

Treatment Patterns, Perceived Effectiveness and Adverse Effects Among Patients with Hairfall in Islamabad and Rawalpindi, Pakistan: A Cross-Sectional Questionnaire Survey

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Abstract

Background: Hairfall is a common dermatological complaint with a considerable psychosocial burden, but little is known about how patients in Pakistan treat it, what side effects they experience and whether they are counselled about them. **Objective:** To describe treatment patterns, patient-reported effectiveness, relapse, adverse effects and pre-treatment counselling among people with hairfall in Islamabad and Rawalpindi, and to test whether patient characteristics were associated with adverse effects, relapse or improvement.

Methods: A cross-sectional, self-administered questionnaire survey (33 items) was conducted over three months using convenience sampling of dermatology outpatient attendees and members of online hairfall support groups. Respondents older than 55 years (n = 31) were excluded. Data were analysed with descriptive statistics, Pearson chi-square tests (Cramér's V, Holm-adjusted p values) and multivariable logistic regression. Multiple-

response items were analysed as percent of cases, blank answers were treated as missing, and height and body mass index (BMI) were re-derived from raw entries.

Results: A total of 418 respondents were analysed (50.2% male; mean age 33.8 ± 10.5 years; 51.4% with BMI ≥ 25 kg/m²). A family history was reported by 43.8%, and 48.6% were currently on treatment. Minoxidil was the agent most often reported as ever used (24.6% of respondents) and as most effective (27.6% of those answering), while use of oils (51.9%), non-medicated shampoos (50.5%), herbal remedies (49.8%), supplements (48.6%) and PRP (47.8%) was common. Treatment was self-initiated in 24.4% and dermatologist-led in 21.8%. Side effects were reported by 48.6% (95% CI 43.8–53.3), most often irritation/redness (35.6% of those describing an effect) and headache (31.6%). Only 31.3% recalled being told about side effects beforehand. No improvement was reported by 24.6%, and 32.1% relapsed after stopping. No patient characteristic was significantly associated with side effects, relapse or improvement after multiple-testing correction (all Holm-adjusted $p \geq 0.40$).

Conclusions: Self-directed and complementary treatments are as common as clinician-directed care, nearly half of patients report side effects, and most do not recall counselling. Structured counselling and pharmacist/dermatologist involvement are needed. Findings rest on self-reported data from a convenience sample, with internal inconsistencies in some items, and should be interpreted cautiously.

Introduction

Hairfall describes a heterogeneous group of hair-loss disorders. Although it is not life-threatening, it places a heavy psychosocial burden on patients, reducing quality of life and self-esteem and increasing depressive symptoms (Alzoabi et al., 2023). Androgenetic hairfall (AGA), the commonest form, is polygenic and driven by androgen-dependent miniaturisation of scalp follicles, with a shortened anagen phase and progressive conversion of terminal into vellus hairs (Kidangazhiathmana & Santhosh, 2022). Patchy immune-mediated hairfall (AA) is a non-scarring condition in which T-cell attack on the follicle plays a central role (Lintzeri et al., 2022).

Treatment depends on the underlying type of hairfall. For AGA, topical minoxidil and oral finasteride are the established first-line agents in men and topical minoxidil in women (Kaufman et al., 1998; Suchonwanit et al., 2019; Tamashunas & Bergfeld, 2021). Minoxidil can cause scalp irritation, contact dermatitis and hypertrichosis (Ebner & Müller, 1995; Friedman et al., 2002; Rossi et al., 2012), and hair loss resumes when it is stopped (Olsen & Weiner, 1987). For limited patchy hairfall, local corticosteroids are first-line (Gregoire et al., 2025); intralesional triamcinolone produced regrowth in a Saudi case series (Kubeyinje, 1994), systemic pulse steroids are used in extensive disease (Shreberk-Hassidim et al., 2016), and the JAK inhibitors tofacitinib and ruxolitinib have shown efficacy in early-phase studies (Kennedy Crispin et al., 2016; Mackay-Wiggan et al., 2016). Adjunctive and procedural options include platelet-rich plasma (PRP) (Gentile et al., 2015; Zhang et al., 2023), low-level laser therapy (LLLT) (Lanzafame et al., 2014), microneedling (Dhurat et al., 2013) and follicular unit extraction (FUE) hair transplantation (Wang et al., 2024). Patients also use supplements (Almohanna et al., 2019), ketoconazole (Piérard-Franchimont et al., 1998; El-Garf et al., 2019), essential oils such as rosemary oil (Panahi et al., 2015), herbal preparations (Bin Rubaian et al., 2024; Cho & Kim, 2020) and stress-reduction measures, since psychological stress is linked to disease activity in patchy hairfall (Matzer et al., 2011; Ahn et al., 2023).

Despite this range of options, local evidence on real-world treatment practices, patient-reported adverse effects and counselling in Pakistan is scarce. This study therefore aimed to (i) describe the treatments used by people with hairfall in Islamabad and Rawalpindi, including self-initiated and complementary approaches; (ii) estimate the frequency and type of patient-reported adverse effects; (iii) describe perceived effectiveness, relapse and pre-treatment counselling; and (iv) test the

hypothesis that demographic or clinical characteristics are associated with adverse effects, relapse or treatment response.

Methods

Design and setting

This was a cross-sectional questionnaire survey conducted over three months at dermatology outpatient departments of secondary and tertiary hospitals in Rawalpindi and Islamabad and in online hairfall support groups. Questionnaires were completed on paper or through Google Forms.

