

Evaluating the Cost Burden of Alopecia Areata Treatment: A Comprehensive Review for Dermatologists

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PRACTICE POINTS

- Hair loss treatments and concealment techniques cost the average patient thousands of dollars. Much of this cost burden comes from items not covered by insurance.
- Providers should be wary of gender- or marketing-related surcharges for minoxidil solutions, and oral minoxidil may be a cost-effective option.
- Self-administering diphencyprone at home is more cost- and time-effective than in-office diphencyprone administration and does not decrease efficacy.

Alopecia areata (AA) is managed with prolonged medical treatments and cosmetic therapies, whose cost can be burdensome. We sought to identify the costs of AA treatment and consolidate the available data for the practicing dermatologist by performing a PubMed search of articles indexed for MEDLINE. Ten studies including approximately 16,000 patients with AA across a range of Oxford Centre for Evidence-Based Medicine Levels of Evidence were included. Studies showed that despite the limited efficacy of many AA therapies, patients incurred substantial expenses to manage their AA.

Alopecia areata (AA) affects 4.5 million individuals in the United States, with 66% younger than 30 years.^{1,2} Inflammation causes hair loss in

well-circumscribed, non-scarring patches on the body with a predilection for the scalp.³⁻⁶ The disease can devastate a patient's self-esteem, in turn reducing quality of life.^{1,7} Alopecia areata is an autoimmune T-cell-mediated disease in which hair follicles lose their immune privilege.⁸⁻¹⁰ Several specific mechanisms in the cytokine interactions between T cells and the hair follicle have been discovered, revealing the Janus kinase-signal transducer and activator of transcription (JAK-STAT) pathway as pivotal in the pathogenesis of the disease and leading to the use of JAK inhibitors for treatment.¹¹

There is no cure for AA, and the condition is managed with prolonged medical treatments and cosmetic therapies.² Although some patients may be able to manage the annual cost, the cumulative cost of AA treatment can be burdensome.¹² This cumulative cost may increase if newer, potentially expensive treatments become the standard of care. Patients with AA report dipping into their savings (41.3%) and cutting back on food or clothing expenses (33.9%) to account for the cost of alopecia treatment. Although prior estimates of the annual out-of-pocket cost of AA treatments range from \$1354 to \$2685, the cost burden of individual therapies is poorly understood.¹²⁻¹⁴

Patients who must juggle expensive medical bills with basic living expenses may be lost to follow-up or fall into treatment nonadherence.¹⁵ Other patients' out-of-pocket costs may be manageable, but the costs to the health care system may compromise care in other ways. We conducted a literature review of the recommended therapies

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for AA based on American Academy of Dermatology (AAD) guidelines to identify the costs of alopecia treatment and consolidate the available data for the practicing dermatologist.

Methods

We conducted a PubMed search of articles indexed for MEDLINE through September 15, 2022, using the terms *alopecia* and *cost* plus one of the treatments (n=21) identified by the AAD² for the treatment of AA (Figure). The reference lists of included articles were reviewed to identify other potentially relevant studies. Forty-five articles were identified.

Given the dearth of cost research in alopecia and the paucity of large prospective studies, we excluded articles that were not available in their full-text form or were not in English (n=3), articles whose primary study topic was not AA or an expert-approved alopecia treatment (n=15), and articles with no concrete cost data (n=17), which yielded 10 relevant articles that we studied using qualitative analysis.

Due to substantial differences in study methods and outcome measures, we did not compare the costs of alopecia among studies and did not perform statistical analysis. The quality of each study was investigated and

