Open Access Original Research Article

MedPeer Publisher
Abbreviated Key Title: MedPeer
ISSN : 3066-2737
homepage: https://www.medpeerpublishers.com

Safety profile of topical spray minoxidil: An observational study

DOI: 10.70780/medpeer.000QGNV

AUTHOR AND AFFILIATION

Lina Benchekroun[1], Lina Mouline[1], Hanane Darghal[1], Mariame Meziane[1], Nadia Ismaili[1], Laila Benzekri[1]
[1] Dermatology Department, Ibn Sina Hospital, University Mohammed V, Rabat, Morocco

Corresponding author: Lina Benchekroun

ABSTRACT

Topical minoxidil is a widely used treatment for various hair loss disorders, including androgenetic alopecia, telogen effluvium, and alopecia areata. While its efficacy is well established, concerns remain regarding its tolerability and side effect profile. This cross-sectional study evaluated 105 minoxidil users via an online questionnaire to assess the prevalence and nature of adverse effects. The majority of participants were female (67.6%) with a mean age of 36.5 years. Most used a 2% solution applied once daily, primarily for AGA and telogen effluvium. Overall, 72% of users reported at least one adverse effect, most commonly scalp irritation (36.2%), facial hypertrichosis (21.9%), and dandruff (18%). Systemic side effects, including palpitations and hypotension, were reported by a minority. Despite the high rate of side effects, only 20% discontinued treatment. Prolonged use was associated with better adherence, suggesting improved tolerance over time. These findings underscore the importance of monitoring for dermatologic and systemic side effects and exploring alternative formulations or therapies for sensitive individuals.

KEYWORDS

Minoxidil, Adverse effects, Hair loss treatment

MAIN ARTICLE

Introduction

Topical minoxidil is a well-established treatment for androgenetic alopecia (AGA), alopecia areata, telogen effluvium, and other hair loss disorders. By prolonging the anagen phase and improving blood flow to hair follicles, it has demonstrated efficacy in stimulating hair growth. However, its safety profile remains a concern, particularly regarding dermatological and systemic side effects, which can impact patient adherence and treatment outcomes. This study aims to evaluate the prevalence and types of minoxidil-related adverse effects, providing insights into its tolerability and potential risks.

Methods

A total of 105 participants were included in this study, based on responses collected via a Google Forms questionnaire. The survey gathered data on demographics, minoxidil concentration and application frequency, duration of use, indications, and reported adverse effects. Responses were compiled in Excel and analyzed using Jamovi software.

Results

The mean age of participants was 36.5 years, with a majority being female (67.6%). Regarding skin phototypes, 61.9% were phototype III, 35.2% phototype IV, and 2% phototype II.

Regarding minoxidil usage, 63.8% used a 2% concentration, while 36.2% used a 5% solution. The average number of sprays per day was seven, with 63% applying it once daily and 36% twice daily.

The main indications for minoxidil use were AGA (38%), telogen effluvium (26%), alopecia areata (17%), frontal fibrosing alopecia/lichen planopilaris (15%), and lupus (2.9%). The mean treatment duration was 14 months (range: 3–84 months). Participants also reported pre-existing conditions such as acne (8%), hypertrichosis (9%), hyperseborrhea (42%), and menstrual cycle disorders (16%).

In terms of safety, 72% of participants reported adverse effects, while 27% experienced none. The most common side effects were scalp itching, redness, and irritation (36.2%), facial hypertrichosis (21.9%), dandruff (18%), headaches (11%), body hypertrichosis (7.6%), palpitations (5.7%), hair shedding (4.8%), and hypotension (1.9%). 21 (20%) patients discontinued treatment due to adverse effects.

Discussion

This study highlights the prevalence of adverse effects with topical minoxidil, impacting compliance. Compared to the study by Shadi et al., which reported a 46.5% rate of adverse events and an 86.3% discontinuation rate, our findings suggest a higher incidence of side effects (72%) and a lower incidence of discontinuation rate (20%) [1]. This discrepancy may be due to population differences or survey methodologies. Dermatological reactions, particularly irritation, redness, dandruff, and hypertrichosis, remain major concerns (Figs. 1 and 2).

