Table SI. *Search strategies used in electronic databases*

Databases: MEDLINE (via PubMed) and EMBASE

Search period: From database inception to 18 June 2025

Last search update: 18 June 2025

Search strategy:

Concept 1 – Scarring alopecias and related disorders

('lichen planopilaris' OR 'frontal fibrosing alopecia' OR 'graham little syndrome' OR 'keratosis follicularis spinulosa decalvans' OR 'central centrifugal cicatricial alopecia' OR 'chronic cutaneous lupus erythematosus' OR 'discoid lupus erythematosus' OR 'folliculitis decalvans' OR 'dissecting folliculitis' OR 'cellulitis of the scalp' OR 'acne keloidalis' OR 'acne keloid' OR 'acne necrotica' OR 'erosive pustular dermatosis of the scalp' OR 'classical pseudopelade' OR 'brocq pseudopelade' OR 'follicular degeneration syndrome' OR 'alopecia mucinosa' OR 'follicular mucinosis')

AND

Concept 2 – Metabolic. autoimmune. dermatological and systemic comorbidities

('metabolic syndrome' OR 'hyperlipidemia' OR 'hypertriglyceridemia' OR 'high-density lipoprotein cholesterol' OR 'vitamin d insufficiency' OR 'vitamin d deficiency' OR 'obesity' OR 'body mass index' OR 'diabetes mellitus type 2' OR 'diabetes mellitus type 1' OR 'diabetes overall' OR 'fasting blood glucose' OR 'insulin resistance' OR 'thyroid disease' OR 'coronary disease' OR 'cerebrovascular disease' OR 'hypertension' OR 'rosacea' OR 'seborrheic dermatitis' OR 'androgenetic alopecia' OR 'lichen planus pigmentosus' OR 'vitiligo' OR 'psoriasis' OR 'acne' OR 'atopy' OR 'asthma' OR 'allergic rhinitis' OR 'atopic dermatitis' OR 'lichen planus' OR 'hirsutism' OR 'osteopenia' OR 'osteoporosis' OR 'depression' OR 'systemic lupus erythematosus' OR 'inflammatory bowel disease' OR 'reproductive health' OR 'uterine fibroids' OR 'celiac disease' OR 'epilepsy' OR 'multiple sclerosis' OR 'crohn disease' OR 'ulcerative colitis' OR 'rheumatoid arthritis' OR 'psoriatic arthritis' OR 'sjögren' OR 'anemia' OR 'endometriosis' OR 'obstructive sleep apnea' OR 'lichen sclerosus' OR 'scleroderma' OR 'polycystic ovary syndrome')

Limits: None

Language restrictions: None

Study design restrictions: None

Table SII. *Included studies in the systematic review*

ID	Article
ID 1	Ong MM, Shapiro A, Linos SR. Increased prevalence of antinuclear antibody positivity in central centrifugal cicatricial alopecia patients. Skin Appendage Disord. 2025;11(4):385-388. doi:10.1159/000543767.
ID 2	Grimes PE, Dias S, Kyei A, Tatarinova TV, Alexis A, Elbuluk N, et al. A retrospective clinical and laboratory analysis including vitamin D and antinuclear antibodies in central centrifugal cicatricial alopecia and nonscarring alopecia in African Americans. J Am Acad Dermatol. 2024;91(6):1240-1242. doi:10.1016/j.jaad.2024.08.028.
ID 3	Joshi TP, Duruewuru A, Garcia D, Mireles N, Truong P, Cockerell CJ. Comorbidities in patients with central centrifugal cicatricial alopecia: a case-control study. Int J Dermatol 2024; 63: e37–e39. doi: 10.1111/ijd.16932
ID 4	Leung B, Lindley L, Reisch J, Glass DA 2nd, Ayoade K. Comorbidities in patients with central centrifugal cicatricial alopecia: a retrospective chart review of 53 patients. J Am Acad Dermatol. 2023;88(2):461-463. doi:10.1016/j.jaad.2022.06.013.
ID 5	Jafari AJ, Brown C, Echuri H, Murina AT. Lack of association between comorbidities and central centrifugal cicatricial alopecia: a retrospective cohort study of 153 patients. J Am Acad Dermatol. 2023;88(2):e101-e103. doi:10.1016/j.jaad.2022.09.056.
ID 6	McKenzie SA, Roche FC, Onyekaba G, Williams DM, Ogunleye TA, Taylor SC. Comorbid anxiety and depression among black women with central centrifugal cicatricial alopecia: a retrospective study. J Dermatol. 2021;48:e19. doi:10.1111/1346-8138.15595.
ID 7	Samrao A, Lyon L, Mirmirani P. Evaluating the association of central centrifugal cicatricial alopecia (CCCA) and fibroproliferative disorders. Dermatol Online J. 2021;27(8). doi:10.5070/D327854688.
ID 8	Kyei A, Bergfeld WF, Piliang M, Summers P. Medical and environmental risk factors for the development of central centrifugal cicatricial alopecia: a population study. Arch Dermatol. 2011;147(8):909-914. doi:10.1001/archdermatol.2011.66.
ID 9	Roche FC, Harris J, Ogunleye T, Taylor SC. Association of type 2 diabetes with central centrifugal cicatricial alopecia: a follow-up study. J Am Acad Dermatol. 2022;86(3):661-662. doi:10.1016/j.jaad.2021.02.036.
ID 10	Dina Y, Okoye GA, Aguh C. Association of uterine leiomyomas with central centrifugal cicatricial alopecia. JAMA Dermatol. 2018;154(2):214. doi:10.1001/jamadermatol.2017.5163.

