

Online Traffic Analysis of Direct-to-Consumer Websites for Hair Loss Treatment and Characterization of Finasteride Patients on a Platform in Germany: A Potential Paradigm Shift in the Treatment of Androgenetic Alopecia

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Purpose: The number of online prescription platforms (OPPs) offering telemedical diagnosis and treatment, including finasteride, for androgenetic alopecia (AA) by using medical questionnaires (MQs) has increased. This type of care delivery differs completely from traditional forms. This study aimed to investigate a potential paradigm shift in AA treatment by measuring the extent of traffic generated by OPPs that exclusively treat AA and furthermore by characterizing sociodemographic features of men undergoing finasteride treatment from an OPP in Germany.

Patients and Methods: Examination of three OPPs (Keeps, Shapiro MD, Myspring), offering finasteride treatment via MQ between Q1 2018 and Q1 2022 was performed by using SEMRush, a marketing software platform for traffic analysis. Further data regarding sociodemographic characteristics were collected from Myspring by recruiting men with AA who obtained finasteride prescriptions between March 2021 and January 2022.

Results: A high number of unique quarterly visitors was recorded. The number of visitors increased on all platforms (Keeps 846%, Shapiro MD 109%, Myspring 427%). Most patients had accessed the platforms from mobile devices. Further data from Myspring included a total of 2904 men. Of all patients who answered the follow-up questionnaire (n = 177), 33.9% had been referred to the platform by television advertising. Of all respondents, 21.5% reported a monthly net income below 1000 euros. 45.2% of responding patients reported being single, while 15.3% considered themselves homosexual, and 4.5% bisexual. Convenience was the most common reason indicated for using an OPP (79.1%).

Conclusion: The tremendous increase in the number of visits to OPPs for AA suggests a paradigm shift in medical care, particularly regarding MQ-based finasteride treatment. Sociodemographic data and reasons for platform use suggest that the shift away from traditional care models may increase in the future. The broad use of these digital health services warrants further investigation, particularly regarding patient safety.

Keywords: androgenetic alopecia, hair loss, finasteride, telemedicine, teledermatology, online prescription platform

Introduction

Androgenetic alopecia (AA) is a common dermatological condition, affecting up to 80% of men and 42% of women worldwide. According to the European S3 Guideline, the 5-alpha-reductase type II inhibitor oral finasteride is the only systemic therapy approved for treating AA in men.¹

Although AA is a benign disease, it is associated with significant quality-of-life impairment.^{2,3} Men with hair loss have increasingly reported negative impacts on their self-esteem and concerns about losing attractiveness.⁴ One in five patients feels uncomfortable when consulting a physician about their hair loss. More than half of patients have reported lack of advice on treatment options and a lack of interest from physicians after consultation.⁵

Dermatology patients have demonstrated strong interest in digital health services.⁶ Direct-to-consumer tele dermatology services such as online prescription platforms (OPPs) represent a new type of medical care. There has been an increase over the last few years in the number of OPPs offering telemedical diagnosis and treatment for AA.⁷ Recently published scientific data regarding this subject suggest that OPPs for the treatment of AA in men can expand access to care and provide patient benefit.⁸ While advertising and the publication of scientific studies have increased the visibility of these services, little is known about the nature of the traffic that these websites generate. There is also a paucity of insights into sociodemographic characteristics of patients using OPPs.

We sought to quantify the number of visitors to OPPs that exclusively offer AA treatment in order to examine whether a change has occurred in the way that AA patients seek medical care. In addition, we characterized male patients of one of these OPPs in terms of their demographics, social backgrounds, and reasons for choosing telemedicine to gain better insight into how OPPs are utilized by patients today and whether this trend toward digital care might continue.

Materials and Methods

Study Design

For the analysis of traffic related to OPPs for men with AA between Q1 2018 and Q1 2022, the following platforms were included: Keeps (keeps.com, USA), Shapiro MD (shapiro.md.com, USA) and MySpring (myspring.com, Germany). Only platforms exclusively addressing patients with AA were examined as part of this analysis. Other platforms focused on men with conditions other than AA, such as sexual dysfunction, were excluded to investigate the specific interest in hair loss platforms.

