

Article

Patterns of alopecia among patients attended in dermatology clinic of Dhaka city: role of socio-demographic and clinical profiles on treatment process

Md Mahabubur Rahaman¹, Anzirun Nahar Asma², Ayesha Siddiqua³, Rahmat Ullah Siddique¹, Sabrina Akter¹ and Morshad Alam^{1*}

¹Aurora Skin and Aesthetics, Panthapath, Dhaka-1205, Bangladesh

²Popular Medical College and Hospital, Dhanmondi, Dhaka-1205, Bangladesh

³Delta Medical College and Hospital, Mirpur, Dhaka-1216, Bangladesh

*Corresponding author: Morshad Alam, Aurora Skin and Aesthetics, Panthapath, Dhaka-1205, Bangladesh. E-mail: evan.morshad1@gmail.com

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Abstract: The treatment of alopecia is widely available, and numerous studies have been conducted for its improvement. However, research focusing on the Bangladeshi population is extremely rare. A number of dermatology clinics in Bangladesh are providing advanced treatment; therefore, the efficacy of those treatments needs to be assessed. The aim of this study was to determine the pattern of alopecia in Bangladesh and identify the factors that are associated with poor treatment responses to administered therapies. We conducted a cross-sectional study among alopecia patients who were getting treatment at Aurora Skin and Aesthetics and completed at least six sessions under an experienced physician. Interviews run by experienced physicians collected demographic, clinical, treatment, and comorbidity-related information from patients aged between 18 and 65 years. The collected data were analyzed using STATA (version 16.0). Among our participants, male pattern baldness (stage-2) was most common (43.6%), followed by male pattern baldness (stage-3) (18.8%) and female pattern hair loss (FPHL), stage-2 (13.9%). The treatment efficacy was good for 46.5% of patients, medium for another 42.56%, and only 10.9% showed poor efficacy. The oily hair of participants showed a statistically significant negative association with treatment efficacy ($P=0.018$). The presence of chronic disease and stress among alopecia patients also negatively impacts the treatment process ($P<0.05$). Smoking among alopecia patients also hampers the treatment process and is significantly associated with poor treatment efficacy. From this study, it is clear that the ongoing treatment has overall excellent efficacy; however, attention should be given to the comorbidities and habits of patients to improve the treatment outcome. The findings of this study would help skin specialists make decisions during alopecia treatment.

Keywords: comorbidities; smoking; hair type; treatment efficacy; Bangladesh

1. Introduction

Alopecia is a medical condition that can affect the scalp or the entire body, and it can be either temporary or permanent. It could result from inherited traits, hormonal changes, illnesses, or a normal part of aging. Hereditary hair loss is the most common reason for baldness (Mahmoudi *et al.*, 2018). The reduction of hair follicles in the parietal and frontal regions of the scalp is a hallmark of the androgenetic form of alopecia, which accounts for 70% of cases. Another common type is alopecia areata, which can be localized or generalized.

Scarring and other types of alopecia, though less frequent, are highly unsettling to patients (Falto-Aizpurua *et al.*, 2014).

The clinical history of the patient is essential for alopecia therapy. Clinicians should consider potential causes, such as drug usage, systemic illness, or weight loss, three months prior to the commencement of hair loss in patients who are complaining of increased hair loss. Gynecologic histories of women are important, and women who have androgenetic alopecia or a history of irregular menstruation should have their hormone levels checked. Iron, vitamin D, and thyroid function should all be measured in lab experiments (Gupta *et al.*, 2018; Mahmoudi *et al.*, 2018; Nestor *et al.*, 2021).

A high level of adherence over a lengthy period of time is typically required for currently approved treatment approaches to be effective. Topical minoxidil and finasteride are medications that have received AGA approval. Males may use the 5% solution once a day and still see the same benefits if combined with topical tretinoin 0.01% (Miteva & Tosti, 2012; Gupta *et al.*, 2022). Depending on the severity of the illness, treatment options include topical, intralesional, or systemic steroids, topical immunotherapy, and systemic immuno-modulators. A significant issue is chemotherapy-induced alopecia (CIA), which impacts 65% of chemotherapy patients. The only way to prevent it, though, is by utilizing scalp cooling systems, which are not effective for all treatment regimens and are only generally available in a small number of cancer treatment institutions (Sardesai *et al.*, 2012; Shreberk-Hassidim *et al.*, 2016; Skogberg *et al.*, 2017; Boontaveeyuwat *et al.*, 2019; Tavakolpour *et al.*, 2019). Other non-surgical therapies, such as low-level laser therapy (LLLT) and platelet-rich plasma (PRP), have also demonstrated potential (Gupta & Carviel, 2017).

