

# Pattern and Profile of Non-Cicatricial Alopecia in Bangladeshi Female Population

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## Abstract

**Introduction:** Non-cicatricial alopecia (NCA) poses significant dermatological and psychosocial challenges, especially in women. This study aims to delineate the pattern, profile, and associated characteristics of NCA among a female population.

**Methods:** This descriptive, observational study was conducted involving 355 female patients with NCA at a tertiary care hospital. Data on demographic details, clinical patterns, hair care practices, and associated diseases were collected and analyzed.

**Result:** The study population predominantly comprised younger women, with the largest age group being 20-29 years (35.77%) and a mean age of 23.61 years. A considerable proportion had primary education (30.99%), with unmarried individuals (56.62%) and students (45.92%) being the most affected. Urban residency was more common (58.59%), with the majority falling into the average economic status (65.92%). A notable history of atopy was reported in 43.94% of participants. The alopecia characteristics showed a mean duration of 22.03 months, with localized hair loss being the most common pattern (48.17%). Basic hair care was prevalent, with 91.55% using shampoo. Systemic lupus erythematosus was the most prevalent associated disease (10.42%). Patchy alopecia, predominantly alopecia areata, was observed in 48.17% of cases, while chronic telogen effluvium was the leading type of diffuse hair loss (55.56%). The Ludwig pattern was most observed in Female Pattern Hair Loss (FPHL) cases (82.50%).

**Conclusion:** This study highlights the demographic and clinical nuances of NCA in females, indicating a higher prevalence in younger urban women, with a notable association with atopy and systemic diseases. The findings suggest the need for a comprehensive approach to the management of NCA, considering its diverse presentations and associated factors.

**Keywords:** Non-cicatricial alopecia, female pattern hair loss, alopecia areata, telogen effluvium, systemic lupus erythematosus

Date of Submission: 24-04-2024

Date of Acceptance: 04-05-2024

## I. Introduction

Hair, a significant aspect of self-image and social interaction, holds a symbolic link to femininity, sexuality, attractiveness, and personality, especially in women. The psychological burden of hair loss, or alopecia, is profound, with studies suggesting a heightened risk of psychiatric disorders such as depression, anxiety, social phobia, and paranoid disorder in those affected (1). Non cicatricial alopecia (NCA) encompasses various forms such as diffuse (telogen effluvium, anagen effluvium), patterned (female pattern hair loss), and focal types (alopecia areata, trichotillomania, tinea capitis), each necessitating distinct treatment protocols for effective management (2). In clinical settings, female patients frequently report diffuse hair loss, predominantly characterized as telogen effluvium. Stress, hormonal changes (postpartum state), medication effects (oral contraceptives, lithium, cimetidine), and endocrinopathies (thyroid, pituitary, and parathyroid diseases) are key etiological factors for telogen effluvium (3). Another notable type, anagen effluvium, results from the disruption

of rapidly dividing hair follicle cells, commonly attributed to chemotherapy (4). Female pattern hair loss (FPHL), or female androgenetic alopecia, prevalent in 6% to 38% of women below and above 50 years respectively, is typified by hair follicle miniaturization and transformation into vellus-like follicles (5,6). External factors such as hormonal imbalances, as seen in polycystic ovarian syndrome (PCOS), along with stress, lifestyle, and nutrition, contribute to the complexity of FPHL's etiology (7). Alopecia areata, an autoimmune inflammatory condition impacting hair on the scalp, face, and body, exhibits unique “exclamation mark” hairs and affects approximately 0.1–0.2% of the global population (8,9). Trichotillomania, a behavioral disorder involving compulsive hair plucking often in response to stress, further exemplifies the diverse etiologies of hair loss, impacting women more frequently than men (10). Hair shaft disorders such as trichorrhexis nodosa and monilethrix add another dimension to NCA, arising from genetic or environmental influences on hair structure (11,12). The comprehensive evaluation and diagnosis of NCA hinge on a detailed patient history, focusing on the chronology of hair loss, pattern, diet, medication, medical conditions, and family history of alopecia. Physical examination and diagnostic tests like the pull test, complete blood count, thyroid function tests, and occasionally, punch biopsy play a crucial role in elucidating the underlying causes of NCA (13). Internationally, studies have investigated the various patterns and risk factors associated with NCA in females (14–17). However, comprehensive data specific to Bangladesh are scarce. The current study aims to systematically describe the pattern and profile of NCA in Bangladeshi females and compare the findings with international reports. Given the phenotypic and genotypic variability observed in NCA and its profound psychological impact on women, understanding the epidemiology, onset, course, precipitating factors, and associated co-morbid conditions of various types of NCA is vital. Such knowledge is crucial not only for dermatologists but also for enhancing patients' quality of life, as hair loss often leads to restricted social contacts and reduced societal acceptance, particularly in women. This study's findings will contribute to a deeper understanding of NCA in females within the context of Bangladesh, addressing the gap in current epidemiological data and aiding in the development of targeted therapeutic strategies.

