Clinical Evaluation of Frontal Fibrosing Alopecia and Thyroid Dysfunction: A Retrospective Study

Basukala MS, Karn D, Mishra A, Shrestha E, Tamang A

Department of Dermatology, Venereology and Leprosy

Dhulikhel Hospital, Kathmandu University Hospital,

Kathmandu University School of Medical Sciences,

Dhulikhel, Kavre, Nepal.

Corresponding Author

Manisha Singh Basukala

Department of Dermatology, Venereology and Leprosy,

Dhulikhel Hospital, Kathmandu University Hospital,

Kathmandu University School of Medical Sciences,

Dhulikhel, Kavre, Nepal.

E-mail: drmanishasingh@kusms.edu.np

Citation

Basukala MS, Karn D, Mishra A, Shrestha E, Tamang A. Clinical Evaluation of Frontal Fibrosing Alopecia and Thyroid Dysfunction: A Retrospective Study. *Kathmandu Univ Med J.* 2025; 93(5): 31-5. (Special Issue)

ABSTRACT

Background

Frontal fibrosing alopecia is a scarring form of hair loss with a suspected but poorly understood link to thyroid disease. Evidence regarding this association remains limited and contradictory.

Objective

To describe the demographic and clinical profile of patients with frontal fibrosing alopecia and to investigate the prevalence of thyroid dysfunction in this population at Dhulikhel Hospital, Kathmandu University Hospital.

Method

A retrospective, cross-sectional analytical study was conducted on the medical records of 81 patients diagnosed with frontal fibrosing alopecia seen at the dermatology unit of Dhulikhel Hospital, Kathmandu University Hospital between May 2018 and May 2023. The study was approved by the Institutional Review Committee -Kathmandu University School of Medical Sciences with institutional Review committee number: 138/23. Associations between frontal fibrosing alopecia, thyroid dysfunction, and clinical features, including skincare and haircare practices, were analyzed using multivariable logistic regression using STATA version 14.

Result

The study included 81 participants with frontal fibrosing alopecia with a mean age of 64.5 ± 3.72 years. The average onset age for frontal fibrosing alopecia was 60.1 ± 3.26 years. Hypothyroidism was observed in 23 (28.4%) patients, and hyperthyroidism in 1 (1.23%). Additionally, no significant associations were found between frontal fibrosing alopecia and other factors such as sun protection use, moisturizing products, or other skincare practices.

Conclusion

Frontal fibrosing alopecia in postmenopausal women showed a high prevalence of hypothyroidism, but no independent association with thyroid dysfunction or common skincare and haircare practices. Thyroid screening may still be considered, and further studies are warranted to explore other etiological factors in Frontal fibrosing alopecia.

KEY WORDS

Dermatology, Frontal fibrosing alopecia, Postmenopausal, Trichoscopy, Thyroid dysfunction

INTRODUCTION

Frontal fibrosing alopecia (FFA) is a distinctive form of primary lymphocytic scarring alopecia, first characterized by Kossard in 1994.[1] It is clinically defined by a progressive, band-like recession of the frontotemporal hairline, frequently accompanied by eyebrow loss (madarosis).[2,3] While classically affecting postmenopausal women, its reported incidence has risen markedly worldwide, and cases in premenopausal women and men are increasingly recognized, suggesting a complex, evolving epidemiology.[1]

The precise etiology of FFA remains elusive, though it is widely considered a disorder of immune dysregulation with possible genetic, hormonal, and environmental co-factors.[4] A significant association between FFA and autoimmune diseases, such as thyroid dysfunction, has been suggested, which may indicate a shared pathogenic pathway.[5,6] Additionally, hormonal changes, particularly in postmenopausal women, are believed to contribute to the development of FFA.[7] However, evidence remains contradictory; while some studies report a high prevalence of thyroid autoantibodies and hypothyroidism in FFA cohorts, others find no significant association compared to control populations.[8-10]

This inconsistency highlights a key gap in defining the clinical and comorbid profile of FFA. Therefore, this study aimed to describe the demographic and clinical characteristics of patients diagnosed with FFA at our institution and to specifically investigate the potential association between FFA and thyroid dysfunction.