For the treatment of alopecia, the patient's clinical history, including drug usage, systemic illness, gynecologic histories, weight loss, and test results, is essential. A high level of adherence over an extended period of time is typically necessary for current approved treatment choices to be effective. The evaluation of different treatment modalities is crucial and should be carried out on a regular basis. Numerous dermatology clinics in Bangladesh offer cutting-edge care, yet studies examining their effectiveness are incredibly rare. The study aimed to determine the pattern of alopecia in Bangladesh and identify the factors that are associated with poor treatment responses to administered therapies. In this study, we assessed how alopecia patients responded to treatment at the six-month mark. We also identified the variables that are linked to the inadequate treatment efficacy of delivered medicines. The findings of these would help clinicians choose treatment options as well as make decisions in complex situations.

2. Materials and Methods

2.1. Ethical approval and informed consent

The research did not require any confidential data or body tissue, moreover, it maintained all the data securely, and never disclosed it anywhere, and is not accessible to anyone. We have followed the Helsinki Declaration (1964) and subsequent revisions during each of the steps of this analytical cross-sectional study (Wilson, 2013). Informed consent from all the patients who participated was obtained before the initiation of the study. Confidentiality was ensured for all of the information collected during the interview process. There was no risk of harm for the study participants, and the dataset was anonymized. The data files for statistical analysis did not include any personal or sensitive information. The participants were able to decline to attend the interview at any point after enrollment in the study.

2.2. Study design

This was a facility based analytical cross-sectional study among alopecia patients who got treatment from Aurora Skin & Aesthetics for at least six sessions. Interviews run by experienced physicians collected demographic, clinical, treatment, and co-morbidity related information from patients aged between 18 to 65 years.

2.3. Study population

The study population was all alopecia patients in Dhaka city, and the target population was alopecia patients attending Aurora Skin & Aesthetics. The study participants were individuals who were available for follow-up after six sessions of treatment under the supervision of an experienced physician. Due to the limitations of resources, manpower, and time, a complete set of data was collected from 101 alopecia patients. A purposive sampling technique was applied for the selection of interview participants.

2.4. Data collection tools and technique

The tools for data collection include the structured questionnaire, treatment related information, prescriptions, and laboratory reports. We have collected information on various socio-demographic factors such as age, sex, hair type, color, scalp, gynecological record, skin problems, weight loss, smoking, etc. The clinical information that is collected includes the type, stage, site, duration, family history, symptoms, comorbidities, etc. We have analysed the treatment efficacy using the patients' feedback after the 3rd and 6th sessions of the treatment procedure. There were a total of eight items, and each of those carried two marks (16 total). Carrying a score less than 10 was denoted as poor efficacy; scoring between 10-13 was denoted as medium efficacy, and scoring 14 or higher was denoted as good efficacy of the administered treatment.

2.5. Data analysis

The data collected by structured interviews was entered and cleaned in Microsoft Excel and analyzed using STATA version 16.0 (STATA Corporation). For the description of socio-demographic, clinical, and treatment related data, various descriptive statistics such as, mean, frequency, and percentage were used. Treatment efficacy was analysed using the 16-point scale developed for this study. The efficacy of the treatment was our dependent variable, and socio-demographic variables, clinical characteristics were our independent variables. The factors that are associated with poor treatment efficacy were determined by Chi-square (χ^2) or Fisher exact tests. The level of significance was set at 5%, and a $P < 0.05$ will be considered statistically significant.

3. Results

3.1. Socio-demographic profile and disease status

The mean age of the study participants was 30.267 (SD: 9.014), minimum: 18, maximum: 51, range: 33. The majority of patients were young adults, with 35.6% being between the ages of 18 and 25, and 39.6% being between the ages of 26 and 35. More than 72% of the participants were female, and 75.2% had a family history of alopecia, which is evident. The majority of the patient's hair was dry (53.5%), and 86.1% had black hair. Smoking was also highly prevalent (34.7%) among the alopecia patients (Table 1).

Table 1. Sociodemographic profile of the patient.

Variable	Category	Frequency	Percentage (%)
Age	18-25 years	36	35.6
	26-35 years	40	39.6
	> 35 years	25	24.8
Sex	Female	28	27.7
	Male	73	72.3
Family history	No	25	24.8
	Yes	76	75.2
Hair type	Dry	54	53.5
	Normal	15	14.9
	Oily	32	31.7
Colour	Black	87	86.1
	Brown	5	5%
	Grey	5	5%
	Others	4	4%
Scalp condition	Dry	42	41.6
	Normal	22	21.8
	Oily	37	36.6
Smoking	No	66	65.3
	Yes	35	34.7

The diagnosis of the alopecia was done by experienced physicians, where male pattern baldness (stage-2) was most common (43.6%), followed by male pattern baldness, stage-2 (18.8%) and female pattern hair loss (FPHL), stage-2 (13.9%). The majority (55.6%) had one or more skin diseases other than alopecia, and 34.7% were facing stress. Around 20% of the participants said they had experienced weight loss after facing alopecia symptoms. Gradual loss of hair was very common among patients (72.3%). The most common site of alopecia is the frontal (67.3%) followed by the crown (16.8%). The majority of the patients said, they were facing hair loss between 1-2 years, where the male pattern is predominant (76.2%). Itching (44.6%) and pain (20.8%) were

two common symptoms faced by alopecia patients. We also asked patients about the presence of chronic diseases other than skin diseases, and 43.6% said, they were facing medical conditions other than alopecia. Most of the patients were in the second stage of hair loss (67.3%), and 58.4% had previously tried different treatments but failed (Table 2).

Table 2. Disease and co-morbidity related characteristics.

Variable	Category	Frequency	Percentage (%)
Type	Androgenetic alopecia	5	5.0
	FPB Stage-2	8	7.9
	FPB Stage-3	1	1.0
	FPHL Stage-2	14	13.9
	FPHL Stage-3	2	2.0
	MPB Stage-1	8	7.9
	MPB Stage-2	44	43.6
	MPB Stage-3	19	18.8
Other skin disease	No	45	44.6
	Yes	56	55.4
Stress	No	66	65.3
	Yes	35	34.7
Weight loss	No	81	80.2
	Yes	20	19.8
Hair fall onset	Gradual	73	72.3
	Sudden	28	27.7
Number of hair fall	50-100	24	23.8
	100-150	41	40.6
	150-200	21	20.8
	200-300	15	14.9
Site	Angle	11	10.9
	Crown	17	16.8
	Frontal	68	67.3
	Occiput	5	5.0
Hair fall duration	1-3 months	4	4.0
	3-6 months	10	9.9
	6-9 months	4	4.0
	>1 year	63	62.4
	>2 year	6	5.9
Pattern	Female pattern	24	23.8
	Male pattern	77	76.2
Any symptoms	Itching	45	44.6
	Multiple	11	10.9
	No	24	23.8
	Pain	21	20.8
Medical condition	No	57	56.4
	Yes	44	43.6
Stage of hair loss	Stage 1	8	7.9
	Stage 2	68	67.3
	Stage 3	25	24.8
Any treatment before	No	59	58.4
	Yes	42	41.6

3.2. Treatment efficacy

We have analysed the treatment efficacy using the patients' feedback after the 3rd and 6th sessions of the treatment procedure. There were a total of eight items, and each of those carried two marks (16 total). Carrying a score less than 10 was denoted as poor efficacy, scoring between 10-13 denoted as medium efficacy, and scoring 14 or higher was denoted as good efficacy of the treatment. According to our analysis, 46.5% reported good efficacy for alopecia, another 42.56% showed medium efficacy, and only 10.9% showed poor efficacy. This result indicates the excellent efficacy of the treatment (Figure 1).

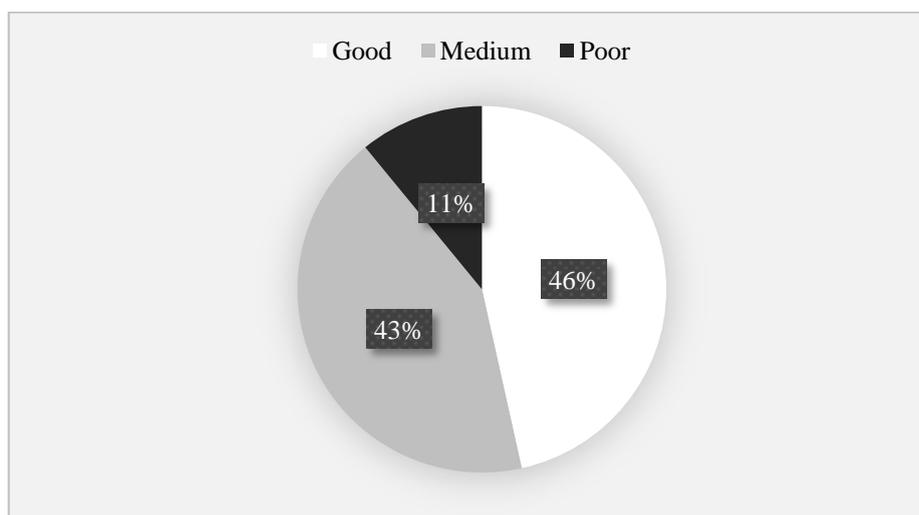


Figure 1. Efficacy of the provided treatment after six sessions.

3.3. Associated factors of poor treatment efficacy against alopecia

We have also analysed the associated factors for alopecia treatment efficacy in the selected dermatology clinic. Hair type had a statistically significant association ($P=0.018$) and scalp condition had a close to significant association ($P=0.08$) with poor treatment efficacy. From our findings, it is clear that patients with oily hair or scalp conditions are at high risk of poor treatment efficacy. Patients who do smoke showed a statistically significant association with poor treatment efficacy ($P=0.001$). Moreover, patients with stress also had a higher prevalence of poor treatment efficacy. It is evident that, the treatment of female pattern alopecia is more complex than that of male pattern alopecia and the association with efficacy was also statistically significant ($P=0.005$). The presence of other chronic conditions among the alopecia patients also has a significant impact on the treatment ($P=0.003$), and the third stage of the alopecia is also difficult to treat (Table 3).

Table 3. Factors associated with treatment efficacy of alopecia.

Variable	Category	Treatment efficacy			P value
		Good, n (%)	Average, n (%)	Poor, n (%)	
Age	18-25 years	16 (44.7)	16 (44.7)	4 (11.1)	0.46
	26-35 years	17 (42.5)	20 (50.0)	3 (7.5)	
	> 35 years	14 (56.0)	7 (28.0)	4 (16.0)	
Sex	Female	13 (46.4)	14 (50.0)	1 (3.6)	0.25
	Male	34 (46.6)	29 (39.7)	10 (13.7)	
Hair type	Dry	32 (59.3)	18 (33.3)	4 (7.4)	0.018*
	Normal	8 (53.3)	5 (33.3)	2 (13.3)	
	Oily	7 (21.9)	20 (62.5)	5 (15.6)	
Scalp condition	Dry	24 (57.1)	16 (38.1)	2 (4.8)	0.08*
	Normal	12 (54.5)	8 (36.4)	2 (9.1)	
	Oily	11 (29.7)	19 (51.4)	7 (18.9)	
Other skin disease	No	20 (44.8)	22 (48.9)	3 (6.7)	0.33
	Yes	27 (48.2)	21 (37.5)	8 (14.3)	
Stress	No	30 (45.5)	32 (48.5)	4 (6.1)	0.06*
	Yes	17 (48.6)	11 (31.4)	7 (20.0)	
Smoking	No	25 (37.9)	37 (56.1)	4 (6.1)	0.001*
	Yes	22 (62.9)	6 (17.1)	7 (20.0)	
Site	Angle	6 (54.5)	4 (36.4)	1 (9.1)	0.39
	Crown	6 (35.3)	9 (52.9)	2 (11.8)	
	Frontal	34 (50.0)	28 (41.2)	6 (8.8)	
	Occiput	1 (20.)	2 (40.0)	2 (40.0)	
Pattern	Female pattern	5 (20.8)	13 (54.2)	6 (25.0)	0.005*
	Male pattern	42 (54.5)	30 (39.0)	5 (6.5)	

Table 3. Contd.

Variable	Category	Treatment efficacy			P value
		Good, n (%)	Average, n (%)	Poor, n (%)	
Chronic condition	No	31 (54.4)	25 (43.9)	1 (1.8)	0.003*
	Yes	16 (36.4)	18 (40.9)	10 (22.7)	
Stage of hair loss	Stage 1	5 (62.5)	3 (37.5)	0 (0.0)	0.047*
	Stage 2	29 (42.6)	34 (50.0)	5 (7.4)	
	Stage 3	13 (52.0)	6 (24.0)	6 (24.0)	

* Statistically significant

4. Discussion

Our study has successfully assessed the efficacy of the alopecia treatment provided in dermatology clinics, where the overall efficacy of the treatment was excellent after the 6th session of follow-up. Close to half of the alopecia patients reported good efficacy of the treatment provided for alopecia by experienced physicians in a selected dermatology clinic. Only 11% of the participants said the efficacy was poor, and our study has determined the factors that are associated with poor efficacy.