## II. Methods

This descriptive, observational study was conducted at the Department of Dermatology and Venereology, Chittagong Medical College Hospital, Bangladesh, from December 2018 to March 2020. A total of 355 female patients, clinically diagnosed with non-cicatricial alopecia, were included. Participants were selected consecutively, ensuring a diverse representation of the study population. Inclusion criteria comprised all female patients presenting with symptoms of non-cicatricial alopecia, while those with cicatricial alopecia or unwilling to participate were excluded. Comprehensive data collection was conducted through face-to-face interviews using a pre-designed case record form. Each participant underwent a detailed clinical examination, and relevant history was recorded, including socio-demographic characteristics, medical history, and hair care practices. Laboratory investigations, such as complete blood count, thyroid function tests, and serum ferritin levels, were performed as necessary to corroborate clinical findings. The data were analyzed using SPSS software, focusing on the prevalence, patterns, and potential risk factors associated with non-cicatricial alopecia in the study cohort. Ethical approval for this study was granted by the Ethical Review Committee of Chittagong Medical College, and informed consent was obtained from all participants.

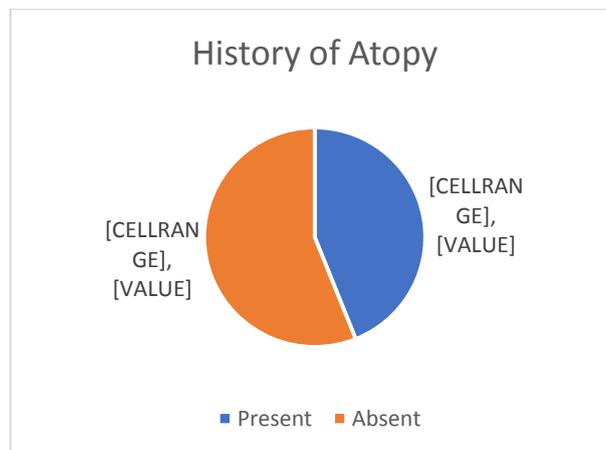
## III. Results

**Table 1:** Baseline characteristics distribution of the participants (N=355)

Variables	Frequency	Percentage
<b>Age</b>		
1-9 years	42	11.83%
10-19 years	87	24.51%
20-29 years	127	35.77%
30-39 years	62	17.46%
40-49 years	30	8.45%
50 years & above	7	1.97%
Mean (±SD)	23.61 (±12.01)	
<b>Education</b>		
Below primary	45	12.68%
Primary	110	30.99%
Secondary	67	18.87%
Higher secondary	59	16.62%
Graduate & above	74	20.85%
<b>Marital Status</b>		

Unmarried	201	56.62%
Married	154	43.38%
<b>Occupation</b>		
Not applicable (Age <7 years)	18	5.07%
Student	163	45.92%
Housewife	115	32.39%
Working outside	59	16.62%
<b>Residence</b>		
Rural	147	41.41%
Urban	208	58.59%
<b>Economic Status</b>		
Low	92	25.92%
Average	234	65.92%
High	28	7.89%

Regarding age distribution, the majority of participants fall within the 20-29 years category (35.77%), followed by the 10-19 years group (24.51%) and the 30-39 years group (17.46%). Participants aged 50 years and above constitute the smallest proportion at 1.97%. The mean age of the participants is 23.61 years ( $\pm 12.01$  SD). In terms of education, primary education is the most common, with 30.99% of participants having completed primary schooling, followed closely by graduate and above (20.85%). Regarding marital status, a slight majority of participants are unmarried (56.62%) compared to married individuals (43.38%). Occupation-wise, students comprise the largest group (45.92%), followed by housewives (32.39%) and those working outside (16.62%). A small percentage (5.07%) is not applicable due to age. Residence distribution shows a nearly balanced split between rural (41.41%) and urban (58.59%) areas. Economically, the majority fall into the average economic status category (65.92%), followed by low (25.92%) and high (7.89%) economic statuses.



