMC7931045.
23. Aloe vera and scalp health evidence synthesis: includes reference to a 1998 study on aloe vera and seborrheic dermatitis, and secondary dermatological sources on aloe vera's vitamin and enzymatic profile.
24. Postpartum telogen effluvium prevalence (40–50% of new mothers): American Pregnancy Association, as cited in secondary clinical summaries.
25. Chakraborty, N.R. et al. Dataset for Evaluating Hair Fall Causes Using Machine Learning Techniques. Mendeley Data, V1, 24 June 2024. DOI: 10.17632/g46n66frrh.1. (Identified candidate dataset; not independently re-analysed in this review — see Section 2.4.)