METHODS

A retrospective, cross-sectional study was conducted at the Department of Dermatology, Dhulikhel Hospital, Kathmandu University Hospital, reviewing records from May 2018 to May 2023. A total of 81 postmenopausal women diagnosed with frontal fibrosing alopecia (FFA) were included via convenience sampling of all eligible patient records. The diagnosis of FFA was established based on characteristic clinical findings of frontotemporal hairline recession and eyebrow loss, supported by trichoscopic examination, which was performed in all cases. A scalp biopsy for histopathological confirmation was performed in two patients, where the clinical presentation was atypical or required differentiation from other forms of alopecia. Data on demographics, clinical features, thyroid function tests, and comorbidities were collected retrospectively using a structured proforma. Ethical approval was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences (Ref: 138/23), and the requirement for informed consent was waived. The inclusion criteria were postmenopausal women with a clinical diagnosis of FFA; exclusion criteria included incomplete records, other primary alopecias, and premenopausal or male patients. Data analysis was performed using Stata software, version 14. Descriptive statistics were reported as mean ± standard deviation or frequency (percentage). Associations of FFA characteristics were assessed using the bivariable and multivariable logistic regression, with a p-value < 0.05 considered significant.

RESULTS

A total of 81 post-menopausal female patients diagnosed with frontal fibrosing alopecia (FFA) were included in the study. The mean age at the time of presentation was 64.5 ± 3.7 years (range, 56–72 years) [Table 1].

Eyebrow involvement was common, with 63 patients (77.8%) showing partial loss and 3 (3.7%) showing complete loss. Lichenoid changes of the scalp were observed in two

Table 1. Baseline demographic and clinical characteristics of patients with FFA (n = 81)

Variable	n (%)
Age at presentation (years) Mean ± Standard deviation (years)	64.5 ± 3.7
Thyroid function	
Normal	57 (70.4)
Hypothyroidism	23 (28.4)
Hyperthyroidism	1 (1.2)
Eyebrow involvement	
Partial loss	63 (77.8)
Complete loss	3 (3.7)
None	18 (22.2)
Scalp findings	
Lichenoid scalp	2 (2.5)
Nail changes	13 (16.0)
Body hair involvement	
Axillary/pubic partial loss	11 (13.6)
Axillary/pubic complete loss	2 (2.5)
Limb hair partial loss	12 (14.8)
Limb hair complete loss	2 (2.5)
Comorbidities	
Type 2 Diabetes	9 (11.1)
Hypertension	6 (7.4)
Coronary Heart Disease	3 (3.7)
Rheumatoid Arthritis	2 (2.5)
Psoriasis	1 (1.2)
Rosacea	5 (6.2)
Hair and skin care practices	
Sun protection used	41 (50.6)
Moisturizer use	43 (53.1)
Facial cleansers	22 (27.2)
Hair colourant	16 (19.8)
Hairspray	11 (13.6)
Foundation/make-up	21 (25.9)
Chemical hair straightening	14 (17.3)

patients (2.5%), and nail changes were seen in 13 (16%). Axillary/pubic hair involvement included partial loss in 11 patients (13.6%) and complete loss in 2 (2.5%). Limb hair involvement was noted in 14 patients (17.3%) with partial or complete loss [Table 1].

Comorbidities included type 2 diabetes mellitus in 9 (11.1%) patients, hypertension in 6 (7.4%), coronary heart disease in 3 (3.7%), rheumatoid arthritis in 2 (2.5%), psoriasis in 1 (1.2%), and rosacea in 5 (6.2%). Regarding hair and skin care practices, 41 (50.6%) patients reported using sun protection, 43 (53.1%) used moisturizers, 22 (27.2%) used facial cleansers, 16 (19.8%) used hair colourants, 11 (13.6%) used hairspray, 21 (25.9%) used foundation/make-up, and 14 (17.3%) underwent chemical hair straightening [Table 1].

Thyroid dysfunction was present in 24 patients (29.6%), including hypothyroidism in 23 (28.4%) and hyperthyroidism in 1 (1.2%) [Table 1].

Crude and multivariable logistic regression analyses were performed to identify FFA characteristics associated with thyroid dysfunction [Table 2]. Variables with perfect prediction, such as hairline Extension Loss and rheumatoid arthritis, were omitted from the multivariable model. The multivariable model was adjusted for age at presentation. None of the FFA characteristics were significantly associated with thyroid dysfunction in the multivariable model which was adjusted for age at presentation [Table 2].

DISCUSSIONS

Frontal fibrosing alopecia (FFA) is a primary scarring alopecia predominantly affecting postmenopausal women, with irreversible hair loss often impacting the frontotemporal scalp and eyebrows.[1,13] In our study, all 81 patients were postmenopausal women, with a mean age of symptom onset of 60.1 ± 3.3 years and a mean age at presentation of 64.5 ± 3.7 years [Table 1], consistent with large case series reporting median onset around 60–61 years.[11-13] The strong preponderance of FFA in postmenopausal women (83–95% of cases) has led to hypotheses implicating hormonal changes, such as estrogen depletion, in disease pathogenesis.[14,15] Despite these patterns, the precise triggers for FFA remain unclear.[11,16]

Clinically, our cohort exhibited the characteristic FFA phenotype. Progressive frontotemporal hairline recession was universal, with partial eyebrow loss in 63 patients (77.8%) and complete eyebrow loss in 3 patients (3.7%) [Table 1] [Fig. 2]. These findings align with previous studies; for example, Maldonado-Cid et al. reported eyebrow involvement in 93% of FFA patients.[17] Additional hair loss patterns, including axillary/pubic hair loss in 13 patients (16.1%) and limb hair loss in 14 patients (17.3%), were observed in subsets of patients, consistent with

Table 2. FFA Characteristics Associated with Thyroid Dysfunction (n=81)

Characteristics	Crude OR	95% CI	p-value	Adjusted OR*	95% CI	p-value
Age (years)	1.148	0.996 - 1.324	0.057	1.112	0.951 - 1.301	0.181
Eyebrow Redness						
No	Ref	-	-	Ref	-	-
Yes	0.581	0.194 - 1.743	0.332	0.479	0.138 - 1.663	0.246
Eyebrow Loss						
No	Ref	-	-	Ref	-	-
Yes	1.196	0.103 - 13.846	0.886	0.732	0.039 - 13.656	0.834
Lichenoid Skin						
No	Ref	-	-	Ref	-	-
Yes	2.435	0.146 - 40.603	0.535	3.815	0.175 - 83.124	0.394
Lichenoid Mucosa						
No	Ref	-	-	Ref	-	-
Yes	2.500	0.331 - 18.872	0.374	5.703	0.561 - 57.933	0.141
Nail Alteration (Ridging)						
No	Ref	-	-	Ref	-	-
Yes	1.067	0.294 - 3.868	0.922	0.906	0.208 - 3.954	0.896
Axillary/Pubic Hair Redness						
No	Ref	-	-	Ref	-	-
Yes	0.875	0.211 - 3.627	0.854	0.648	0.102 - 4.128	0.646
Axillary/Pubic Hair Loss						
No	Ref	-	-	Ref	-	-
Yes	2.435	0.146 - 40.603	0.535	2.620	0.139 - 49.258	0.520
Hairline Extension Redness						
No	Ref	-	-	Ref	-	-
Yes	0.762	0.187 - 3.101	0.704	0.722	0.131 - 3.969	0.708
Type 2 Diabetes Mellitus						
No	Ref	-	-	Ref	-	-
Yes	0.649	0.125 - 3.380	0.608	0.312	0.025 - 3.831	0.362
Hypertension						
No	Ref	-	-	Ref	-	-
Yes	1.205	0.205 - 7.062	0.837	1.567	0.243 - 10.099	0.636
Rosacea						
No	Ref	-	-	Ref	-	-
Yes	3.929	0.612 - 25.198	0.149	3.194	0.369 - 27.676	0.292