**Figure 1:** History of atopy in patients with non-cicatricial alopecia (N=355)

Figure 1 illustrates the history of atopy among patients with non-cicatricial alopecia (N=355). Among the participants, 43.94% reported a history of atopy, while 56.06% indicated the absence of such a history.

**Table 2:** Characteristics of non-cicatricial alopecia at presentation (N=355)

Characteristics	Frequency	Percentage
<b>Duration of alopecia (months)</b>		
Mean ( $\pm$ SD)	22.03 ( $\pm 31.21$ )	
Median (IQR)	7 (2-24)	
Range	0.15-264	
<b>Type of hair shedding</b>		
Prominent	310	87.32%
Alarming	38	10.70%
Minimal	7	1.97%
<b>Pattern of hair loss</b>		
Localized	171	48.17%
Diffuse	144	40.56%
Patterned	40	11.27%

Site of involvement		
Scalp	353	99.44%
Axilla & pubic area	10	2.82%
Extremity	10	2.82%
Eyebrow	22	6.20%
<b>Spontaneous hair re- growth</b>	264	74.37%
<b>H/O previous episode</b>	49	13.80%

The duration of alopecia at presentation varied widely, with a mean duration of 22.03 months ( $\pm 31.21$  SD) and a median duration of 7 months (IQR: 2-24). The range spanned from 0.15 to 264 months, indicating considerable variability in the duration of alopecia among individuals. Regarding the type of hair shedding, prominent shedding was predominant, reported by 87.32% of participants, followed by alarming shedding (10.70%) and minimal shedding (1.97%). The pattern of hair loss also varied, with the localized pattern being the most common (48.17%), followed by diffuse (40.56%) and patterned (11.27%) patterns. The scalp was the primary site of involvement, reported by 99.44% of participants, while involvement of other areas such as axilla & pubic area, extremity, and eyebrow was less common. Spontaneous hair regrowth was observed in a significant proportion of cases (74.37%), while a history of previous episodes was reported by 13.80% of participants.

**Table 3:** Hair care practice among the patients (N=355)

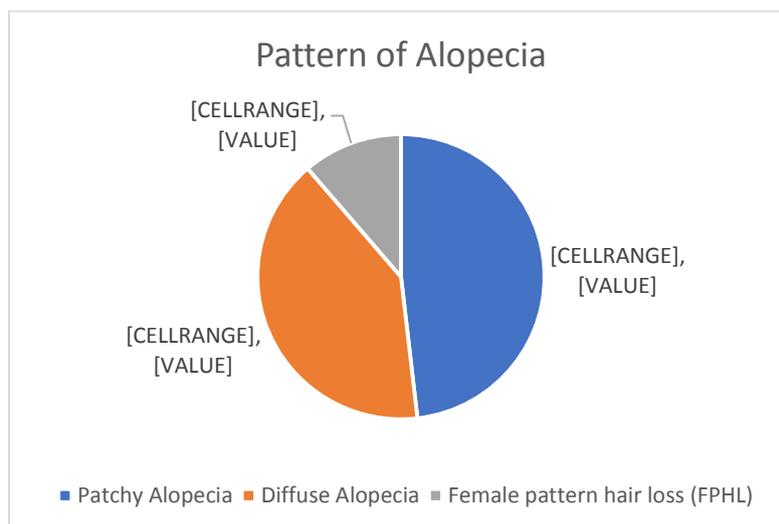
Hair care practice	Frequency	Percentage
None	22	6.20%
Using shampoo	325	91.55%
Using hair dye	6	1.69%
Use of hair dryer	2	0.56%
Tight braiding of hair	2	0.56%
Hair straightening	6	1.69%

A minority of participants reported not using any specific hair care practices (6.20%). The vast majority indicated using shampoo as part of their hair care routine (91.55%), while a small proportion reported using hair dye (1.69%), using a hair dryer (0.56%), tight braiding of hair (0.56%), and hair straightening (1.69%).