The bulk of the patients who participated in the trial were young adults, with a mean age of about 30. This suggests that young people are very conscious of their hair, bodies, and overall beauty (Kaziga *et al.*, 2021). The majority of women are extremely self-conscious of their appearance, and beauty standards are significantly varying throughout the world (Kaziga *et al.*, 2021). Young females in Bangladesh are likewise more self-conscious of their beauty (Alam *et al.*, 2022). Similar to this, over 72% of our participants were female since they place a high value on attractiveness (Chumlea *et al.*, 2004; Goh *et al.*, 2006).

Alopecia is strongly correlated with family history, according to several earlier studies. In addition to a history of hair loss in the mother or hair loss in the maternal grandparents, hair loss in a man's father also appears to have a significant role in raising his risk of hair loss (Chumlea *et al.*, 2004; Goh *et al.*, 2006). Our study shows that the patient has a positive family history of alopecia for the most part. It is clear from this that family history has a significant impact on the onset of alopecia.

Most of the time, patients with baldness were also smokers. Moreover, smoking was statistically associated with less effective treatment outcomes in patients. There is ongoing discussion on smoking's connection to androgenetic alopecia. Smoking may cause hair loss through vasoconstriction, DNA adduct formation, damage from free radicals to the hair follicle, accelerated aging, and hormonal impacts (Kavadya and Mysore, 2022). The information at hand indicates a clear connection between smoking, alopecia, and addiction. There isn't enough research, though, showing how quitting smoking will reduce hair loss. Furthermore, there are presently no sizable controlled investigations with histological support for the findings (Vora *et al.*, 2019; Tubayesha *et al.*, 2020; Salem *et al.*, 2021).

We have also examined the contributing elements to the dermatological clinic's success in treating alopecia. Poor treatment efficacy was statistically associated with hair type and scalp condition. Sebum overproduction causes pore obstruction, irritation, and hardness. That ultimately causes hair loss and thinning of the hair. Therefore, having an oily scalp may result in hair loss that is greater than hair regrowth (Trüeb *et al.*, 2018; Kesika *et al.*, 2023). Our research shows that patients who have oily hair or scalp conditions are at a higher risk of experiencing subpar therapeutic outcomes.

Additionally, patients with stress also had a higher rate of ineffective treatment. Alopecia areata has been linked to the start and/or worsening of psychosocial stress. Patients with stress-reactive alopecia may have depressive disorder, which is something that should be taken into account while managing these patients as a whole. According to recent research, psychological stress directly causes alopecia and positively correlates with the condition's severity (Chen *et al.*, 2021; Rajoo *et al.*, 2019).

The third stage of alopecia was the most challenging to cure, and the presence of additional chronic conditions had a significant impact on the treatment. Patients with alopecia who also have a variety of chronic conditions hinder their healing process. Studies on alopecia patients who also have other chronic diseases are scarce at the moment. Therefore, long-term studies are required to explore the connection between alopecia treatment response and chronic diseases (such as cardiovascular disease and cancer). To better understand how genetics, outside factors such as the environment, and factors influencing a patient's response to therapy interact, more research is required. Patients with alopecia who also have one or more chronic conditions may experience treatment difficulties (Alhanshali *et al.*, 2023; Schmidt *et al.*, 2002).

5. Conclusions

Our analysis demonstrated the excellent treatment efficacy of the administered treatment at Aurora Skin & Aesthetics in Dhaka city. Male pattern baldness and female pattern hair loss (second stage) were the most common types of alopecia. The overall treatment efficacy was excellent and would be recommended for further application. Alopecia patients with oily hair, stress, or any other chronic disease should receive extra care from physician. Patients should discontinue smoking and any other hazardous practices for a better treatment outcome. The findings of this study would guide skin specialists and practitioners to take effective measures during the treatment process. More studies should be conducted on molecular and genetic factors that are affecting the treatment outcomes of vitiligo patients.

Data availability

The dataset that arose and were used in the current study is available from the corresponding author on reasonable request.

Conflict of interest

None to declare.

Authors' contributions

Md Mahabubur Rahaman, Anzirun Nahar Asma, and Morshad Alam contributed to research design, proposal development, data analysis, and manuscript writing; Anzirun Nahar Asma, Ayesha Siddiqua, Rahmat Ullah Siddique and Sabrina Akter involved in data collection and data entry, and manuscript writing. All authors have read and approved the final manuscript.

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