Subsequently, to gain a better understanding of this emerging phenomenon, a more detailed analysis was conducted with anonymized data provided by Wellster Healthtech Group, the provider of “www.myspring.com”, which is an OPP available in Germany for AA. Patient data were collected via structured questionnaires between March 2021 and January 2022. The patients were asked about AA characteristics, finasteride contraindications, and possible medication interactions. The stage of AA loss was classified using the Hamilton-Norwood scale. The patients could select the stage that most closely described their current hair condition based on images. Because stage I of the Hamilton-Norwood scale describes no visible hair loss, images from type II (slight recession around the temples) to type VII (only a narrow band of the original hair growth) were presented to the patients for selection. Physicians reviewed all information before issuing prescriptions. After prescription, oral finasteride could be ordered from a cooperating online pharmacy. Information regarding the efficacy of the drug and occurrence of possible side effects was provided by email as a standard procedure to ensure patient safety. Subsequently, collection of further data regarding socio-demographic and other characteristics was performed using follow-up questionnaires sent by e-mail 28 days after the first prescription ([Supplementary File](#)). Answering the follow-up questionnaire was voluntary and had no influence on receiving medical care on the platform. Only questionnaires that were at least 90% completed were included in the analysis.

Participants

Male patients aged 18 years old or older and with self-assessed AA were eligible for a finasteride prescription. The diagnosis of AA was confirmed by a physician based on the patients' statements. Prescriptions were only issued to patients with no contraindications. The patients were classified as “urban” if they lived in places with more than 100,000 residents; all others were considered “rural”. Regarding migration status, the patients were asked whether they themselves, their parents, or their grandparents had immigrated to Germany.

Ethics

This study was conducted in accordance with the 1964 Helsinki Declaration and its later amendments. Before commencement of the study, the local ethics authority (ethics committee of the regional medical association Hamburg) reviewed the project design and waived the need for approval (reference number: 2021–300103-WF), as study-related patient data were anonymized and could not be assigned to any individual. Informed consent was received from all patients. This manuscript was written in accordance with the STROBE guidelines.

Statistical Analysis

The SEMrush marketing software platform was used for traffic analysis. This platform can determine the number of users who visit a website within a certain period. In addition, it enables evaluation of the type of access each user used to reach the website (direct access, referral from another website, a search engine, social media, or paid advertising). The analysis was based on website traffic only.

Data management and analysis for the characterization of patients from a German OPP for AA were performed using GraphPad Prism software version 8 (GraphPad Software, San Diego, CA, USA). Descriptive statistics were summarized as mean \pm standard deviation. A Mann–Whitney *U*-test was used to compare differences in mean age. A Fisher's exact test was used for the analysis of the comparison of the stage of AA and comparisons of residence. All statistical tests were two-sided, and the α -level was set at 5% ($p \leq 0.05$).

Results

Traffic Analysis

Analysis of three OPPs for finasteride treatment of AA from Q1 2018 to Q1 2022 showed a high number of visitors. Regarding Keeps, a continuous increase in quarterly visitors was identified from Q1 2018 to Q1 2022, with approximately 3,300,000 visitors in Q1 2022. For Shapiro MD, the highest number of quarterly visitors, approximately 678,600, was also recorded in Q1 2022. A peak of approximately 137,000 quarterly visitors in Q3 2021 was noted for Myspring. The number of visitors increased on all platforms over the study period (Keeps 846%, Shapiro MD 109%, Myspring 427% from Q1 2021 to Q1 2022) (Table 1).

Further analysis of traffic share in 2021 showed that most patients had accessed the platforms from mobile devices (Keeps 70%, Shapiro MD 50%, Myspring 71%) (Figure 1). Most visitors had accessed the platforms directly by entering the uniform resource locator (URL) in a browser's search bar (Keeps 54%, Shapiro MD 46%, Myspring 61%) (Figure 1).