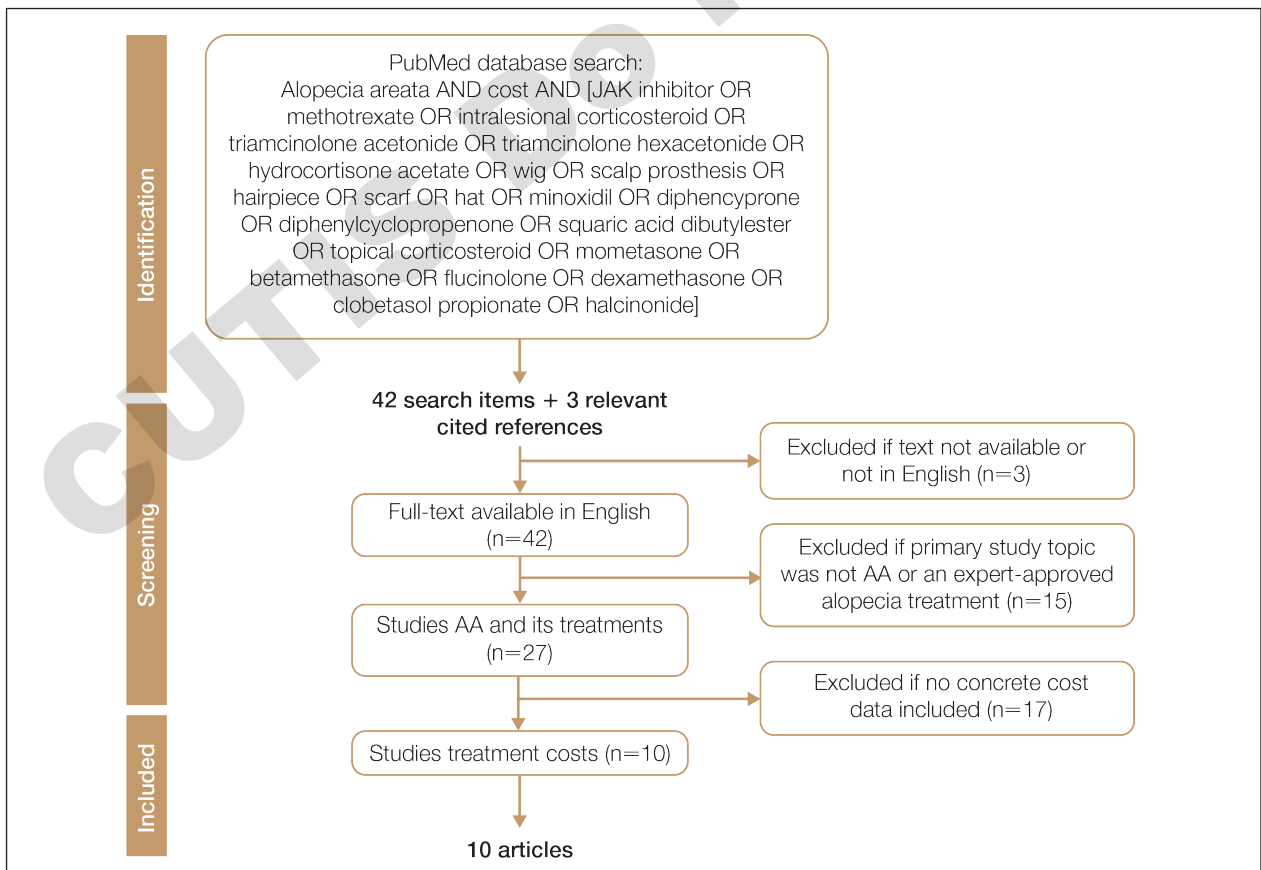
assigned a level of evidence per the 2009 criteria from the Centre for Evidence-Based Medicine.¹⁶

All cost data were converted into US dollars (\$) using the conversion rate from the time of the original article’s publication.

Results

Total and Out-of-pocket Costs of AA—Li et al¹³ studied out-of-pocket health care costs for AA patients (N=675). Of these participants, 56.9% said their AA was moderately to seriously financially burdensome, and 41.3% reported using their savings to manage these expenses. Participants reported median out-of-pocket spending of \$1354 (interquartile range, \$537–\$3300) annually. The most common categories of expenses were hair appointments (81.8%) and vitamins/supplements (67.7%).¹³

Mesinkovska et al¹⁴ studied the qualitative and quantitative financial burdens of moderate to severe AA (N=216). Fifty-seven percent of patients reported the financial impact of AA as moderately to severely burdensome with a willingness to borrow money or use savings to cover out-of-pocket costs. Patients without insurance cited cost as a major barrier to obtaining treatment. In addition to direct treatment-related expenses, AA patients spent a mean of \$1961 per year



Literature review methodology on costs of alopecia areata (AA) treatment. JAK indicates Janus kinase.

on therapy to cope with the disease's psychological burden. Lost work hours represented another source of financial burden; 61% of patients were employed, and 45% of them reported missing time from their job because of AA.¹⁴

Mostaghimi et al¹² studied health care resource utilization and all-cause direct health care costs in privately insured AA patients with or without alopecia totalis (AT) or alopecia universalis (AU) (n=14,972) matched with non-AA controls (n=44,916) (1:3 ratio). Mean total all-cause medical and pharmacy costs were higher in both AA groups compared with controls (AT/AU, \$18,988 vs \$11,030; non-AT/AU, \$13,686 vs \$9336; $P < .001$ for both). Out-of-pocket costs were higher for AA vs controls (AT/AU, \$2685 vs \$1457; non-AT/AU, \$2223 vs \$1341; $P < .001$ for both). Medical costs in the AT/AU and non-AT/AU groups largely were driven by outpatient costs (AT/AU, \$10,277 vs \$5713; non-AT/AU, \$8078 vs \$4672; $P < .001$ for both).¹²