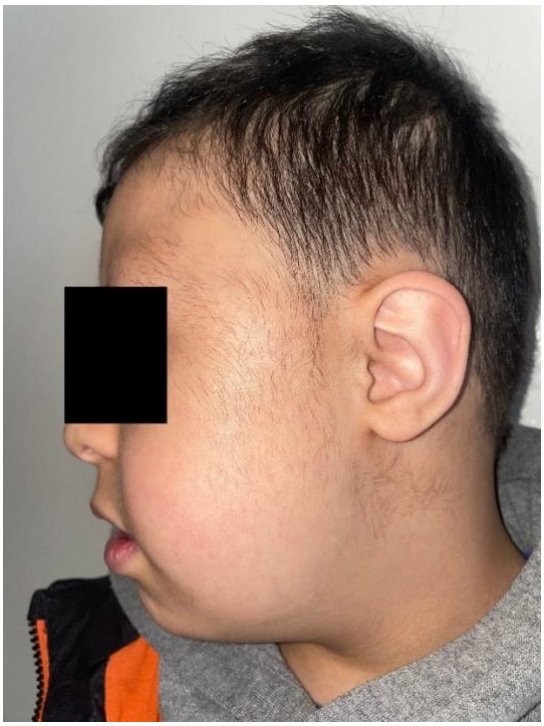

Figure 1: Facial hypertrichosis in a child treated for alopecia areata

Figure 2: Trichoscopy of the scalp showing white scales

Shadi et al. found that treatment duration influenced compliance, with longer use correlating with greater adherence [1]. Our findings support this, as users with extended treatment durations were less likely to discontinue, possibly due to improved tolerance or perceived benefits. The trend toward once-daily application observed in our study raises questions about its effectiveness compared to the recommended twice-daily regimen, warranting further research.

Previous large-scale studies confirmed minoxidil's systemic safety, with no significant cardiovascular risks [2]. Our study aligns with this, as systemic effects remained rare, though palpitations and hypotension were reported in a small subset of users. These effects highlight minoxidil's vasodilatory properties, and patients with pre-existing cardiovascular conditions should be monitored for such reactions [2].

Conclusion

Adverse effects, particularly dermatological reactions, remain a significant barrier to long-term minoxidil adherence. Compliance improves with prolonged use, supporting the importance of patient education on treatment expectations. Scalp irritation and dandruff, likely due to propylene glycol, could be minimized by using foam formulations, though these are unavailable in some countries. Other agents such as Capixyl, Procapil, and rosemary extract have been explored as alternatives to minoxidil, with fewer reported adverse effects in some studies [3]. For patients who are unable to tolerate topical minoxidil, alternative strategies such as transitioning to oral minoxidil or incorporating microneedling have shown promising results in enhancing hair regrowth [4]. Reducing the number of daily sprays may also help minimize side effects while maintaining therapeutic efficacy and improving adherence. Furthermore, systemic alternatives including spironolactone, bicalutamide, and dutasteride have demonstrated potential in managing androgenetic alopecia, particularly among patients with poor tolerance or inadequate response to topical therapies [5].

ACKNOWLEDGEMENTS

The authors have no acknowledgements to declare and report no conflicts of interest.

REFERENCES

1. Shadi Z. Compliance to topical minoxidil and reasons for discontinuation among patients with androgenetic alopecia. Dermatology and Therapy. 2023;13:1157-69. https://doi.org/10.1007/s13555-023-00919-x

2. Shapiro J. Safety of topical minoxidil solution: a one-year, prospective, observational study. J Cutan Med Surg. 2003;7:322-9. https://doi.org/10.1007/s10227-002-0121-6

3. Eslahi E, Hashemi N, Shamaei S. Effectiveness of the active ingredients (Capixyl, Procapil, and rosemary extract) of the Trust® tonic for the treatment of androgenetic alopecia in comparison to minoxidil. Our Dermatol Online. 2022;13(4):346-351. https://doi.org/10.7241/ourd.20224.1

4. Parajuli S, Paudel U. Microneedling for androgenetic alopecia not responding to conventional treatment. Our Dermatol Online. 2020;11:140-2. https://doi.org/10.7241/ourd.20202.5

5. Collado Marmolejos S, Palmer V, Valdebran M. Spironolactone, bicalutamide, and dutasteride as a treatment option for androgenetic alopecia. Our Dermatol Online. 2024;15(3):304-309