ID	Article
ID 11	Narasimman M, De Bedout V, Castillo DE, Miteva MI. Increased association between previous pregnancies and use of chemical relaxers in 74 women with central centrifugal cicatricial alopecia. Int J Trichology. 2020;12(4):176-181. doi:10.4103/ijt.ijt_37_20.
ID 12	Brown-Korsah JB, Roche FC, Taylor SC. Association of breast and colorectal cancer in patients with central centrifugal cicatricial alopecia: a retrospective, cross-sectional pilot study. J Am Acad Dermatol. 2021 Mar;84(3):859-860. doi: 10.1016/j.jaad.2020.10.044.
ID 13	Bala L, Kafai Golahmadi A, Elshimy N. Central centrifugal cicatricial alopecia and fibroproliferative disorders: exploring the association with uterine leiomyomas. Clin Exp Dermatol. 2025;00:1-3. doi:10.1093/ced/llaf339. Letter to the Editor.
ID 14	Onamusi T, Larrondo J, McMichael AJ. Clinical factors and hair care practices influencing outcomes in central centrifugal cicatricial alopecia. Arch Dermatol Res. 2023;315:2375-2381. doi:10.1007/s00403-023-02630-5.
ID 15	Collins MS, Ali S, Wiss IP, Senna MM. Increased risk of vitamin D deficiency and insufficiency in Black patients with central centrifugal cicatricial alopecia. J Am Acad Dermatol 2022; 87: 689–691. doi: 10.1016/j.jaad.2022.02.018
ID 16	Hagigeorges D, Manatis-Lornell A, Marks DH, Okhovat JP, Senna MM. Patients with central centrifugal cicatricial alopecia: identifying gynecologic comorbidities [abstract]. J Am Acad Dermatol. 2019 Oct. Abstract 8629.
ID 17	Ayandibu G, Bergfeld W. Retrospective cohort study to assess the prevalence of different factors of metabolic syndrome in central centrifugal cicatricial alopecia patients [abstract]. J Am Acad Dermatol. 2018 Sep. Abstract 6293.
ID 18	Suchonwanit P, Hector CE, Bin Saif GA, McMichael AJ. Factors affecting the severity of central centrifugal cicatricial alopecia. Int J Dermatol. 2016;55(6):e338-e343. doi:10.1111/ijd.13061.
ID 19	Shah SK, Alexis AF. Central centrifugal cicatricial alopecia: retrospective chart review. J Cutan Med Surg. 2010;14(5):212-222. doi:10.2310/7750.2010.09055.
ID 20	Balazic E, Chen A, Konisky H, Hawkins K, Choi J, Mhaimeed N, Kindred C, Kobets K. A retrospective chart review of central centrifugal cicatricial alopecia patients at a single urban institution. JAAD Int. 2023 Dec;13:61-62. doi:10.1016/j.jdin.2023.07.014.
ID 21	Ali S, Collins M, Taylor SC, Kelley K, Stratton E, Senna M. Diabetes type 2 and central centrifugal cicatricial alopecia severity. J Am Acad Dermatol. 2022;87(6):1418-1419. doi:10.1016/j.jaad.2022.08.031.

ID	Article
ID 22	Jackson TK, Sow Y, Ayoade KO, Seykora JT, Taylor SC, Ogunleye T. Central centrifugal cicatricial alopecia in males. J Am Acad Dermatol. 2023;89(6):1136-1140. doi:10.1016/j.jaad.2023.07.1011.
ID 23	Conic RRZ, Piliang M, Bergfeld W, Atanaskova-Mesinkovska N. Vitamin D status in scarring and non-scarring alopecia. J Am Acad Dermatol. 2021;85(2):478-480. doi:10.1016/j.jaad.2018.04.032.

Table SIII. *Excluded studies and reasons for exclusion*

ID	Article	Reason for exclusion
1	Agner M, Obeime I, Larrondo J, McMichael A. Severity of hair loss and quality of life for patients with central centrifugal cicatricial alopecia. J Eur Acad Dermatol Venereol. 2024;38:e979-e980.	Did not assess comorbidities
2	Antunes-Duarte S, Oliveira-Soares R. Central centrifugal cicatricial alopecia: a subtype of lichen planopilaris in African descent? Port J Dermatol Venereol. 2024;82(3):149-155.	Did not assess comorbidities
3	Lubov JE, Okereke UR, Clapp B, Toyohara J, Taiwo D, Kakpovbia E, Lo Sicco K, Adotama P. Central centrifugal cicatricial alopecia in Black men: A case series highlighting key clinical features in this cohort. JAAD Case Rep. 2023;38:27-31. doi:10.1016/j.jdcr.2023.05.023.	Did not assess comorbidities
4	Collins MS, Ali S, Wiss IP, Senna MM. Response to Weinstein's "Reply of Increased risk of vitamin D deficiency and insufficiency in Black patients with central centrifugal cicatricial alopecia." J Am Acad Dermatol. 2022;87(6):e233-e234. doi:10.1016/j.jaad.2022.08.016.	Did not assess comorbidities
5	Leung B, Lindley L, Reisch J, Glass DA 2nd, Ayoade K. Comorbidities in patients with central centrifugal cicatricial alopecia: a retrospective chart review of 53 patients. J Am Acad Dermatol. 2023;88(2):461-463. doi:10.1016/j.jaad.2022.06.013.	Duplicate records
6	Cunningham C, Thompson KG, Murina AT. Perifollicular pink halo: A potential dermoscopic marker of inflammation in central centrifugal cicatricial alopecia. J Am Acad Dermatol. [abstract]. Abstract No. 15460.	Did not assess comorbidities
7	Geisler AN, Taye M, Larrondo J, Mayo TT, Aguh C, McMichael A, MacKelfresh JB, Krueger L. Updates on disorders in curly hair. Int J Dermatol. 2024;63:1145-1154. doi:10.1111/ijd.17184.	Literature review
8	Leung BW, Glass DA II, Ayoade K. Response to "Lack of association between comorbidities and central centrifugal cicatricial alopecia: a retrospective cohort study of 153 patients". J Am Acad Dermatol. 2023;89(6):e283. doi:10.1016/j.jaad.2023.07.1041.	Did not assess comorbidities
9	Green M, Feschuk A, Valdebran M. Risk factors and comorbidities associated with central centrifugal cicatricial	Overlapping population

ID	Article	Reason for exclusion
	alopecia. Int J Womens Dermatol. 2023;9:e108. doi:10.1097/JW9.0000000000000108.	
10	Chan J, Coias JL, Wyles SP. Central centrifugal cicatricial alopecia and the impact of wig prosthesis on patient quality of life: a case report with medical insurance appeal letter. Int J Womens Dermatol. 2023;9:e102. doi:10.1097/JW9.0000000000000102.	Case report
11	Okwundu N, Ogbonna C, McMichael AJ. Seborrheic dermatitis as a potential trigger of central centrifugal cicatricial alopecia: a review of literature. Skin Appendage Disord. 2023;9:13-17. doi:10.1159/000526216.	Literature review
12	Aguh C, Dina Y, Talbot CC Jr, Garza L. Fibroproliferative genes are preferentially expressed in central centrifugal cicatricial alopecia. J Am Acad Dermatol. 2018;79(5):904-912. doi:10.1016/j.jaad.2018.05.1257.	Did not assess comorbidities
13	Wang KL, Pincelli TP, Wentworth AB, White LJ, Li Z, Sokumbi O, Bruce AJ. Central centrifugal cicatricial alopecia: retrospective case-control study of 54 patients from a tertiary care center. Int J Womens Dermatol. 2025;11:e206. doi:10.1097/JW9.0000000000000206.	Did not assess comorbidities

Table SIV. *Characteristics of studies included in the systematic review and meta-analysis of comorbidities in central centrifugal cicatricial alopecia (CCCA)*

The table summarizes the key characteristics of all studies included in the qualitative synthesis and quantitative analyses. Information is provided on data source, journal and year of publication, country, publication type, study design, sample size (cases and controls, when applicable), matching variables, comorbidities assessed, and reported funding sources and conflict of interest (CoI) disclosures, as stated in the original publications.

The evidence base comprises mainly retrospective case–control studies, together with cross-sectional studies and case series reporting descriptive prevalence data. Studies without a comparator group (controls) were included only in prevalence analyses and were excluded from association meta-analyses.

Matching variables are reported when available; NR indicates not reported and NA indicates not applicable. Funding information and CoI statements are reproduced verbatim from the original articles and were not independently verified.