General Patient Characteristics

To obtain a better understanding of the patient population using OPPs in treating AA, we conducted an additional analysis of 2904 men with AA (P1) who had obtained at least one prescription of finasteride on a German OPP between March 2021 and January 2022. The mean age of this group was 32.7 ± 8.4 years (range 19–72). The percentage of men

Table 1 Total Number of Unique Visitors to Online Prescription Platforms for Androgenetic Alopecia, by Quarter (Number of Unique Visitors \times 1000)

| | 2018 Q1 | 2018 Q2 | 2018 Q3 | 2018 Q4 | 2019 Q1 | 2019 Q2 | 2019 Q3 | 2019 Q4 | 2020 Q1 |
|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Keeps.com | 349 | 311.1 | 383 | 658.7 | 642.7 | 739.3 | 965.1 | 900.4 | 926.7 |
| ShapiroMD.com | 324 | 313.9 | 618 | 330.8 | 588.5 | 147.7 | 97.7 | 98.1 | 103 |
| Myspring.com | # | # | # | # | # | # | # | # | # |
| | 2020 Q2 | 2020 Q3 | 2020 Q4 | 2021 Q1 | 2021 Q2 | 2021 Q3 | 2021 Q4 | 2022 Q1 | |
| Keeps.com | 1200 | 1200 | 1300 | 1500 | 2500 | 2600 | 3100 | 3300 | |
| ShapiroMD.com | 190.1 | 132.5 | 117.6 | 105.6 | 197.9 | 257.1 | 653.3 | 678.6 | |
| Myspring.com | # | # | # | 9.2 | 70.2 | 137 | 58 | 48.5 | |

Note: #, no data available, since myspring.com launched in 2021 Q1.

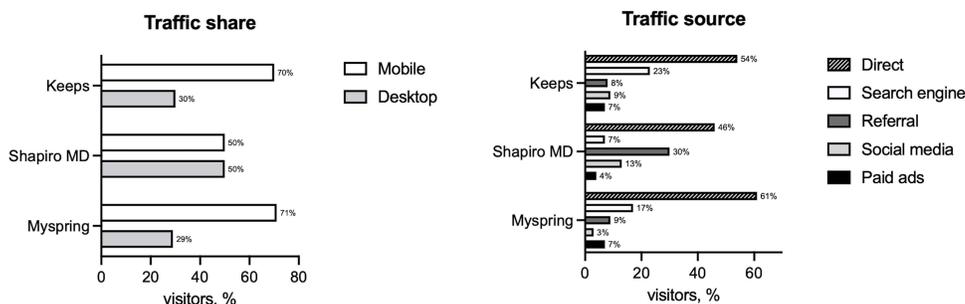


Figure 1 Traffic share and traffic source to online prescription platforms for androgenetic alopecia in 2021. Definition: Direct = traffic to a domain via URLs entered in a browser's search bar; Search = traffic to a domain directly from a search engine; Referral = traffic to a domain from a hyperlink on another domain (except social media); Social = traffic to a domain from links on social media websites; Paid = traffic to a domain from paid advertisements on Google Ads.

residing in a rural area was 53.9%. Further analysis was conducted for a subset of 177 patients (P2) who had completed the follow-up questionnaire. The P2 group did not differ significantly from the P1 group in terms of age ($p = 0.770$), distribution according to the Hamilton-Norwood scale ($p = 0.631$), and residency ($p = 0.642$) (Table 2).

Source of Referral and Rationale for Online Prescription

Most patients had become aware of the OPP through television advertising (33.9%), followed by Google search engine advertising (33.3%) and social media (29.9%). 85.3% of the patients reported obtaining information regarding AA on the Internet, while 24.9% had obtained information from friends and 14.1% had used magazines. The patients were asked about their motivation to seek treatment on an OPP. Convenience (79.1%) was cited as the most common reason, followed by discretion (32.8%), trusted pharmacy (30.5%), reasonable medication price (27.7%), and shame (27.1%) (Figure 2).