*Adjusted for age of presentation
OR = Odds Ratio; CI = Confidence Interval

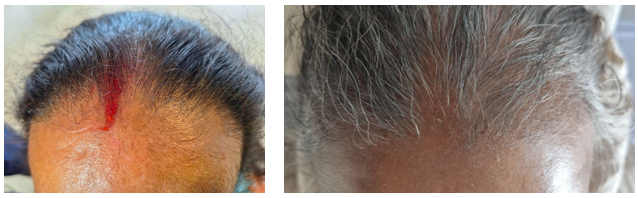

Figure 1. Clinical photograph of a patient with advanced frontal fibrosing alopecia, showing a band-like frontal hairline recession and sparing of a "pseudo-fringe" of anterior temporal hairs.

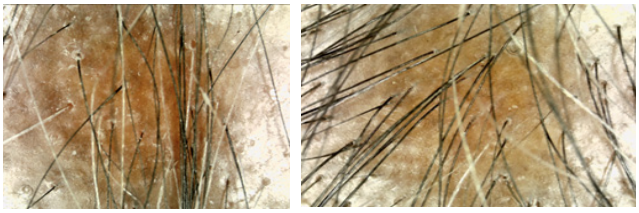

Figure 2. Dermoscopic image (×10 magnification) of the frontal hairline in FFA, demonstrating a sparse field of solitary terminal hairs ("lonely hair" sign) with absence of vellus hairs and focal perifollicular white scales (casts), typical of this condition.

literature reports. Histopathology, performed in atypical or diagnostically challenging cases, uniformly demonstrated lichenoid perifollicular inflammation and concentric fibrosis characteristic of FFA, including lymphocytic infiltrates around infundibular and isthmic regions, with replacement of follicular units by fibrous tracts [Fig. 3].[17,18]

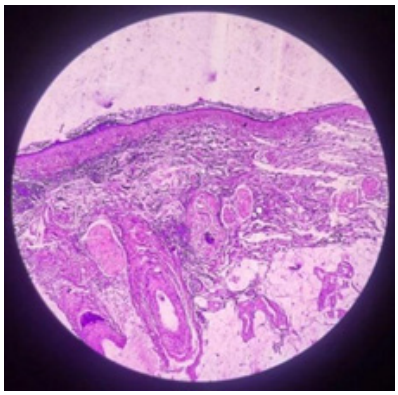

Figure 3. Scalp biopsy (H&E stain, original magnification ×100) from a frontal hairline in FFA. The epidermis is thinned and underlying dermis shows concentric perifollicular fibrosis with a mild lymphocytic infiltrate. The arrow indicates a lobule of adipocytes entrapped in fibrous tissue, highlighting the scarring process.

We observed a high prevalence of hypothyroidism (23 patients, 28.4%) among our cohort, while 57 patients (70.4%) had normal thyroid function and 1 patient (1.2%) had hyperthyroidism (Table 1). However, multivariable analysis adjusted for age at presentation revealed no statistically significant association between thyroid dysfunction and FFA (p=0.965) [Table 2].

This mirrors the mixed evidence in the literature. Small case series, such as a German cohort (N=12), reported a strong correlation between FFA and hypothyroidism.[19] And a UK questionnaire study also noted higher thyroid disease prevalence in FFA patients than controls.[10] Similarly, a recent case-control study identified thyroid disorders as a potential risk factor (OR≈1.7), and a meta-analysis of scarring alopecias, including FFA, reported hypothyroidism significantly more frequent in FFA than controls [OR 1.73 (1.24–2.42), prevalence 17%].[8,20] On the other hand, some studies did not detect significant differences, and the causal relationship remains uncertain.[13,21] Our findings suggest that although thyroid autoimmunity is common among FFA patients, it may reflect a general predisposition to autoimmune disease rather than a direct pathogenic role. Consensus reviews report hypothyroidism in 8–44% of FFA cohorts, supporting recommendations for routine thyroid screening in FFA patients.[17,19,20]

Other comorbidities in our cohort were largely consistent with previous studies. Rosacea was present in 5 patients (6.2%), lower than the 16–20% reported in some series, yet case-control data show rosacea is associated with FFA (OR=2.0).[8,17] Metabolic conditions were infrequent: type 2 diabetes in 9 patients (11.1%) and hypertension in 6 patients (7.4%), consistent with meta-analytic data showing no significant association between FFA and these conditions.[20,22,23]

We also evaluated environmental and cosmetic factors. Approximately half of patients reported using sun protection (41 patients, 50.6%) and facial moisturizers (43 patients, 53.1%), while 16 patients (19.8%) used hair colorants and 14 patients (17.3%) underwent chemical hair straightening [Table 1]. Multivariable analysis showed none of these practices were significantly associated with thyroid dysfunction or disease severity [Table 2]. The role of leave-on cosmetics in FFA has been debated.[24,25] Aldoori et al. reported a striking association between sunscreen use and FFA, whereas other studies found no link.[8,10] Our findings, like those of later negative studies, suggest that if environmental agents play a role, it may involve specific exposures or genetics not captured by simple questionnaires.[26] Formaldehyde-based hair straightening was implicated as a risk factor in a Brazilian case-control study.[8] Our findings, in line with later negative studies, suggest that if environmental agents contribute to FFA, it may involve specific exposures, formulations, or genetic predispositions not captured by simple questionnaires. Larger prospective studies are warranted to further clarify these relationships.[8,26]

This study has several limitations. Its retrospective, single-center design may introduce selection bias, and only postmenopausal women were included, limiting generalizability to men and younger women. The lack of a matched control group constrains the ability to test associations, and our sample size may have limited power to detect modest effects. Recall bias regarding cosmetic practices is possible. Finally, this study is observational, so causal inferences cannot be drawn. Future prospective studies with larger cohorts and matched controls are necessary to clarify the role of comorbidities and environmental factors in FFA pathogenesis.

CONCLUSION

In postmenopausal women with FFA, no significant association was found between thyroid dysfunction, particularly hypothyroidism, or the use of common skincare and hair care products, and FFA onset. The study's focus on a high-risk group and use of multivariable analysis are strengths, while the small sample size and retrospective design are limitations. Future research should explore genetic and environmental factors in larger, diverse populations to better understand FFA pathogenesis.

REFERENCES

1. Kossard S. Post-Menopausal Frontal Fibrosing Alopecia. In: Trüeb RM, Tobin DJ (eds) Aging Hair. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 33–39.
2. Moreno-Ramírez D, Camacho Martínez F. Frontal fibrosing alopecia: a survey in 16 patients. *J Eur Acad Dermatol Venereol.* 2005; 19: 700-5.
3. Backar S. Frontal fibrosing alopecia: An overview. *J Skin Sex Transmitted Dis*. 2022; 4: 40-6.
4. Messenger AG, Asfour L, Harries M. Frontal fibrosing alopecia: An update. *Am J Clin Dermatol.* 2025; 26: 155 - 74.
5. Christoph T, Müller-Röver S, Audring H, Tobin DJ, Hermes B, Cotsarelis G, et al. The human hair follicle immune system: cellular composition and immune privilege. *Br J Dermatol.* 2000; 142: 862-73.
6. Ito T, Ito N, Saatoff M, Hashizume H, Fukamizu H, Nickoloff BJ, et al. Maintenance of hair follicle immune privilege is linked to prevention of NK cell attack. *J Invest Dermatol*. 2008; 128: 1196-1206.
7. Roman AM, Petca RC, Dumitrașcu MC, Petca A, Ionescu Miron AI, Șandru F. Frontal Fibrosing Alopecia and Reproductive Health: Assessing the Role of Sex Hormones in Disease Development. *J Pers Med*. 2024 Jan 5;14(1):72.
8. Ramos PM, Anzai A, Duque-Estrada B, Farias DC, Melo DF, Mulinari-Brenner F, et al. Risk factors for frontal fibrosing alopecia: A case-control study in a multiracial population. *J Am Acad Dermatol.* 2021; 84: 712–8.
9. Ladizinski B, Bazakas A, Selim MA, Olsen EA. Frontal fibrosing alopecia: a retrospective review of 19 patients seen at Duke University. *J Am Acad Dermatol.* 2013; 68: 749-55.
10. Aldoori N, Dobson K, Holden CR, McDonagh AJ, Harries M, Messenger AG. Frontal fibrosing alopecia: possible association with leave-on facial skin care products and sunscreens; a questionnaire study. *Br J Dermatol*. 2016; 175: 762–7.
11. Tavakolpour S, Mahmoudi H, Abedini R, Kamyab Hesari K, Kiani A, Daneshpazhooh M. Frontal fibrosing alopecia: An update on the hypothesis of pathogenesis and treatment. *Int J Womens Dermatol.* 2019 Jan 23;5(2):116-123.
12. Owczarek M, Jałowska M, Mariowska A, Grochowska W, Szyszkowska J, Metelkina D, et al. FFA Patient Profile Analysis Based on the Authors' Observations and a Review of the Literature - An Original Survey. *J Clin Med*. 2025 Jun 18;14(12):4346.
13. Baba PU. Frontal Fibrosing Alopecia (FFA). *Aesthet Plast Surg*. 2025 Apr;1(1):90-9.
14. Porriño-Bustamante ML, Fernández-Pugnaire MA, Arias-Santiago S. Frontal fibrosing alopecia: A review. *J Clin Med.* 2021; 10: 1805.
15. Maciejewska M, Czuwara J, Dąbrowska N, Olszewska M, Rudnicka L. Potential etiological factors in frontal fibrosing alopecia. *Przegl Dermatol.* 2022; 109: 427–436.
16. Starace M, Cedirian S, Rapparini L, Quadrelli F, Pampaloni F, Bruni F, et al. Enhanced insights into frontal fibrosing alopecia: Advancements in pathogenesis understanding and management strategies. *Dermatol Ther (Heidelb).* 2024; 14: 1457–77.
17. Maldonado Cid P, Leis Dosil VM, Garrido Gutiérrez C, Salinas Moreno S, Thuissard Vasallo IJ, Andreu Vázquez C, et al. Frontal fibrosing alopecia: A retrospective study of 75 patients. *Actas Dermosifiliogr.* 2020; 111: 487–95.
18. Ma SA, Imadojemu S, Beer K, Seykora JT. Inflammatory features of frontal fibrosing alopecia. *J Cutan Pathol.* 2017; 44: 672–6.
19. Valesky EM, Maier MD, Kaufmann R, Zöller N, Meissner M. Single-center analysis of patients with frontal fibrosing alopecia: evidence for hypothyroidism and a good quality of life. *J Int Med Res.* 2019; 47: 653-61.
20. Yongpisarn T, Tejapira K, Suchonwanit P. Comorbidities in primary cicatricial alopecia: a systematic review and meta-analysis. *Front Immunol.* 2025; 16: 1516407.
21. Popa A, Carsote M, Cretoiu D, Dumitrascu MC, Nistor CE, Sandru F. Study of the thyroid profile of patients with alopecia. *J Clin Med*. 2023; 12: 1115.
22. Liu L, Chen Y, Chen J, Xue Y, Chen T, Li Y, et al. Association between frontal fibrosing Alopecia and Rosacea: Results from clinical observational studies and gene expression profiles. *Front Immunol.* 2022; 13: 985081.
23. Akin Belli A, Alatas ET, Kara Polat A, Akbaba G. Assessment of thyroid disorders in patients with rosacea: a large case-control study. *An Bras Dermatol.* 2021; 96: 539–43.
24. Harak K, Tomić Krsnik L, Vukojević M, Marinović B, Bukvić Mokos Z. Frontal fibrosing alopecia and the role of cosmeceuticals in its pathogenesis. *Cosmetics.* 2025; 12: 168.
25. Robinson G, McMichael A, Wang SQ, Lim HW. Sunscreen and frontal fibrosing alopecia: A review. *J Am Acad Dermatol*. 2020; 82: 723-8.
26. Edwards TM, Myers JP. Environmental exposures and gene regulation in disease etiology. *Environ Health Perspect.* 2007; 115: 1264-70.