**Table 4:** Associated systemic and concomitant skin disease among patients (N=355)

Associated Disease	Frequency	Percentage
<b>Systemic disease</b>		
SLE	37	10.42%
DM	14	3.94%
Hypothyroidism	9	2.54%
Hyperthyroidism	3	0.85%
PCOS	3	0.85%
MCTD	3	0.85%
Othersa	12	3.38%
<b>Skin disease</b>		
Cutaneous lupus, fungal infections, acne vulgaris etc.	92	25.92%

Table 4 outlined the associated systemic and concomitant skin diseases among patients (N=355). Among systemic diseases, systemic lupus erythematosus (SLE) was the most prevalent, affecting 10.42% of participants, followed by diabetes mellitus (DM) (3.94%), hypothyroidism (2.54%), hyperthyroidism (0.85%), polycystic ovary syndrome (PCOS) (0.85%), mixed connective tissue disease (MCTD) (0.85%), and other systemic conditions (3.38%). In terms of concomitant skin diseases, conditions such as cutaneous lupus, fungal infections, and acne vulgaris were prevalent, collectively affecting 25.92% of participants.



**Figure 2:** Different patterns of alopecia among the patients (N=255)

Figure 2 illustrated the different patterns of alopecia among the patients (N=255). Patchy alopecia was the most common pattern, observed in 48.17% of patients, followed by diffuse alopecia affecting 40.56% of patients. Female pattern hair loss (FPHL) was less prevalent, occurring in 11.27% of patients.

**Table 5:** Characteristics pattern of patchy alopecia among the patients (n=177)

Variables	Frequency	Percentage
<b>Types</b>		
Alopecia areata	156	88.14%
Trichotillstosis	7	3.95%
Congenital triangular alopecia	5	2.82%
T. capitis	3	1.69%
<b>Number of patches</b>		
Single	60	33.90%
Multiple	104	58.76%
Whole scalp	7	3.95%
Presence of crusting	27	15.25%
Presence of Dyspigmentation	33	18.64%

Table 5 delineated the characteristic pattern of patchy alopecia among the patients (n=177). Alopecia areata was the predominant type, observed in 88.14% of cases, followed by trichotillstosis (3.95%), congenital triangular alopecia (2.82%), and tinea capitis (1.69%). Regarding the number of patches, the majority of patients presented with multiple patches (58.76%), followed by single patches (33.90%), and a small proportion exhibited patchy hair loss across the entire scalp (3.95%). Additionally, crusting was observed in 15.25% of cases, while dyspigmentation was present in 18.64% of cases.

**Table 6:** Different types and probable risk factors of patients of diffuse hair loss (n=144)

Variables	Frequency	Percentage
<b>Types</b>		
Acute Telogen effluvium	57	39.58%
Chronic Telogen effluvium	80	55.56%
Woolly hair	7	4.86%
<b>Probable risk factors</b>		
Chronic illness	30	20.83%
Drug intake	20	13.89%
Idiopathic	20	13.89%
Inflammatory scalp diseases	17	11.81%
Anemia	17	11.81%

Hypothyroidism	8	5.56%
Crush diet/nutritional deficiency	8	5.56%
Stress	7	4.86%
Hair weathering	7	4.86%
Febrile illness	3	2.08%
Structural defect	7	4.86%

Table 6 delineated the different types and probable risk factors of patients with diffuse hair loss (n=144). Among the types observed, chronic telogen effluvium was the most prevalent, affecting 55.56% of patients, followed by acute telogen effluvium (39.58%) and woolly hair (4.86%). As for probable risk factors contributing to diffuse hair loss, chronic illness was identified in 20.83% of cases, followed by drug intake (13.89%), idiopathic causes (13.89%), inflammatory scalp diseases (11.81%), anemia (11.81%), hypothyroidism (5.56%), crush diet or nutritional deficiency (5.56%), stress (4.86%), hair weathering (4.86%), febrile illness (2.08%), and structural defects (4.86%).