Costs of Concealment—When studying the out-of-pocket costs of AA (N=675), Li et al¹³ discovered that the median yearly spending was highest on headwear or cosmetic items such as hats, wigs, and makeup (\$450; interquartile range, \$50–\$1500). Mesinkovska et al¹⁴ reported that 49% of patients had insurance that covered AA treatment. However, 75% of patients reported that their insurance would not cover costs of concealment (eg, weave, wig, hair piece). Patients (N=112) spent a mean of \$2211 per year and 10.3 hours per week on concealment.¹⁴

Minoxidil—Minoxidil solution is available over-the-counter, and its ease of access makes it a popular treatment for AA.¹⁷ Because manufacturers can sell directly to the public, minoxidil is marketed with bold claims and convincing packaging. Shrank¹⁸ noted that the product can take 4 months to work, meaning customers must incur a substantial cost burden before realizing the treatment's benefit, which is not always obvious when purchasing minoxidil products, leaving customers—who were marketed a miracle drug—disappointed. Per Shrank,¹⁸ patients who did not experience hair regrowth after 4 months were advised to continue treatment for a year, leading them to spend hundreds of dollars for uncertain results. Those who did experience hair regrowth were advised to continue using the product twice daily 7 days per week indefinitely.¹⁸

Wehner et al¹⁹ studied the association between gender and drug cost for over-the-counter minoxidil. The price that women paid for 2% regular-strength minoxidil solutions was similar to the price that men paid for 5% extra-strength minoxidil solutions (women's 2%, \$7.63/30 mL; men's 5%, \$7.61/30 mL; $P = .67$). Minoxidil 5% foams with identical ingredients were priced significantly more per volume of the same product when sold as a product directed at women vs a product directed at men (men's 5%, \$8.05/30 mL; women's 5%, \$11.27/30 mL; $P < .001$).¹⁹

Beach²⁰ compared the cost of oral minoxidil to topical minoxidil. At \$28.60 for a 3-month supply, oral

minoxidil demonstrated cost savings compared to topical minoxidil (\$48.30).²⁰

Diphencyprone—Bhat et al²¹ studied the cost-efficiency of diphencyprone (DPC) in patients with AA resistant to at least 2 conventional treatments (N=29). After initial sensitization with 2% DPC, patients received weekly or fortnightly treatments. Most of the annual cost burden of DPC treatment was due to staff time and overhead rather than the cost of the DPC itself: \$258 for the DPC, \$978 in staff time and overhead for the department, and \$1233 directly charged to the patient.²¹

Lekhavat et al²² studied the economic impact of home-use vs office-use DPC in extensive AA (N=82). Both groups received weekly treatments in the hospital until DPC concentrations had been adjusted. Afterward, the home group was given training on self-applying DPC at home. The home group had monthly office visits for DPC concentration evaluation and refills, while the office group had weekly appointments for DPC treatment at the hospital. Calculated costs included those to the health care provider (ie, material, labor, capital costs) and the patient's final out-of-pocket expense. The total cost to the health care provider was higher for the office group than the home group at 48 weeks (office, \$683.52; home, \$303.67; $P < .001$). Median out-of-pocket costs did not vary significantly between groups, which may have been due to small sample size affecting the range (office, \$418.07; home, \$189.69; $P = .101$). There was no significant difference between groups in the proportion of patients who responded favorably to the DPC.²²

JAK Inhibitors—Chen et al²³ studied the efficacy of low-dose (5 mg) tofacitinib to treat severe AA (N=6). Compared to prior studies,^{24–27} this analysis reported the efficacy of low-dose tofacitinib was not inferior to higher doses (10–20 mg), and low-dose tofacitinib reduced treatment costs by more than 50%.²³

Per the GlobalData Healthcare database, the estimated annual cost of therapy for JAK inhibitors following US Food and Drug Administration approval was \$50,000. At the time of their reporting, the next most expensive immunomodulatory drug for AA was cyclosporine, with an annual cost of therapy of \$1400.²⁸ Dillon²⁹ reviewed the use of JAK inhibitors for the treatment of AA. The cost estimates by Dillon²⁹ prior to FDA approval aligned with the pricing of Eli Lilly and Company for the now-approved JAK inhibitor baricitinib.³⁰ The list price of baricitinib is \$2739.99 for a 30-day supply of 2-mg tablets or \$5479.98 for a 30-day supply of 4-mg tablets. This amounts to \$32,879.88 for an annual supply of 2-mg tablets and \$65,759.76 for an annual supply for 4-mg tablets, though the out-of-pocket costs will vary.³⁰

Comment

We reviewed the global and treatment-specific costs of AA, consolidating the available data for the practicing dermatologist. Ten studies of approximately 16,000 patients with AA across a range of levels of

Comparing Costs of AA Treatment

Reference (year)	Study design	Study treatment	Cost measurement	Results	Level of evidence ^a
Total costs of AA					
Mesinkovska et al ¹⁴ (2020)	Cross-sectional, quantitative and qualitative online survey of the disease burden of AA	216 patients with self-reported moderate to severe AA	Out-of-pocket costs for AA including costs of wigs and makeup to conceal hair loss and therapy for the psychosocial impact of disease	57% of patients reported financial impact of AA as moderately to severely burdensome with a willingness to use savings/borrow money to cover out-of-pockets costs	2a
Mostaghimi et al ¹² (2022)	Retrospective cohort study comparing privately insured AA patients vs matched controls without AA	Patients with AA: 14,972 total (AT/AU, n=1250 and non-AT/AU, n=13,722); participants without AA: 44,916	Evaluating comorbidities in patients with AA and their associated costs vs those without AA	AA patients paid more than non-AA patients in out-of-pocket health care expenses (AT/AU vs control: \$2685 vs \$1457; non-AT/AU vs control: \$2223 vs \$1341; <i>P</i> <.001 for both)	1a
Concealment cost					
Li et al ¹³ (2019)	Survey evaluation of disease-related financial burden and out-of-pocket costs associated with AA	675 individuals (629 with active AA) responded to survey questions about the qualitative financial burden of AA	Out-of-pocket costs associated with the qualitative financial burden of AA	Moderately financially burdensome: 31.7%; seriously financially burdensome: 25.2%; highest median yearly spending: headwear/cosmetics	2b
Minoxidil					
Shrank ¹⁸ (1995)	Expert opinion on efficacy and cost of OTC minoxidil lotion in Britain	2% OTC minoxidil lotion	Accumulated cost of routine lotion usage	Price/60 mL: \$94; cost burden to observe benefits of use: \$563/y	4
Wehner et al ¹⁹ (2017)	Investigation of gender-based price differentials per 30 mL of OTC minoxidil	Minoxidil pricing in 24 pharmacies	Price/30 mL of men's (5%) and women's (2%) minoxidil solution, and men's and women's 5% minoxidil foam	Men's minoxidil 5%: \$7.61/30 mL; women's minoxidil 2%: \$7.63/30 mL; minoxidil 5% marketed to men: \$8.05/30 mL; minoxidil 5% marketed to women: \$11.27/30 mL	1b
Beach ²⁰ (2018)	Case series of patients with AGA and TA	Nightly 1.25 mg oral minoxidil	Cost of 3-mo supply of topical vs oral minoxidil	Oral minoxidil more cost-effective (oral minoxidil: \$28.60; topical minoxidil: \$48.30)	2b
DPC					
Bhat et al ²¹ (2011)	Retrospective cohort evaluation of the efficacy of DPC	29 patients with AA resistant to ≥2 conventional treatments	Patient and administrative cost of 2% DPC weekly for 1 y	Annual cost to patient: \$1233; annual cost per patient to department: \$1236	2b

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Reference (year)	Study design	Study treatment	Cost measurement	Results	Level of evidence ^a
Lekhavat et al ²² (2022)	Comparison of efficacy and economic impact of H-DPC vs O-DPC	H-DPC: 41 patients; O-DPC: 41 patients; each evaluated at 24, 36, and 48 wk	Provider cost was measured through direct medical costs; patient cost was measured through direct and indirect costs	Patients taught to self-administer DPC saved \$4705 over the course of a 48-wk treatment period	1a
JAK inhibitors					
Chen et al ²³ (2019)	Evaluation of the efficacy and safety of 5 mg tofacitinib for severe AA	6 patients received a daily oral dosage of tofacitinib (5 mg); 2 patients did not complete study	Cost of treating severe AA with 10–20 mg vs 5 mg tofacitinib	5 mg tofacitinib reduced cost of severe AA treatment by >50% with comparable efficacy	1c
Dillon ²⁹ (2021)	Literature review on efficacy and outcomes of JAK inhibitors	Comprehensive assessment of long-term AA treatment with JAK inhibitors	ACOT for JAK inhibitors per patient	JAK inhibitors ACOT: \$50,000–\$59,000	1a

Abbreviations: AA, alopecia areata; ACOT, annual cost of therapy; AGA, androgenetic alopecia; AT, alopecia totalis; AU, alopecia universalis; DPC, diphenylprone; H-DPC, home-use DPC; JAK, Janus kinase; O-DPC, office-use DPC; OTC, over-the-counter; TA, traction alopecia.

^aBased on criteria from the Centre for Evidence-Based Medicine.¹⁶

evidence (1a to 4) were included (Table). Three of 10 articles studied global costs of AA, 1 studied costs of concealment, 3 studied costs of minoxidil, 2 studied costs of DPC, and 2 studied costs of JAK inhibitors. Only 2 studies achieved level of evidence 1a: the first assessed the economic impact of home-use vs office-use DPC,²² and the second researched the efficacy and outcomes of JAK inhibitors.²⁹

Hair-loss treatments and concealment techniques cost the average patient thousands of dollars. Spending was highest on headwear or cosmetic items, which were rarely covered by insurance.¹³ Psychosocial sequelae further increased cost via therapy charges and lost time at work.¹⁴ Patients with AA had greater all-cause medical costs than those without AA, with most of the cost driven by outpatient visits. Patients with AA also paid nearly twice as much as non-AA patients on out-of-pocket health care expenses.¹⁴ Despite the high costs and limited efficacy of many AA therapies, patients reported willingness to incur debt or use savings to manage their AA. This willingness to pay reflects AA's impact on quality of life and puts these patients at high risk for financial distress.¹³

Minoxidil solution does not require physician office visits and is available over-the-counter.¹⁷ Despite identical ingredients, minoxidil is priced more per volume when marketed to women compared with men, which reflects the larger issue of gender-based pricing that does not

exist for other AAD-approved alopecia therapies but may exist for cosmetic treatments and nonapproved therapies (eg, vitamins/supplements) that are popular in the treatment of AA.¹⁹ Oral minoxidil was more cost-effective than the topical form, and gender-based pricing was a nonissue.²⁰ However, oral minoxidil requires a prescription, mandating patients incur the cost of an office visit. Patients should be wary of gender- or marketing-related surcharges for minoxidil solutions, and oral minoxidil may be a cost-effective choice.

Diphenylprone is a relatively affordable drug for AA, but the regular office visits traditionally required for its administration increase associated cost.²¹ Self-administration of DPC at home was more cost- and time-effective than in-office DPC administration and did not decrease efficacy. A regimen combining office visits for initial DPC titration, at-home DPC administration, and periodic office follow-up could minimize costs while preserving outcomes and safety.²²

Janus kinase inhibitors are cutting-edge and expensive therapies for AA. The annual cost of these medications poses a tremendous burden on the payer (list price of annual supply ritlecitinib is \$49,000),³¹ be that the patient or the insurance company. Low-dose tofacitinib may be similarly efficacious and could substantially reduce treatment costs.²³ The true utility of these medications, specifically considering their steep costs, remains to be determined.

Conclusion

Alopecia areata poses a substantial and recurring cost burden on patients that is multifactorial including treatment, office visits, concealment, alternative therapies, psychosocial costs, and missed time at work. Although several treatment options exist, none of them are definitive. Oral minoxidil and at-home DPC administration can be cost-effective, though the cumulative cost is still high. The cost utility of JAK inhibitors remains unclear. When JAK inhibitors are prescribed, low-dose therapy may be used as maintenance to curb treatment costs. Concealment and therapy costs pose an additional, largely out-of-pocket financial burden. Despite the limited efficacy of many AA therapies, patients incur substantial expenses to manage their AA. This willingness to pay reflects AA's impact on quality of life and puts these patients at high risk for financial distress. There are no head-to-head studies comparing the cost-effectiveness of the different AA therapies; thus, it is unclear if one treatment is most efficacious. This topic remains an avenue for future investigation. Much of the cost burden of AA treatment falls directly on patients. Increasing coverage of AA-associated expenses, such as minoxidil therapy or wigs, could decrease the cost burden on patients. Providers also can inform patients about cost-saving tactics, such as purchasing minoxidil based on concentration and vehicle rather than marketing directed at men vs women. Finally, some patients may have insurance plans that at least partially cover the costs of wigs but may not be aware of this benefit. Querying a patient's insurance provider can further minimize costs.

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