Sociodemographic Features of Patients

Mid-range earners, with a monthly net income between 2001 and 3000 euros, represented the largest subgroup on the OPP (29.9%). A monthly net income of less than 1000 euros was identified in 21.5% of the respondents. In addition, 51.4% of the patients stated having a university degree. Regarding relationship status, 45.2% were identified as being single. In terms of sexual orientation, 75.7% considered themselves to be heterosexual, 15.3% to be homosexual and 4.5% to be bisexual. Of all respondents, 82.5% identified themselves as native Germans, while 17.5% identified as immigrant (Table 3).

Table 2 General Characteristics of Patients from a German Online Prescription Platform for Androgenetic Alopecia

| | All Patients (P1) | Follow-Up Group (P2) | P value* |
|-------------------------------|-------------------|----------------------|----------|
| | n = 2904 | n = 177 | |
| Age | | | 0.770 |
| Mean \pm SD | 32.7 \pm 8.4 | 32.9 \pm 8.5 | |
| Range | 19–72 | 19–66 | |
| Norwood-Hamilton-Scale, n (%) | 2904 (100.0) | 177 (100.0) | 0.631 |
| Type II–IV | 2308 (79.5) | 144 (81.4) | |
| Type V–VII | 596 (20.5) | 33 (18.6) | |
| Residence, n (%) | 2904 (100.0) | 177 (100.0) | 0.642 |
| Urban | 1340 (46.1) | 85 (48.0) | |
| Rural area | 1564 (53.9) | 92 (52.0) | |

Note: *Differences in general patient characteristics according to Mann-Whitney U-test or Fisher's exact test.

Abbreviations: n, number; SD, standard deviation.

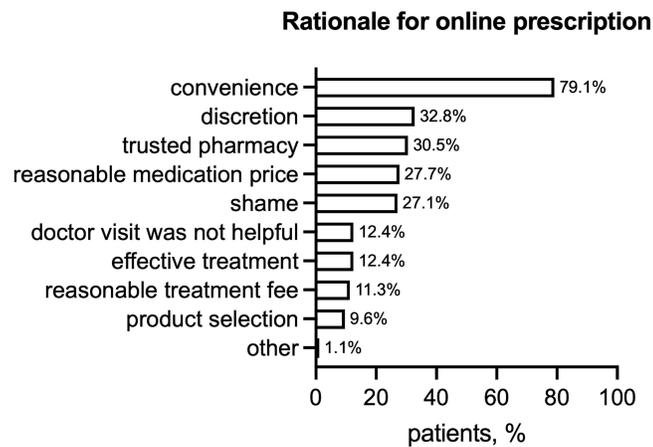


Figure 2 Rationale for online prescription of patients from a German online prescription platform for androgenetic alopecia. Responses of follow-up group P2 (n = 177). Multiple answers possible.

Discussion

The emergence of OPPs for the treatment of AA has initiated a potential paradigm shift in medical care, particularly considering the differences between traditional care delivery and finasteride treatment based on digital MQs. Therefore, it is essential to gain a better understanding of these digital health services.

Table 3 Social Characteristics of Patients from a German Online Prescription Platform for Androgenetic Alopecia. Responses of Follow-Up Group P2 (N = 177)

| | Follow-Up Group (P2) |
|-----------------------------------|----------------------|
| | n = 177 |
| Income, n (%) | |
| < 1000 | 38 (21.5) |
| 1001–2000 | 31 (17.5) |
| 2001–3000 | 53 (29.9) |
| 3001–5000 | 34 (19.2) |
| > 5000 | 21 (11.9) |
| Education, n (%) | |
| University degree | 91 (51.4) |
| A-level | 42 (23.7) |
| Secondary school | 35 (19.8) |
| Elementary school | 9 (5.1) |
| Employment status, n (%) | |
| Full time | 123 (69.5) |
| Part time | 8 (4.5) |
| Unemployed | 4 (2.3) |
| Student | 27 (15.3) |
| Vocational training | 15 (8.5) |
| Relationship status, n (%) | |
| Single | 80 (45.2) |
| Relationship | 56 (31.6) |
| Married | 39 (22.0) |
| Other | 2 (0.1) |

(Continued)

Table 3 (Continued).

| | Follow-Up Group (P2) |
|------------------------------------|----------------------|
| | n = 177 |
| Sexual orientation, n (%) | |
| Heterosexual | 134 (75.7) |
| Homosexual | 27 (15.3) |
| Bisexual | 8 (4.5) |
| Other | 8 (4.5) |
| Migration background, n (%) | |
| German | 146 (82.5) |
| Non-German | 31 (17.5) |

Abbreviation: n, number.

This study illustrates the enormous interest in OPPs for the treatment of AA. In addition to the high number of visitors to the platforms, a dramatic increase in the number of users was also noted over the study period. As the aim of our analysis was to investigate traffic generated by AA platforms, only OPPs offering exclusive treatment for AA were included. The real interest in telemedical platforms for AA is probably much higher, as many other platforms offer AA treatment together with medical care for other diseases, such as erectile dysfunction. Another study investigating traffic patterns of popular OPPs for erectile dysfunction found an average number of unique visitors of 1.39 million for Hims (forhims.com) and 1.34 million for Roman (getroman.com) per month; both platforms also offer treatment for AA, including finasteride.⁹ By combining this traffic analysis with our previous findings that every second OPP user had already visited an outpatient doctor for AA treatment,⁸ it can be concluded that the way patients seek medical care for AA has shifted dramatically. If this trend continues in the future, further research regarding this phenomenon would be warranted.

According to our traffic analysis, most visitors had accessed the platforms via mobile phones. This pattern illustrates how tele dermatology has transformed the delivery of medical care. Patients can visit OPPs at any time using their mobile phones. Treatment is provided completely independently of the location of a doctor's office, an already well-known advantage of telemedicine. Our data highlight that patients now are not even restricted to using a computer in their homes to receive telemedical treatment. Due to the constant advancement of technology, smartphones are expected to play a key role in telemedicine in the future.¹⁰ This advantage of OPPs contrasts with the traditional care model, for which long waiting times have been cited as a barrier,⁸ and suggests that the trend described here is likely to continue. Consistent with this assumption, convenience was cited in our study as the most important reason for using an OPP. In our study population, every second patient lived in a rural area. Tele dermatology has the potential to reduce geographic barriers and therefore facilitate access to care for patients outside urban regions.

Because OPPs for treating AA are highly frequented, more accurate data regarding patients who have received telemedical treatment is of great interest in gaining a better understanding of these platforms. This study is the first worldwide to analyse sociodemographic data regarding men with AA who had been treated via telemedicine using data from a German OPP. Most patients had become aware of the OPP through television advertising. Consistent with this, our traffic analysis showed that most visitors had accessed the website directly by entering the URL for all three platforms studied.

Inequalities in the use of medical care by people with different sexual orientations have been increasingly addressed in recent years. Studies have already shown that members of sexual minorities are more likely to delay medical consultations, for instance because they do not wish to disturb health care providers or have already had a poor experience with health care.¹¹ Generally, 6.4% of males in Germany identify themselves as gay, bisexual, or transgender compared to 19.8% gay or bisexual male OPP users.¹² The high proportion of sexual minorities receiving treatment on an OPP indicates a further reduction in treatment barriers through telemedicine.

In general, AA is associated with a significant limitation of quality of life.² Although the burden of hair loss was not surveyed in this study, the socio-demographic data showed that every fifth patient in our study had a monthly net income of less than 1000 euros. Because finasteride treatment of AA is not covered by statutory health insurance, it can be associated with high costs. The fact that many patients were willing to incur these costs despite a relatively low income level indicates the high burden of this disease.

Every second man in our study cohort reported being single. The high proportion of single men suggests that men use OPPs for AA to increase their attractiveness, since full hair is considered a beauty ideal and could have a positive effect on dating.

In our study, discretion and shame were stated as key reasons in addition to convenience for using online treatment. In another previous study, more than half of patients reported feeling only moderately comfortable or even uncomfortable seeing a physician due to AA and thus had delayed their consultations.⁵ Because the challenges associated with outpatient treatment in men with hair loss, such as embarrassment and the burden of seeing a doctor, are apparently less prominent when receiving treatment via an OPP, telemedicine could potentially reduce barriers to specialty care for AA.

In this study, men receiving finasteride treatment were characterized. According to the European S3 Guideline, the 5-alpha-reductase type II inhibitor oral finasteride is the only systemic therapy approved for treating male AA.¹ Even though finasteride is considered a safe drug, there is evidence of treatment-related sexual side effects that have also impacted the drug's public reputation.^{13,14} Well-managed OPPs may also be useful in this situation. OPPs might enable a new type of health-services research using real-world digital data, which could be used in the future to address a wide range of medical queries such as the frequency of sexual side effects during finasteride treatment.

In addition to finasteride, the treatment of AA can include a variety of other therapeutic approaches that extend beyond telemedical treatment. Platelet-rich plasma should be mentioned here as an example. In monthly sessions, autologous platelet-rich plasma is injected into multiple areas across the scalp to improve hair growth.¹⁵

Our data provide deep insights into the sociodemographic characteristics of the patient population of an OPP. With the high representation of members of sexual minorities, these platforms could make a positive impact on access to AA treatment. The significant proportion of patients with relatively low incomes as well as the presence of many single patients indicates the high burden of AA that might have contributed to treatment initiation. In addition to convenience, patients appreciate the discretion of this treatment modality; this factor could also accelerate the shift away from the traditional care model.

On the other hand, many unknowns regarding OPPs also exist. Over diagnosis and over prescription of medications have been cited as points of concern regarding direct-to-consumer tele dermatology in general.¹⁶ The significant increase in the use of digital health platforms requires close examination in terms of effectiveness and patient safety. There is an urgent need to understand how patients use telemedicine in the treatment of AA to ensure quality and safety. Our description of this patient population represents an initial step towards a better understanding of this new type of medical care.

Limitations

The study was limited by a lack of individual demographics for Keeps and Shapiro MD as well as a lack of information regarding what proportion of unique visits lead to medical treatment. Further limitations include the cross-sectional design and retrospective time window from the analysis of patients from the German OPP. Because participation in the follow-up survey was voluntary (6.1% participation rate), the number of patients in the follow-up group P2 was relatively low; selection bias cannot be excluded. However, the comparison between groups P1 and P2 did not indicate any significant differences in the general patient characteristics. In addition, one third of the patients had become aware of the OPP via social media. Therefore, the study population may have differed from the general population experiencing hair loss due to the marketing channels that had been used. The study group definition also was based on patients' self-assessment of AA according to the Hamilton-Norwood scale, without further diagnostic techniques to confirm AA. Because limited data regarding the patient safety of OPPs exist, further research is needed to prospectively evaluate these

platforms. Topical agents for hair loss were not considered in this study; however, the characterization of patients receiving topical agents such as minoxidil via an OPP is also of interest.

Conclusion

The strong increase in the number of visits to OPPs for AA suggests a paradigm shift in medical care, particularly regarding questionnaire-based finasteride treatment. Considering that most visitors had accessed the platforms from mobile devices and that convenience (followed by discretion) was cited as the most important argument, this trend may accelerate in the future. For a condition such as AA, which patients often experience as embarrassing, digital health platforms can be an especially useful extension of care. For the very first time, data regarding sociodemographic characteristics of patients with AA who were using telemedicine have been presented. This has shown that OPPs may help to increase access to AA treatment, particularly for minorities such as the gay and bisexual cohorts. These data can serve as an initial step toward the better understanding of these new digital health platforms. In addition, the broad use of these digital health services warrants further investigation, particularly regarding patient safety.

Abbreviations

AA, androgenetic alopecia; MQ, medical questionnaire; OPP, online prescription platform; URL, uniform resource locator.

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Disclosure

Finn Abeck certifies that all potential conflicts of interest, including specific interests and relationships and affiliations relevant to the subject matter or materials discussed in the manuscript, are as follows: Florian Schröder and Johannes von Büren: employees of Wellster Healthtech Group. Johannes von Büren: Member of the medical advisory board of Wellster Healthtech Group and owns stock options from Wellster Healthtech Group. All other authors declare no conflicts of interest in this work.

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