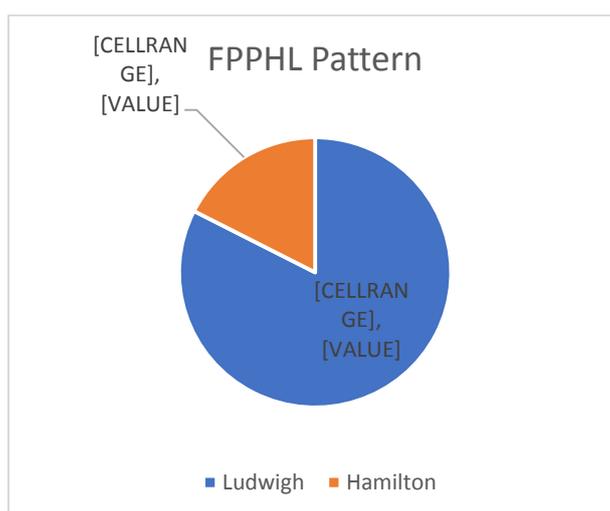


Figure 3: Different pattern of FPHL (Female pattern hair loss) (n=40)

Figure 3 depicted the different patterns of Female Pattern Hair Loss (FPHL) among the patients (n=40). The majority of cases exhibited the Ludwig pattern, accounting for 82.50% of patients, while the Hamilton pattern was observed in only 17.50% of cases.

#### IV. Discussion

This comprehensive analysis of non-cicatricial alopecia (NCA) in a cohort of 355 female patients provides insights into various aspects of this condition, from demographic characteristics to alopecia patterns. By comparing our findings with a selection of 10 relevant studies, we can better understand NCA in the context of global research. Our study found a predominant age group of 20-29 years (35.77%) with a mean age of 23.61 years. This younger demographic prevalence aligns with the findings by Tan et al., and Ross et al., who reported a similar age distribution in alopecia cases, suggesting an earlier onset of hair loss in recent times (18,19). The educational background with most participants having primary education (30.99%) is comparable to the study by Sowjanya et al., indicating that NCA affects women across diverse educational backgrounds, reflecting a broad societal impact (20). The higher incidence of NCA in unmarried participants (56.62%) and students (45.92%) in our study corresponds with Gordon and Tosti's study, which highlighted the influence of age and lifestyle factors in alopecia (21). Furthermore, the predominance of urban residents (58.59%) in our study resonates with Harries et al., suggesting the potential role of urban environmental and lifestyle stressors in hair loss (22). A significant proportion of our study population (43.94%) reported a history of atopy. This finding is echoed in the research by Summers et al., which suggests a possible immunological component in alopecia, specifically linking atopic conditions to hair loss (23). Our findings on the mean duration of alopecia (22.03 months) and the predominant pattern of hair loss being localized (48.17%) find parallels in the work of Monib et al., and Sagar, who discuss chronicity and patterns in hair loss (24,25). The predominant use of basic hair care practices such as shampoo (91.55%) in our cohort corresponds to the observations by Mysore et al., emphasizing the impact of proper hair care practices on alopecia (26). The notable incidence of systemic

diseases like SLE (10.42%) and skin-related conditions (25.92%) in our participants is in line with findings by Herskovitz and Tosti, which highlighted the association between systemic diseases and alopecia (27). The high prevalence of patchy alopecia (48.17%), specifically alopecia areata (88.14%), and the prevalence of chronic telogen effluvium (55.56%) as a type of diffuse hair loss, resonate with existing studies (28,29). These studies emphasize the diversity of alopecia patterns and their prevalence, highlighting the multifaceted nature of hair loss conditions. The observation of the Ludwig pattern in 82.50% of FPHL cases aligns with the research by Clarysse and Sinclair, as well as by one of Eckert et al., who explore the prevalence and typology of FPHL, shedding light on the various manifestations of this common hair loss type in women (30,31). Our study, through its comparative analysis with existing literature, underscores the multifaceted nature of NCA and its diverse manifestations. The demographic profile, coupled with clinical and alopecic characteristics, highlights the importance of a holistic approach in understanding and managing NCA. These findings not only add to the global understanding of alopecia but also emphasize the need for targeted research and treatment strategies, especially in diverse demographic settings.

#### *Limitations of The Study*

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

### **V. Conclusion**

This study provides a comprehensive insight into the characteristics of non-cicatricial alopecia (NCA) among females, revealing key demographic trends and clinical patterns. The findings underscore the predominance of NCA in younger women, notably in urban settings, with a significant association between atopic history and alopecia. The diversity in alopecia patterns, from patchy alopecia predominantly of the alopecia areata type to the predominance of chronic telogen effluvium in diffuse hair loss, highlights the complexity of NCA. Notably, systemic diseases such as systemic lupus erythematosus and skin-related issues are notably associated with NCA, emphasizing the need for a multidisciplinary approach in diagnosis and treatment. Overall, this study contributes to the broader understanding of NCA, paving the way for more tailored and effective management strategies in the female population.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee