

Using artificial intelligence to analyze publicly available social media posts to understand patient perspectives toward specific treatments of alopecia areata



To the Editor: Although studies exist on the clinical efficacy of alopecia areata (AA) treatments, there are limited data on patient-perceived efficacy and satisfaction. Patients' perception of efficacy may not always match providers' perceived efficacy because clinicians' ratings of successful outcomes, side effects, costs, etc¹ were not developed with patient input. Because of the psychosocial burden associated with AA,² many patients use social media to discuss their disease, offering perspectives into disease burden and treatment satisfaction.³

Our study analyzed 102,444 public social media posts from Facebook, Twitter, Reddit, and Instagram regarding AA treatment. Analysis aimed to determine patient-perceived efficacy of treatment and identify efficacious treatments associated with a negative emotional response. The treatments included were minoxidil, dexamethasone (oral), prednisone (oral), triamcinolone (injection), biotin, essential oils, JAK Inhibitors, and wig/hairpiece. The Brandwatch artificial intelligence-powered database identified posts related to AA treatments. Natural language processing provided a Patient Global Impression of Change (PGIC) score⁴ following treatment for each post. Emolex identified underlying positive or negative emotion behind posts. PGIC scores and underlying emotion were compared between posts for each treatment using an independent samples Student *t* test.

For all treatment modalities except dexamethasone, there were >75% positive PGIC score posts, indicating most reported some degree of improvement in AA. For dexamethasone, only 34.5% posts included a positive PGIC score, indicating most reported either no improvement or worsening of AA (Table I).

When comparing underlying emotion and PGIC scores, minoxidil, JAK inhibitors, and prednisone had significantly more posts with positive PGIC score and negative underlying emotion than posts with positive PGIC score and positive underlying emotion. This suggests that although >75% patients using these treatments noticed improvement in AA, a significant number still had underlying negative sentiments (Fig 1). Biotin and wigs/hairpieces were also associated with more underlying negative emotion in positive PGIC score posts, although this difference was not significant. For dexamethasone, even in the small proportion that reported a positive PGIC score, a significant number of patients indicated a negative underlying sentiment. For essential oils treatment and triamcinolone, more positive PGIC score posts had a positive underlying sentiment, suggesting that most patients using these treatments noticed improvement and were satisfied, although this was not statistically significant.

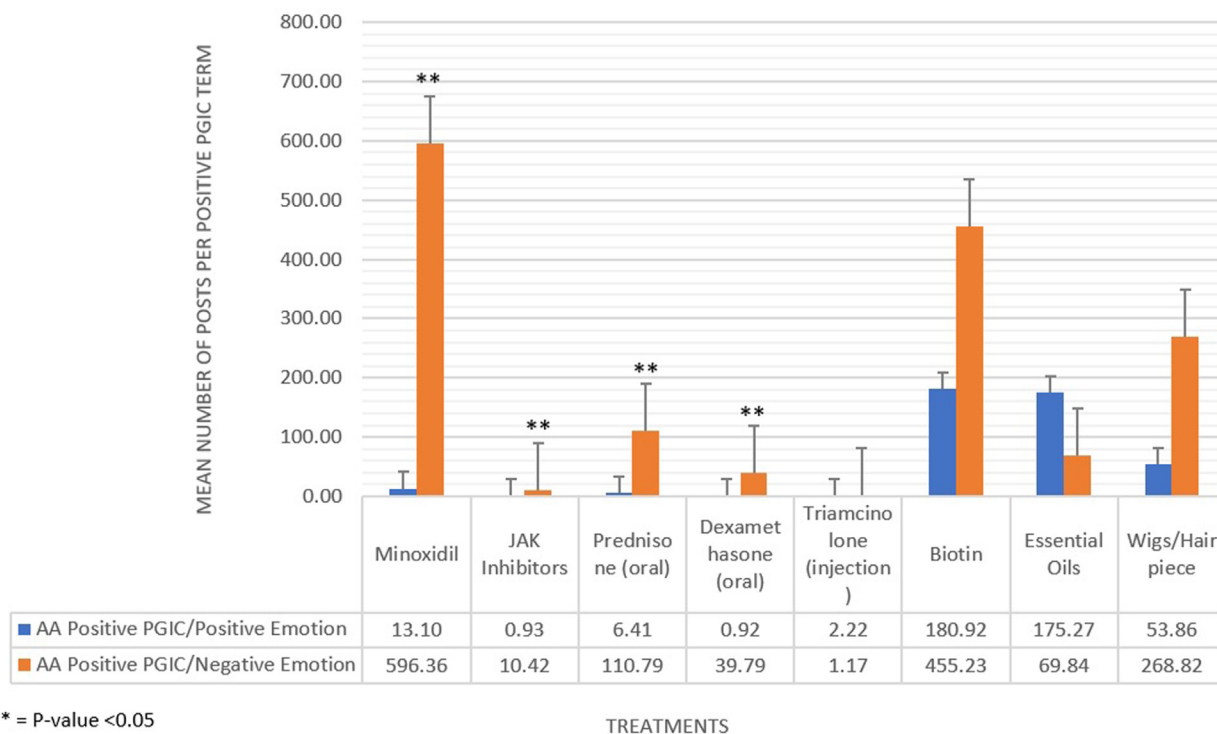
In terms of limitations, our study involved only self-identified patients with AA without verification that posts were from clinically diagnosed patients with AA. Also, our findings may be biased toward populations that utilize social media and may not represent all patients with AA. "Essential oils" could include different ingredients and we were unable to

Table I. Alopecia areata social media posts from May 2008 to February 2020

Drug/treatment	Number of positive PGIC posts (%)	Number of neutral PGIC posts (%)	Number of negative PGIC posts (%)	Total number of posts
Minoxidil	23,269 (85.2)	789 (2.9)	3255 (11.9)	27,313
Dexamethasone (oral)	1919 (34.5)	938 (16.9)	2705 (48.6)	5562
Prednisone (oral)	8104 (78.7)	608 (5.9)	1590 (15.4)	10,302
Triamcinolone (injection)	86 (83.5)	7 (6.8)	10 (9.7)	103
Biotin	28,606 (89.2)	431 (1.3)	3045 (9.5)	32,082
Essential oils	6931 (92.2)	263 (3.5)	321 (4.3)	7515
JAK inhibitors	674 (85.1)	11 (1.4)	107 (13.5)	792
Wigs/hairpiece	16,041 (85.4)	186 (1.0)	2548 (13.6)	18,775

PGIC, Patient Global Impression of Change.

AA Social Media Posts from May 2008-February 2020



** = P-value <0.05

Fig 1. Alopecia areata social media posts from May 2008 to February 2020. AA, Alopecia areata; PGIC, Patient Global Impression of Change.

standardize ingredients based on our methodology. Although the study’s purpose was to analyze “subjective” data in online patient perspectives, future studies could combine electronic medical records with patient posts to understand the gap between “objective” improvement and what makes a patient happy/satisfied with treatment. Further analysis of these data may reveal reasons associated with the satisfaction category.

Our findings could assist providers in optimizing treatment regimen(s) for patients with AA and allow for consideration of patient preferences in choosing treatment(s). This could improve patient-centered care and patient satisfaction, creating a better patient-provider relationship.

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IRB approval status: The IRB has ruled this study as “Not Human Subject Research (NHSR),” as publicly accessible social media data is considered part of the public domain.

Key words: alopecia areata; artificial intelligence; biologics; corticosteroids; patient-centered research; patient-reported outcomes; social media; treatment response.

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Conflict of interest
None disclosed.

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