Participants, sampling and sample size

Eligible participants were adults aged 18 to 55 years with a clinician-made or self-reported diagnosis of any type of hairfall who could give informed consent. Participants were recruited by convenience sampling: consecutive willing attendees at the participating clinics and willing members of the online groups were invited, so the sample is non-probabilistic. A minimum of 385 respondents was calculated for estimating a proportion with 95% confidence and a 5% margin of error; the target was set at 450 to allow for incomplete forms. Of the 449 completed questionnaires, 31 (6.9%) were from respondents aged 56–69 years, outside the eligibility limit, and were excluded, leaving 418 respondents for analysis, which still exceeds the calculated minimum. Recruitment channel (clinic or online) was not recorded, so the two sources cannot be compared.

Instrument

The 33-item, closed-ended, self-administered questionnaire covered demographics (age, gender, height, weight, BMI, occupation), duration and family history of hairfall, current and past treatment, treatments ever used (tick all that apply), drug names, use of anti-fungals, supplements, PRP, LLLT, microneedling, hair transplantation, stress-reduction techniques, oils, herbal remedies and non-medicated shampoos, source and duration of the most recent treatment, combination therapy, side effects (any, causative treatment, type), whether a doctor explained possible side effects beforehand, response to the most recent treatment, relapse after stopping and the treatment that worked best. The type of hairfall and treatment adherence were not measured. No validation or pilot testing of the instrument is reported.

Data cleaning and coding

All entries were checked against the raw response sheet. Ninety-nine heights recorded in centimetres were converted to feet. Self-entered BMI disagreed with weight and height in 32 of the 418 analysed respondents (including impossible values such as 5 and 66 kg/m²), so BMI was recalculated for everyone as weight (kg) divided by height (m) squared and classified as underweight (<18.5), normal (18.5–24.9), overweight (25.0–29.9) or obese (≥30). Two spellings of “mild improvement” were merged. Free-text drug names and best-treatment answers were mapped to categories using explicit rules (Appendix B). Blank answers were treated as missing rather than as “none”. Side-effect agents and types (questions 28–29) were analysed only for respondents who answered “yes” to having experienced side effects (question 27), in line with the questionnaire’s “if yes” instruction.

A skip-pattern inconsistency was found: 117 respondents answered “no” to both current and past treatment yet completed questions that apply only to treated patients (for example, 63 reported PRP, 52 hair transplantation, 59 side effects and 83 some improvement). Because these answers imply that treatment had been received, the authors recoded these respondents as having received treatment in the past (past treatment = “yes”); their current-treatment status was left unchanged. Before recoding, 208 respondents (49.8%) had reported past treatment; after recoding, 325 (77.8%) did.

This recoding is a data-correction decision, not a measurement, and is acknowledged as a limitation.

Statistical analysis

Categorical variables are presented as frequency and percentage, with Wilson 95% confidence intervals for key proportions; age and BMI as mean $\pm$ standard deviation. Tick-all-that-apply items are reported as percent of cases, so percentages can sum to more than 100%. Associations of side effects, relapse and any improvement (versus none) with gender, age group, BMI category, family history, hairfall duration, current and past treatment, treatment source, treatment duration, combination therapy and counselling were tested with Pearson chi-square tests; effect size is Cramér's V and p values were adjusted within each outcome by the Holm method. Side effects were additionally modelled by multivariable logistic regression (odds ratios with 95% CI; likelihood-ratio test). With 418 respondents the study could detect an effect size $w \approx 0.14$ (one degree of freedom) with 80% power at $\alpha = 0.05$. Analyses used Python (SciPy, statsmodels).

Results

Participant characteristics

Of 418 respondents, 210 (50.2%) were male and 208 (49.8%) female (Table 1, Figure 1). Mean age was 33.8 ± 10.5 years (range 18–55); the largest age group was ≥ 38 years (38.5%). Mean BMI was 25.6 ± 6.1 kg/m²: 36.6% had normal weight, 27.3% were overweight, 24.2% obese and 12.0% underweight (51.4% had BMI ≥ 25). A positive family history was reported by 183 (43.8%) (95% CI 39.1–48.6). Duration of hairfall was under six months in 28.7% and over three years in 25.6%.

Table 1. Characteristics of the 418 participants

Characteristic	n (%)
Gender	
Female	208 (49.8)
Male	210 (50.2)
Age group (years); mean $\pm$ SD 33.8 $\pm$ 10.5	
18–27	153 (36.6)
28–37	104 (24.9)
≥ 38	161 (38.5)
BMI category (kg/m²); mean $\pm$ SD 25.6 $\pm$ 6.1	
Underweight (<18.5)	50 (12.0)
Normal (18.5–24.9)	153 (36.6)
Overweight (25–29.9)	114 (27.3)
Obese (≥ 30)	101 (24.2)
Height	
<5 ft	20 (4.8)
5–6 ft	369 (88.3)
>6 ft	29 (6.9)
Body weight	
≤ 55 kg	70 (16.7)

Characteristic	n (%)
56–69 kg	126 (30.1)
70–84 kg	129 (30.9)
≥85 kg	93 (22.2)
Duration of hairfall	
<6 months	120 (28.7)
6–12 months	96 (23.0)
1–3 years	95 (22.7)
>3 years	107 (25.6)
Family history of hairfall	
Yes	183 (43.8)
No	235 (56.2)

Height entries in centimetres (n = 99 before exclusions) were converted to feet; BMI was recalculated from height and weight. Respondents older than 55 years were excluded.

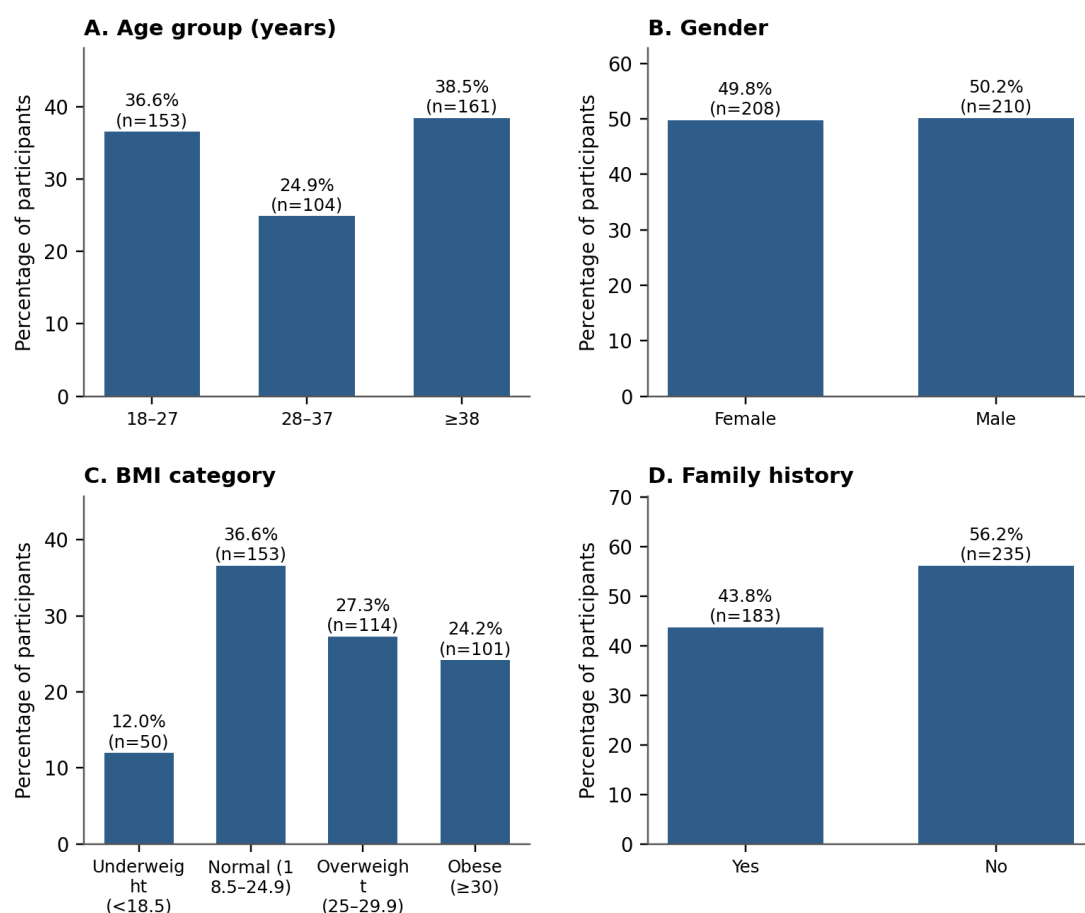


Figure 1. Participant characteristics (N = 418): (A) age group, (B) gender, (C) body mass index category, (D) family history of hairfall.

Treatment history and modalities used

Currently, 203 respondents (48.6%) were on treatment and 325 (77.8%) had received treatment in the past after recoding (Figure 2). Among treatments ever used (multiple response, Figure 3), minoxidil was reported by 103 respondents (24.6%), finasteride by 68 (16.3%), anti-fungals (ketoconazole or griseofulvin) by 57 (13.6%), steroids by

98 in total (intralesional 28, topical 18, oral 9 and 43 without a stated route), JAK inhibitors by 14 (3.3%) and immunotherapy (DPCP/SADBE) by 13 (3.1%). Supplements, biotin or multivitamins were named by 82 (19.6%) and shampoos, oils, herbal or homeopathic products by 117 (28.0%); 40 (9.6%) named no medicine or left the item blank. When asked to write the drug name, 93 respondents (22.2%) left the item blank; among the products named, minoxidil-based products were most common (93 (22.2%) of all respondents), followed by supplements (71 (17.0%)), hair serums, sprays or lotions (42 (10.0%)), finasteride (42 (10.0%)) and anti-fungals (41 (9.8%)). In dedicated yes/no questions (Figure 4), use of natural or essential oils (51.9%), non-medicated shampoos (50.5%), herbal remedies (49.8%), supplements (48.6%), PRP (47.8%), stress-reduction techniques (47.1%), LLLT (45.9%), anti-fungals (45.5%), hair transplantation (42.3%) and microneedling (41.9%) was reported. Combination therapy was used by 197 (47.1%) respondents (95% CI 42.4–51.9).

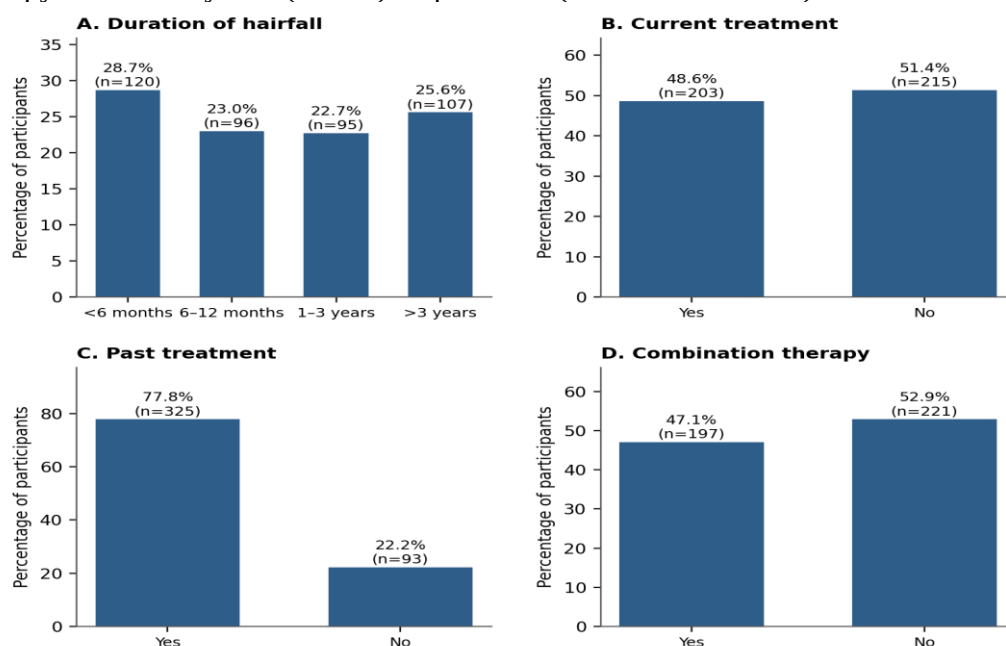


Figure 2. Hairfall duration, current treatment, past treatment (after recoding) and combination therapy (N = 418).

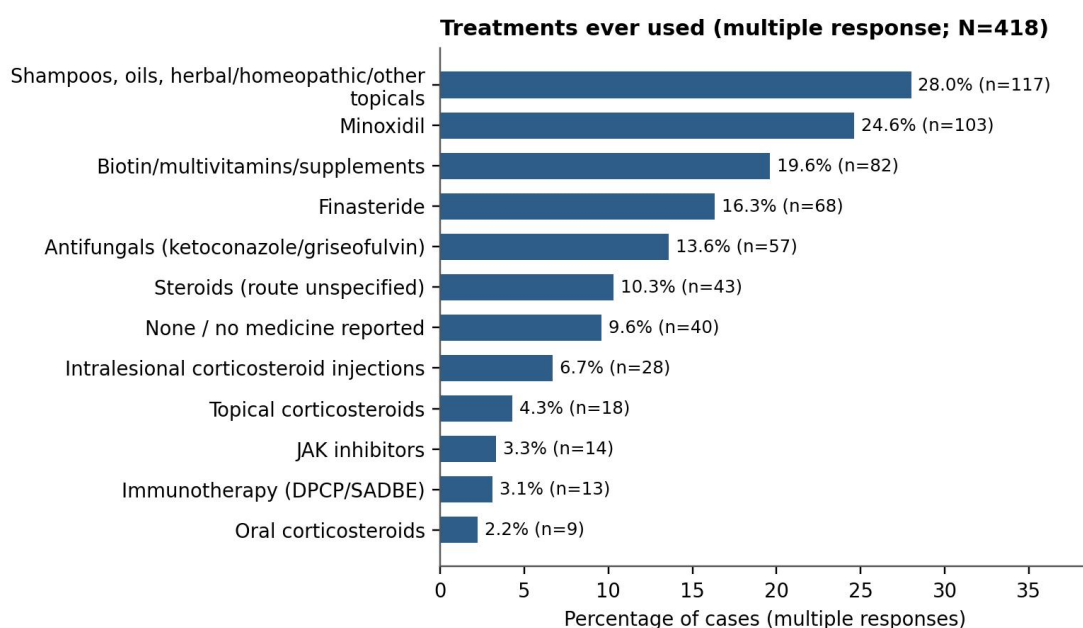


Figure 3. Treatments ever used (tick-all-that-apply; percentage of 418 respondents, so bars sum to more than 100%). “None/no medicine” includes 27 blank answers.

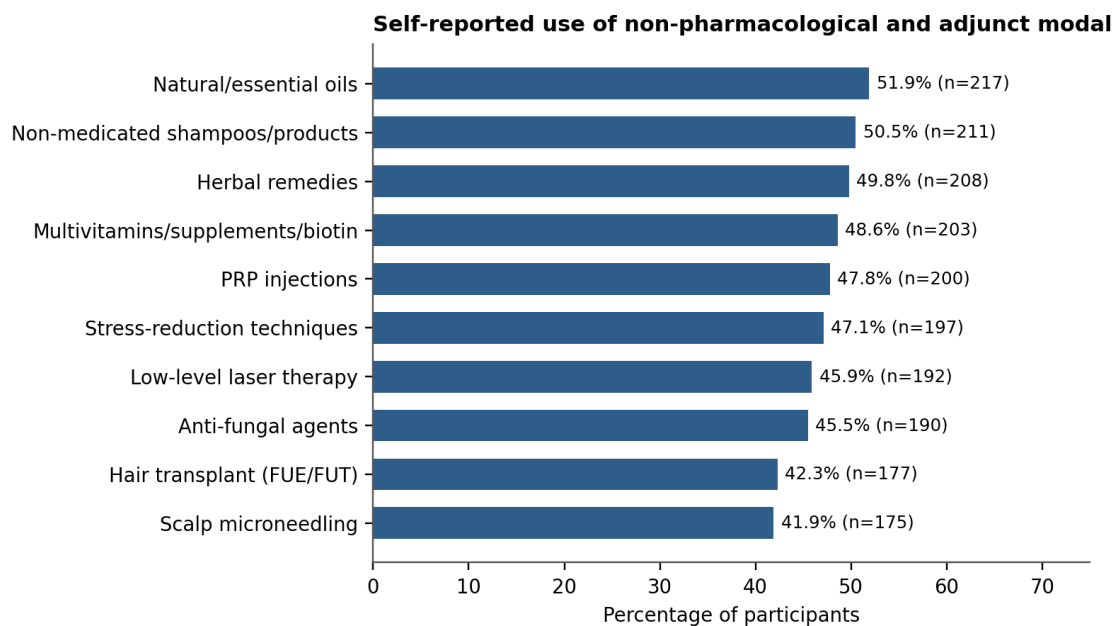


Figure 4. Self-reported use of oils, shampoos, herbal remedies, supplements, procedures and other modalities in dedicated yes/no questions (N = 418).

3.3 Source and duration of treatment

Treatment was most often self-initiated (102 (24.4%)), followed by dermatologist (91 (21.8%)), online sources (78 (18.7%)), general practitioners (74 (17.7%)) and pharmacy over-the-counter advice (73 (17.5%)); no source accounted for a majority (Figure 5). Duration of the most recent treatment was under one month in 25.1%, 1–3 months in 24.6%, 3–6 months in 24.2% and over six months in 26.1%.

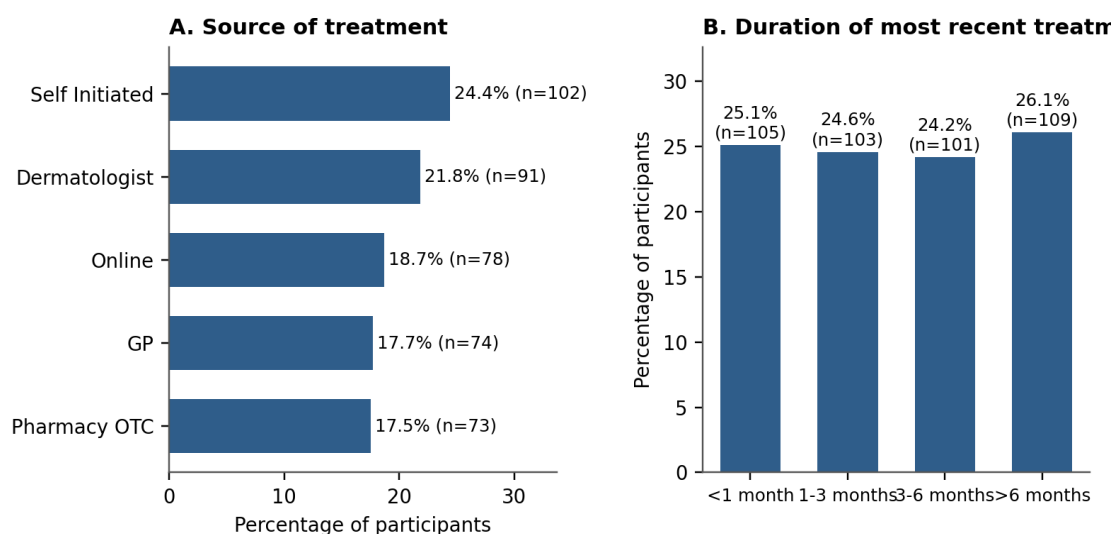


Figure 5. (A) Source of treatment and (B) duration of the most recent treatment (N = 418).

Adverse effects

Side effects were reported by 203 respondents (48.6%; 95% CI 43.8–53.3). Of these, 118 named at least one causative treatment (Figure 6A): topical minoxidil (22.0% of those naming a treatment), anti-fungals (15.3%), intralesional corticosteroids (13.6%), finasteride (11.9%), topical corticosteroids (10.2%), immunotherapy and unspecified steroids (7.6% each), biotin (6.8%) and oral corticosteroids (5.1%). A total of 174 described at least one specific effect (Figure 6B): irritation or redness (35.6%), headache (31.6%), excessive shedding or more hair fall (16.1%), mood changes (14.9%), weight changes (14.4%), skin thinning (13.2%), local pain (12.6%), hypertrichosis (2.9%) and infection or flu-like symptoms (2.3%); 17.2% described

other effects such as change of hair colour, rough hair, stomach discomfort or limits on prolonged anti-fungal use.

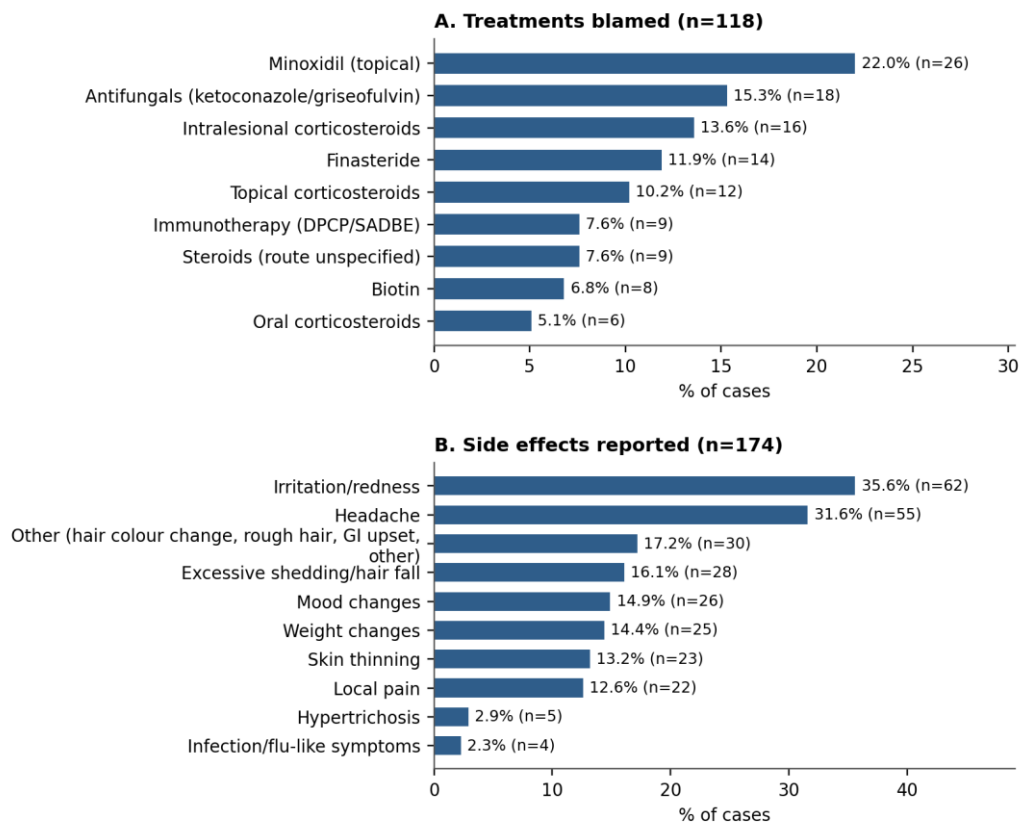


Figure 6. Adverse effects among respondents who reported side effects: (A) treatments blamed (n = 118 naming a treatment) and (B) effects reported (n = 174 describing an effect); percent of cases, so bars sum to more than 100%.

Counselling, response, relapse and best treatment

Only 131 respondents (31.3%; 95% CI 27.1–35.9) recalled being told about possible side effects before treatment; 148 (35.4%) said they were not and 139 (33.3%) could not remember, so 68.7% had no recollection of counselling (Table 2, Figure 7). Response to the most recent treatment was “no improvement” in 103 (24.6%), mild in 90 (21.5%), moderate in 87 (20.8%), good in 71 (17.0%) and full regrowth in 67 (16.0%); thus 315 (75.4%) reported at least some improvement and 138 (33.0%) good improvement or full regrowth. Relapse after stopping treatment was reported by 134 (32.1%) (95% CI 27.8–36.7).

When asked which treatment worked best, 114 respondents (27.3%) left the item blank. Among the 304 who answered, minoxidil-based therapy was named most often (84 (27.6%)), followed by herbal or natural remedies (57 (18.8%)), biotin supplements (35 (11.5%)), PRP (30 (9.9%)), hair serums or sprays (28 (9.2%)), anti-fungals (27 (8.9%)) and finasteride (17 (5.6%)). Only 19 respondents (6.2% of those answering; 4.5% of all) stated that no treatment had worked.

Table 2. Counselling, response to treatment, relapse and treatment reported as most effective

Item	n (%)
Told about side effects by a doctor beforehand (N = 418)	
Yes	131 (31.3)
No	148 (35.4)

Item	n (%)
Don't remember	139 (33.3)
Response to most recent treatment (N = 418)	
No improvement	103 (24.6)
Mild improvement	90 (21.5)
Moderate improvement	87 (20.8)
Good improvement	71 (17.0)
Full regrowth	67 (16.0)
Relapse after stopping treatment (N = 418)	
Yes	134 (32.1)
No	284 (67.9)
Treatment that worked best (n = 304 answering; 114 blank)	
Minoxidil-based therapy	84 (27.6)
Herbal/natural remedies	57 (18.8)
Nutritional supplements (biotin)	35 (11.5)
PRP	30 (9.9)
Hair growth serums/sprays/lotions	28 (9.2)
Antifungal treatment	27 (8.9)
Finasteride therapy	17 (5.6)
Other medications	7 (2.3)
No effective treatment stated	19 (6.2)

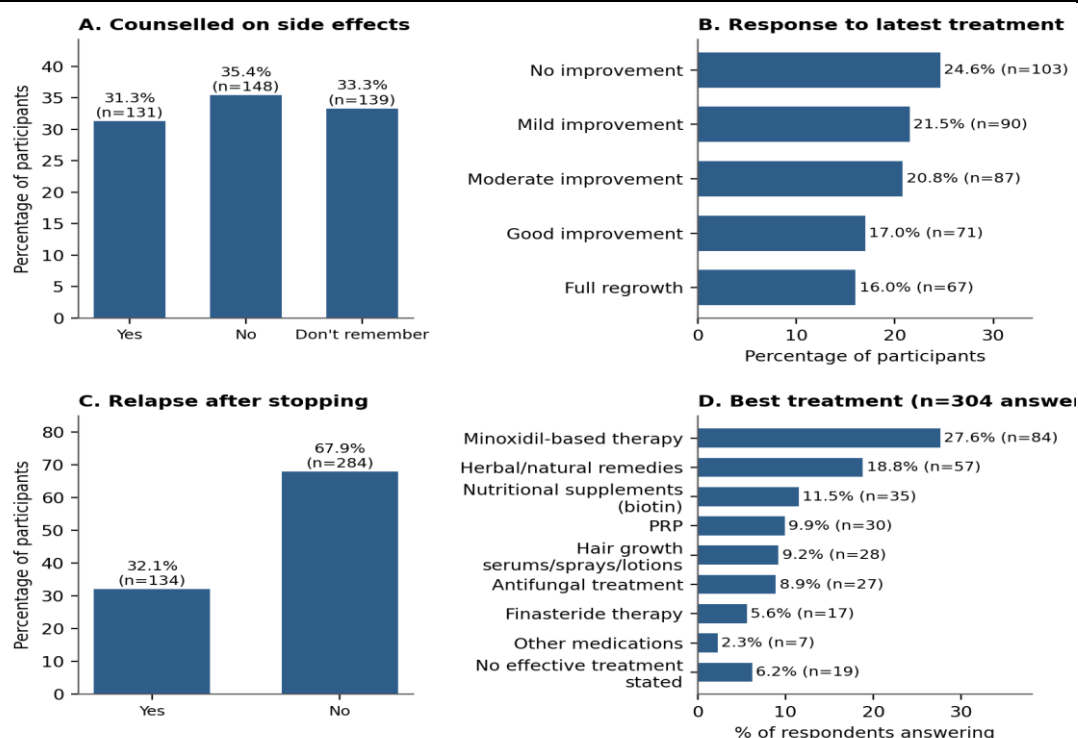


Figure 7. (A) Counselling about side effects, (B) response to the most recent treatment, (C) relapse after stopping treatment and (D) treatment reported as most effective among the 304 respondents who answered.

Factors associated with adverse effects, relapse and improvement

No characteristic was significantly associated with any outcome after correction for multiple testing (Table 3). The prevalence of side effects was similar in men (48.1%) and women (49%) and across age groups (47.1%, 49% and 49.7%). Two unadjusted comparisons had $p < 0.05$, both for the outcome “any improvement”: family history (improvement 70.5% with and 79.1% without a family history; $p = 0.042$) and pre-treatment counselling (80.9% among those counselled, 68.2% among those not counselled and 77.7% among those who did not remember; $p = 0.036$). Neither survived Holm adjustment (adjusted $p = 0.42$ and 0.40) and both should be regarded as exploratory. In the multivariable model, none of the predictors was significantly associated with side effects (likelihood-ratio test $p = 0.88$; McFadden pseudo- $R^2 = 0.017$; Table 4). The proportion recalling counselling did not differ significantly by source of treatment ($\chi^2(4) = 8.34$, $p = 0.080$): dermatologist 28.6%, general practitioner 39.2%, online 35.9%, pharmacy 35.6%, self-initiated 21.6%.

Table 3. Chi-square tests of association: χ^2 (df); p value (unadjusted)

Characteristic	Any side effect	Relapse	Any improvement
Gender	0.04 (1); 0.847	1.24 (1); 0.265	0.03 (1); 0.865
Age group	0.23 (2); 0.891	0.65 (2); 0.722	1.74 (2); 0.419
BMI category	0.53 (3); 0.913	0.96 (3); 0.811	0.89 (3); 0.828
Family history	0.18 (1); 0.675	0.02 (1); 0.888	4.15 (1); 0.042
Duration of hairfall	4.29 (3); 0.232	1.78 (3); 0.620	4.37 (3); 0.224
Currently on treatment	0.81 (1); 0.369	0.42 (1); 0.519	0.00 (1); 0.996
Past treatment	2.84 (1); 0.092	0.30 (1); 0.582	0.32 (1); 0.570
Treatment source	4.27 (4); 0.370	0.88 (4); 0.927	3.82 (4); 0.431
Duration of recent treatment	1.56 (3); 0.669	5.90 (3); 0.117	1.71 (3); 0.635
Combination therapy	0.00 (1); 0.949	2.71 (1); 0.100	0.62 (1); 0.432
Pre-treatment counselling	3.14 (2); 0.074	1.43 (2); 0.488	6.62 (2); 0.036

Holm-adjusted $p \geq 0.40$ for every test. Predictors that coincide with an outcome were not tested against it. Cramér’s V ranged from 0.000 to 0.126 (negligible to small).

Table 4. Multivariable logistic regression for any side effect ($n = 418$)

Predictor (comparison vs reference)	OR (95% CI)	p
Gender: Male vs Female	0.99 (0.67–1.46)	0.947
Age (years): 28–37 vs 18–27	1.04 (0.62–1.74)	0.888
Age (years): ≥ 38 vs 18–27	1.08 (0.68–1.70)	0.748
BMI: < 18.5 vs 18.5–24.9	0.86 (0.45–1.66)	0.657
BMI: ≥ 25 vs 18.5–24.9	1.06 (0.69–1.62)	0.782
Family history: Yes vs No	1.13 (0.76–1.68)	0.553
Combination therapy: Yes vs No	0.99 (0.67–1.47)	0.967
Treatment source: GP vs Dermatologist	1.07 (0.56–2.03)	0.836
Treatment source: Online vs Dermatologist	0.59 (0.31–1.10)	0.096

Predictor (comparison vs reference)	OR (95% CI)	p
Treatment source: Pharmacy OTC vs Dermatologist	0.85 (0.45–1.61)	0.620
Treatment source: Self Initiated vs Dermatologist	0.83 (0.47–1.48)	0.527
Duration of recent treatment: 1-3 months vs <1 month	0.81 (0.46–1.41)	0.452
Duration of recent treatment: 3-6 months vs <1 month	0.83 (0.47–1.45)	0.507
Duration of recent treatment: >6 months vs <1 month	1.09 (0.62–1.89)	0.769
Told about side effects: Don't remember vs Yes	0.66 (0.40–1.08)	0.096
Told about side effects: No vs Yes	0.70 (0.43–1.13)	0.142
Likelihood-ratio test of the full model: p = 0.88. No predictor reached significance.		

Discussion

Principal findings

In this survey of 418 people with hairfall, treatment was as often self-directed (24.4%) as dermatologist-led (21.8%), nearly half used combination therapy (47.1%), and minoxidil was the agent most often reported as used and as most effective. Almost half reported a side effect (48.6%), fewer than a third recalled any counselling about side effects (31.3%), about one in four saw no improvement (24.6%) and about one in three relapsed after stopping (32.1%). None of the patient characteristics examined predicted side effects, relapse or improvement after multiple-testing correction.

Comparison with existing literature

The prominence of minoxidil and finasteride fits current recommendations for AGA (Kaufman et al., 1998; Suchonwanit et al., 2019; Tamashunas & Bergfeld, 2021). However, the survey recorded neither the type of hairfall nor adherence, so reported improvement cannot be attributed to any agent, and “most effective” reflects patient perception only. Reported relapse in about a third after stopping treatment is consistent with the long-standing observation that hair loss resumes when minoxidil is discontinued (Olsen & Weiner, 1987) and with the chronic, relapsing course of several forms of hairfall (Lintzeri et al., 2022).

Irritation or redness was the commonest effect, which fits the known contact-irritant and allergic effects of topical minoxidil (Ebner & Müller, 1995; Friedman et al., 2002; Rossi et al., 2012). Skin thinning (13.2%) is in keeping with the atrophy that can follow local corticosteroids (Gregoire et al., 2025), and excessive shedding (16.1%) with the shedding that can accompany starting minoxidil. The high frequency of headache (31.6%) is less easily explained by topical therapy; because effects could not be linked to individual agents, this may reflect oral products, anti-fungals, other medicines or non-specific attribution. Treatment-by-effect pairing therefore requires prospective or pharmacovigilance-style data.

The large share of respondents using oils, herbal products, supplements and shampoos echoes the broad use of complementary therapies described in surveys of patchy hairfall (Hussain et al., 2017). Evidence for such products ranges from a small trial of rosemary oil (Panahi et al., 2015) to general reviews (Bin Rubaian et al., 2024; Cho & Kim, 2020), and for micronutrient supplementation it is strongest where a deficiency exists (Almohanna et al., 2019). In our data herbal or natural remedies ranked second among treatments considered most effective (18.8% of those answering), which should not be read as evidence of efficacy given the self-report design and absence of

a comparator. Reported use of PRP (47.8%), LLLT (45.9%), microneedling (41.9%) and hair transplantation (42.3%) is higher than might be expected from the evidence base for these modalities (Zhang et al., 2023; Lanzafame et al., 2014; Dhurat et al., 2013; Wang et al., 2024) and from their cost and availability. Respondents may have misunderstood these items, or the questions may have been interpreted as “ever considered or heard of”; these figures should be verified before being used for planning.

Only 31.3% recalled being told about side effects beforehand. Counselling was not significantly more frequent among respondents whose treatment came from a dermatologist (28.6%) than among those using other sources, which is unexpected and may reflect recall problems, differing interpretations of “told by a doctor” among patients using several sources, or data-quality issues. Either way, the result points to a clear opportunity for structured counselling by prescribers and pharmacists, who are also the first contact for over-the-counter purchases (17.5% of respondents).

Implications

Clinicians and pharmacists should routinely ask about complementary and over-the-counter products, document and explain expected adverse effects (particularly irritation, early shedding and the need for long-term maintenance), and set realistic expectations given the high reported relapse after discontinuation. Health authorities and professional bodies could develop patient information leaflets and online resources, given that online and self-initiated sources together account for 43.1% of treatment.

Strengths and limitations

Strengths are the reasonable sample size, inclusion of both clinic attendees and online participants, a near-even gender split, and coverage of both conventional and complementary treatments. Limitations are substantial. First, the sample is a convenience sample and the recruitment channel was not recorded, so prevalence estimates cannot be generalised. Second, all information is self-reported; diagnosis, type of hairfall, severity, adherence and drug exposure were not verified, and recall bias is likely. Third, the data contain internal inconsistencies. 117 respondents who denied both current and past treatment still answered treatment-dependent questions and were recoded as having received treatment, which assumes that the treatment answers rather than the denial were correct; 170 respondents who denied side effects nevertheless recorded side-effect types; and 42.3% reported hair transplantation, including 47 respondents with hairfall of under six months. Such cases were retained because the correct answer cannot be known, but the corresponding results should be treated with caution and the original forms re-checked. Fourth, respondents older than 55 years were excluded after data collection, which restricts generalisability to adults aged 18–55 years. Fifth, free-text answers had to be coded by the research team, and blank answers (for example, 114 for best treatment) limit those items. Sixth, the questionnaire was not validated and omitted type of hairfall and adherence. Finally, many tests were performed on a modest sample, so null findings do not exclude small associations, and the two unadjusted associations with improvement are exploratory.

Conclusions

Among 418 adults with hairfall in Islamabad and Rawalpindi, treatment is frequently self-initiated, complementary and combined, minoxidil is the most commonly used and best-regarded agent, almost half report side effects, a third relapse, and most do not recall being counselled about adverse effects. No demographic or clinical characteristic was significantly associated with side effects, relapse or improvement after multiple-testing correction. Structured pre-treatment counselling and greater involvement of dermatologists and pharmacists are warranted, and future studies

should record the type of hairfall and adherence, use validated instruments, sample probabilistically and follow patients prospectively.

Declarations

Author contributions: HI – data collection, questionnaire design and methodology; BS – literature review, introduction and abstract; US, SU, AT – discussion, conclusion and limitations, proofreading and submission preparation; MB – supervision. Statistical re-analysis and manuscript conversion were performed for this version.

Data availability: All derived tables are given in Appendix A;

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