Abbreviations: NA, not applicable; NR, not reported; EHR, electronic health records; EMR, electronic medical records; CoI, conflict of interest.

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
ID 1	Ong et al.	TriNetX research network (EHR database) / multicenter	Skin Appendage Disorders / 2025	United States	Full text	Case–control / retrospective	5811 / 5811	Age, age at diagnosis	Diabetes type 1; autoimmune thyroiditis; systemic lupus erythematosus; vitiligo; rheumatoid arthritis with rheumatoid factor; other rheumatoid arthritis;	None / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
									scleroderma; Sjögren's; myasthenia gravis; celiac disease; ulcerative colitis; multiple sclerosis; polymyalgia rheumatica	
ID 2	Grimes et al.	Skin Pathology Laboratory, Boston University / single-center	Journal of the American Academy of Dermatology / 2024	United States	Letter	Case–control / retrospective	79 / 25	NR	Diabetes type 2; thyroid disease; hypertension, systemic lupus erythematosus, carcinomas	None / Yes
ID 3	Joshi et al.	All of Us Research Program (EHR/EMR database; manual chart review within database) / multicenter	International Journal of Dermatology / 2024	United States	Letter	Case–control / retrospective	201 / 201	Age, race, ethnicity, gender	Hyperlipidemia; Hypertension; Diabetes type 2; Allergic rhinitis; Asthma; Atopic dermatitis; Anxiety; Depression; Autoimmune conditions	None / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
ID 4	Leung et al.	UT Southwestern Medical Center chart review with Dallas Heart Study population controls / single-center	Journal of the American Academy of Dermatology / 2023	United States	Letter	Case–control / retrospective	53 / 212	Age	Hyperlipidemia; Hypertension; Obesity; Diabetes type 2; Allergic rhinitis; Anxiety; Vitamin D deficiency; Malignancy; Gastroesophageal reflux disease; Asthma; Sleep disorders; Hypothyroidism; Anemia; Hirsutism; Seborrheic dermatitis; Acne; Iron deficiency; Systemic lupus erythematosus; Vitiligo	None / No
ID 5	Jafari et al.	Tulane University dermatology clinic chart review / single-center	Journal of the American Academy of Dermatology / 2023	United States	Letter	Case–control / retrospective	153 / 153	Age, sex, ethnicity, insurance status	Hypertension; Obesity; Peripheral artery disease; Dyslipidemia; Diabetes type 2; Hyperparathyroidism; Adrenal nodule; Hidradenitis suppurativa; HIV; Autoimmune disorder (systemic lupus erythematosus; discoid lupus erythematosus; sarcoidosis; Crohn’s disease;	None / Yes

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
									vitiligo; Sjögren syndrome; Hashimoto's thyroiditis; Graves' disease); Hormonally driven diagnosis (endometrial hyperplasia; uterine leiomyoma; hirsutism); Psychiatric disease (bipolar disorder; major depressive disorder; generalized anxiety disorder; schizophrenia); Seborrheic dermatitis; History of bacterial scalp infection; History of fungal scalp infection	
ID 6	McKenzie et al.	Dermatology Department, Perelman School of Medicine (University of Pennsylvania) chart review /	Journal of Dermatology / 2021	United States	Letter	Case–control / retrospective	270 / 153	NR	Anxiety; Depression	NR / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		single-center								
ID 7	Samrao et al.	Kaiser Permanente Northern California EHR (biopsy-confirmed cases with manual chart review) / multicenter	Dermatology Online Journal / 2021	United States	Full text	Case–control / retrospective	427 / 1281	Age, sex	Diabetes mellitus (overall); Hypertension; Lung disease; Atherosclerosis; Liver disease; Cirrhosis; Non-alcoholic steatohepatitis; Uterine leiomyoma; Overweight; Obesity	NR / NR
ID 8	Kyei et al.	Community-based population survey with scalp examination (Cleveland, Ohio; churches/health fair) / single-center	Archives of Dermatology / 2011	United States	Full text	Case–control / prospective	52 / 224	NR	Diabetes type 2; Thyroid disease; Bacterial skin infection; Tinea corporis; Tinea capitis; Vaginal yeast infection; Acne; Hirsutism; Keloid formation; Seborrheic dermatitis; Atopic dermatitis; Contact dermatitis (from chemical relaxers)	Public and Private / No
ID 9	Roche et al.	Epic Clarity EHR database, Hospital	Journal of the	United States	Letter	Case–control /	181 / 16454	Race, age,	Diabetes type 2	None / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		of the University of Pennsylvania / single-center	American Academy of Dermatology / 2022			retrospective		sex; obesity controlled (BMI ≥30)		
ID 10	Dina et al.	Johns Hopkins Hospital Epic SlicerDicer EHR query / single-center	JAMA Dermatology / 2018	United States	Letter	Case–control / retrospective	447 / 486657	Race, age, sex	Uterine leiomyomas	Public / No
ID 11	Narasimman et al.	University dermatology outpatient clinic chart review (University of Miami) / single-center	International Journal of Trichology / 2020	United States	Full text	Case–control / retrospective	74 / 96	Age, sex, race	Diabetes mellitus (overall); Hypertension; Uterine leiomyomas (fibroids)	None / No
ID 12	Brown-Korsah et al.	University of Pennsylvania Health System	Journal of the American	United States	Letter	Case–control / retrospectiv	742 / 224674	Race, age, sex	Breast cancer; Colorectal cancer	Public / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		EPIC Clarity database (EHR) / single-center	Academy of Dermatology / 2021			e				
ID 13	Bala et al.	Hair clinic, London secondary care centre (Charing Cross Hospital, Imperial College Healthcare NHS Trust) / single-center	Clinical and Experimental Dermatology / 2025	United Kingdom	Letter	Case series / retrospective	10 / NA	NA	Uterine leiomyoma	None / No
ID 14	Onamusi et al.	Specialty alopecia clinic chart review, Wake Forest School of Medicine / single-center	Archives of Dermatological Research / 2023	United States	Full text	Case series / retrospective	100 / NA	NA	Seborrheic dermatitis; Anemia; Thyroid disease; Diabetes mellitus (overall)	Public / Yes
ID	Collins	Specialty alopecia	Journal of	United	Letter	Case series	27 / NA	NA	Vitamin D deficiency	None / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
15	et al.	clinic chart review, Massachusetts General Hospital / single-center	the American Academy of Dermatology / 2022	States		/ retrospective				
ID 16	Hagigeorges et al.	Specialty alopecia clinic intake forms review, Massachusetts General Hospital / single-center	Journal of the American Academy of Dermatology / 2019	United States	Abstract	Case series / retrospective	13 / NA	NA	Uterine leiomyomas (fibroids); Macromastia; Breast cancer	None / NR
ID 17	Ayandibu et al.	Cleveland Clinic dermatology clinic chart review with NHANES III historical controls	Journal of the American Academy of Dermatol	United States	Abstract	Cross-sectional / retrospective	90 / NA	NA	Metabolic syndrome; Obesity; Hypertension; Dyslipidemia	NR / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		/ single-center	ogy / 2018							
ID 18	Suchonwanit et al.	Hair Loss Clinic, Wake Forest School of Medicine / single-center	International Journal of Dermatology / 2016	United States	Full text	Cross-sectional / prospective	38 / NA	NA	Acne; Hirsutism; Keloid; Bacterial infection; Tinea capitis; Tinea corporis; Vulvovaginal candidiasis; Contact dermatitis; Seborrheic dermatitis; Diabetes mellitus type 2; Thyroid disease	None / No
ID 19	Shah et al.	St. Luke's-Roosevelt Hospital Center; Skin of Color Center / single-center	Journal of Cutaneous Medicine and Surgery / 2010	United States	Full text	Cross-sectional / retrospective	69 / NA	NA	Seborrheic dermatitis; Traction alopecia; Androgenetic alopecia; Acne keloidalis nuchae; Folliculitis decalvans	None / No conflicts of interest declared
ID 20	Balazic et al.	Montefiore Medical Center (Albert Einstein College of Medicine) chart review / single-	JAAD International / 2023	United States	Letter	Cross-sectional / retrospective	185 / NA	NA	Diabetes mellitus type 2; Hyperlipidemia; Hyperthyroidism; Hypothyroidism; Thyroid condition (other); Hypertension	None / Yes

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		center								
ID 21	Ali et al.	Specialty alopecia clinic electronic medical record review / single-center	Journal of the American Academy of Dermatology / 2022	United States	Letter	Case series / retrospective	35 / NA	NA	Diabetes type 2; Prediabetes	None / No
ID 22	Jackson et al.	Academic dermatology department chart review, University of Pennsylvania / single-center	Journal of the American Academy of Dermatology / 2023	United States	Full text	Case series / retrospective	17 / NA	NA	Latent tuberculosis; Androgenetic alopecia; Lichen planopilaris; Diabetes type 2 absent	None / No
ID 23	Conic et al.	Cleveland Clinic Foundation electronic health record (tertiary	Journal of the American Academy	United States	Full text	Cross-sectional / retrospective	29 / NA	NA	Vitamin D deficiency	Public / No

ID	Study	Source	Journal / year	Country	Type of publication	Type of study	Cases/controls	Match	Comorbidities	Funding (type) / Conflict of interest
		hair loss clinic) / single-center	of Dermatology / 2021							

Table SV. *Comorbidities reported in cross-sectional studies and case series of patients with central centrifugal cicatricial alopecia (CCCA)*
This table summarizes descriptive prevalence data on comorbidities reported in cross-sectional studies and case series of patients with central centrifugal cicatricial alopecia (CCCA). For each comorbidity, the table reports the study identifier, first author and year, disease subtype, number of CCCA cases, mean age, number of female patients, number of events, and event proportion within each study.

Comorbidities are grouped by clinical domain, including cardiovascular risk factors, metabolic disorders, inflammatory dermatoses, gynecologic and hormonal conditions, thyroid disorders, infectious diseases, other cicatricial alopecias, and miscellaneous systemic conditions. Studies without a comparator group were included exclusively for descriptive purposes and were not considered in association meta-analyses.

Percentages represent the proportion of affected individuals among CCCA cases within each study. NR indicates data not reported.

Abbreviations: CCCA, central centrifugal cicatricial alopecia; NR, not reported; LPP, lichen planopilaris; AK, acne keloidalis.

Comorbidities	ID	Study	Subtype	Cases (n)	Mean Age	Female (n)	Events (n)	Event
Cardiovascular risk factors								
Hypertension	ID 14	Onamusi et al., 2023.	CCCA	100	49.93	100	13	13%
	ID 17	Ayandibu & Bergfeld, 2018	CCCA	90	NR	90	43	48%
	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	95	51.30%

Comorbidities	ID	Study	Subtype	Cases (n)	Mean Age	Female (n)	Events (n)	Event
Diabetes (overall)	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	4	10.50%
	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	44	23.70%
	ID 21	Ali et al., 2022	CCCA	35	49.2	32	10	28.60%
	ID 22	Jackson et al., 2023	CCCA	17	43	0	0	0%
Hyperglycemia/prediabetes	ID 17	Ayandibu & Bergfeld, 2018	CCCA	90	NR	90	23	25%
	ID 21	Ali et al., 2022	CCCA	35	49.2	32	10	28.60%
Dyslipidemia	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	65	35.10%
Metabolic syndrome	ID 17	Ayandibu & Bergfeld, 2018	CCCA	90	NR	90	35	38.80%
Obesity	ID 17	Ayandibu & Bergfeld, 2018	CCCA	90	NR	90	50	56%
Other cicatricial alopecias								
LPP	ID 22	Jackson et al., 2023	CCCA	17	43	0	2	11.80%
Folliculitis Decalvans	ID 19	Shah & Alexis, 2010	CCCA	69	38.2	67	1	1.40%

Comorbidities	ID	Study	Subtype	Cases (n)	Mean Age	Female (n)	Events (n)	Event
AK	ID 19	Shah & Alexis, 2010	CCCA	69	38.2	67	2	2.90%
Traction alopecia	ID 19	Shah & Alexis, 2010	CCCA	69	38.2	67	6	8.70%
Inflammatory dermatoses								
Acne	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	25	65.80%
Seborrheic dermatitis	ID 14	Onamusi et al., 2023.	CCCA	100	49.93	100	39	39%
	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	22	57.90%
	ID 19	Shah & Alexis, 2010	CCCA	69	38.2	67	13	18.80%
Contact dermatitis	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	6	15.80%
Gynecologic / Hormonal disorders								
Uterine Leiomyoma	ID 13	Bala et al., 2025	CCCA	10	58	10	8	80%
	ID 16	Hagigeorges et al., 2019	CCCA	13	46	12	9	75%
Androgenetic alopecia	ID 19	Shah & Alexis, 2010	CCCA	69	38.2	67	4	5.80%

Comorbidities	ID	Study	Subtype	Cases (n)	Mean Age	Female (n)	Events (n)	Event
	ID 22	Jackson et al., 2023	CCCA	17	43	0	2	11.80%
Macromastia	ID 16	Hagigeorges et al., 2019	CCCA	13	46	12	1	13%
Hirsutism	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	14	36.80%
Thyroid disorders								
Thyroid disease	ID 14	Onamusi et al., 2023.	CCCA	100	49.93	100	16	16%
	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	3	7.90%
Hypothyroidism	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	6	3.20%
Hyperthyroidism	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	1	0.50%
Other thyroid disorders	ID 20	Balazic et al., 2023	CCCA	185	53.7	185	4	2.20%
Infectious diseases								
Tinea capitis	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	1	2.60%
Ringworm	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	4	10.50%

Comorbidities	ID	Study	Subtype	Cases (n)	Mean Age	Female (n)	Events (n)	Event
Vaginal yeast	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	23	60.50%
Bacterial infections	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	2	5.30%
Tuberculosis	ID 22	Jackson et al., 2023	CCCA	17	43	0	3	17.60%
Other diseases								
Keloid	ID 18	Suchonwanit et al., 2016	CCCA	38	45.8	38	12	31.60%
Vitamin D deficiency	ID 15	Collins et al., 2022	CCCA	27	NR	NR	27	92.59%
	ID 23	Conic et al., 2021	CCCA	29	55.2	29	23	79%
Anemia	ID 14	Onamusi et al., 2023.	CCCA	100	49.93	100	30	30%
Breast cancer	ID 16	Hagigeorges et al., 2019	CCCA	13	46	12	1	13%

Table SVI. *Comorbidities in patients with central centrifugal cicatricial alopecia (CCCA): case–control studies*

This table summarizes case–control studies reporting comorbidities in patients with central centrifugal cicatricial alopecia (CCCA). For each comorbidity, the table details the study identifier, first author and year, CCCA subtype, number of cases and controls, number of events in cases and controls, mean age, sex distribution, and study-level odds ratios (ORs) with 95% confidence intervals (CIs) when reported in the original publication.

Comorbidities are grouped by clinical domain, including cardiovascular and metabolic risk factors, psychiatric disorders, autoimmune and inflammatory diseases, endocrine and hormonal conditions, infections, malignancies, and other systemic disorders. Odds ratios are shown only when explicitly reported or directly extractable from the original studies; cells marked as NR indicate that the effect estimate was not reported or could not be reliably derived.

This table provides the study-level evidence base used for the quantitative synthesis of association outcomes. Meta-analytic pooled estimates derived from these data are presented separately in the Results section and in Supplementary Table S9.

Abbreviations: CCCA, central centrifugal cicatricial alopecia; OR, odds ratio; CI, confidence interval; NR, not reported; EHR, electronic health records.

Comorbidities	ID	Study	Subtype	Cases (n)	Events cases	Mean age cases	Female cases (n)	Control (n)	Events controls	Mean age controls	Female controls (n)	OR	95% CI
Cardiovascular risk factors													
Hypertension	ID 2	Grimes et al. (2024)	CCCA	79	20	54	78	25	6	52	24	NR	NR

	ID 3	Joshi et al. (2024)	CCCA	201	122	55.4	192	201	46	55.4	192	5.2	3.37–8.03
	ID 4	Leung et al. (2023)	CCCA	53	37	51.3	53	212	123	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	129	57.2	153	153	126	56.8	153	NR	NR
	ID 7	Samrao et al. (2021)	CCCA	427	240	50.1	427	1281	751	50.1	1281	NR	NR
	ID 11	Narasimman et al. (2020)	CCCA	74	45	46.9	74	96	54	47.4	96	NR	NR
Diabetes type 1	ID 1	Ong et al. (2025)	CCCA	5811	166	53.3	5811	5811	281	49.9	5811	NR	NR
	ID 2	Grimes et al. (2024)	CCCA	79	15	54	78	25	0	52	24	NR	NR
Diabetes type 2	ID 3	Joshi et al. (2024)	CCCA	201	94	55.4	192	201	27	55.4	192	5.66	3.46–9.25
	ID 4	Leung et al. (2023)	CCCA	53	13	51.3	53	212	43	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	77	57.2	153	153	72	56.8	153	NR	NR
	ID 7	Samrao et al. (2021)	CCCA	427	79	50.1	427	1281	268	50.1	1281	NR	NR

	ID 8	Kyei et al. (2011)	CCCA	52	9	58	52	224	13	40	224	NR	NR
	ID 9	Roche et al. (2022)	CCCA	181	105	57	181	16454	7002	55	16454	1.86	1.39–2.51
	ID 11	Narasimman et al. (2020)	CCCA	74	17	46.9	74	96	21	47.4	96	NR	NR
Dyslipidemia	ID 3	Joshi et al. (2024)	CCCA	201	161	55.4	192	201	64	55.4	192	8.62	5.46–13.59
	ID 4	Leung et al. (2023)	CCCA	53	35	51.3	53	212	35	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	74	57.2	153	153	71	56.8	153	NR	NR
Overweight	ID 7	Samrao et al. (2021)	CCCA	427	321	50.1	427	1281	884	50.1	1281	NR	NR
Obesity	ID 4	Leung et al. (2023)	CCCA	53	34	51.3	53	212	120	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	44	57.2	153	153	44	56.8	153	NR	NR
	ID 7	Samrao et al. (2021)	CCCA	427	54	50.1	427	1281	179	50.1	1281	NR	NR

Non-alcoholic steatohepatitis	ID 7	Samrao et al. (2021)	CCCA	427	8	50.1	427	1281	33	50.1	1281	NR	NR
Cardiovascular disease													
Atherosclerosis	ID 7	Samrao et al. (2021)	CCCA	427	89	50.1	427	1281	252	50.1	1281	NR	NR
Peripheral artery disease	ID 5	Jafari et al. (2023)	CCCA	153	6	57.2	153	153	5	56.8	153	NR	NR
Psychiatric													
Anxiety	ID 3	Joshi et al. (2024)	CCCA	201	105	55.4	192	201	34	55.4	192	5.37	3.39–8.52
	ID 4	Leung et al. (2023)	CCCA	53	6	51.3	53	212	0	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	9	57.2	153	153	6	56.8	153	NR	NR
Anxiety/depression	ID 6	McKenzie et al. (2021)	CCCA	270	27	NR	270	84	10	NR	84	0.82	0.38–1.70
	ID 6	McKenzie et al. (2021)	CCCA	270	27	NR	270	69	7	NR	69	0.98	0.41–2.36

Depression	ID 3	Joshi et al. (2024)	CCCA	201	97	55.4	192	201	45	55.4	192	3.23	2.10–4.98
	ID 5	Jafari et al. (2023)	CCCA	153	18	57.2	153	153	17	56.8	153	NR	NR
Bipolar disorder	ID 5	Jafari et al. (2023)	CCCA	153	3	57.2	153	153	0	56.8	153	NR	NR
Sleep disorders	ID 4	Leung et al. (2023)	CCCA	53	3	51.3	53	212	0	50.3	212	NR	NR
Schizophrenia	ID 5	Jafari et al. (2023)	CCCA	153	4	57.2	153	153	0	56.8	153	NR	NR
Neurologic autoimmune disorders													
Multiple sclerosis	ID 1	Ong et al. (2025)	CCCA	5811	46	53.3	5811	5811	31	49.9	5811	NR	NR
Myasthenia gravis	ID 1	Ong et al. (2025)	CCCA	5811	16	53.3	5811	5811	19	49.9	5811	NR	NR
Systemic autoimmune diseases													
Autoimmune overall	ID 3	Joshi et al. (2024)	CCCA	201	51	55.4	192	201	<20	55.4	192	4.92	2.58–9.34
	ID 4	Leung et al.	CCCA	53	1	51.3	53	212	0	50.3	212	NR	NR

		(2023)											
	ID 5	Jafari et al. (2023)	CCCA	153	35	57.2	153	153	25	56.8	153	NR	NR
Rheumatoid arthritis	ID 1	Ong et al. (2025)	CCCA	5811	37	53.3	5811	5811	40	49.9	5811	NR	NR
Systemic lupus erythematosus	ID 1	Ong et al. (2025)	CCCA	5811	105	53.3	5811	5811	80	49.9	5811	NR	NR
	ID 2	Grimes et al. (2024)	CCCA	79	0	54	78	25	0	52	24	NR	NR
	ID 4	Leung et al. (2023)	CCCA	53	1	51.3	53	212	0	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	10	57.2	153	153	4	56.8	153	NR	NR
Sjögren syndrome	ID 1	Ong et al. (2025)	CCCA	5811	81	53.3	5811	5811	62	49.9	5811	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	3	57.2	153	153	0	56.8	153	NR	NR
Discoid lupus	ID 5	Jafari et al. (2023)	CCCA	153	1	57.2	153	153	3	56.8	153	NR	NR
Rheumatoid	ID 1	Ong et al.	CCCA	581	144	53.3	5811	5811	160	49.9	5811	NR	NR

arthritis other		(2025)		1									
Polymyalgia rheumatica	ID 1	Ong et al. (2025)	CCCA	5811	10	53.3	5811	5811	20	49.9	5811	NR	NR
Sarcoidosis	ID 5	Jafari et al. (2023)	CCCA	153	6	57.2	153	153	2	56.8	153	NR	NR
Fibrosing disorders													
Scleroderma	ID 1	Ong et al. (2025)	CCCA	5811	21	53.3	5811	5811	20	49.9	5811	NR	NR
Scar formation / keloid	ID 8	Kyei et al. (2011)	CCCA	52	2	58	52	224	9	40	224	NR	NR
Inflammatory dermatoses													
Seborrheic dermatitis	ID 4	Leung et al. (2023)	CCCA	53	1	51.3	53	212	0	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	30	57.2	153	153	28	56.8	153	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	14	58	52	224	54	40	224	NR	NR
Hidradenitis suppurativa	ID 5	Jafari et al. (2023)	CCCA	153	4	57.2	153	153	4	56.8	153	NR	NR

Acne	ID 5	Jafari et al. (2023)	CCCA	153	1	57.2	153	153	0	56.8	153	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	38	58	52	224	154	40	224	NR	NR
Autoimmune dermatoses													
Vitiligo	ID 4	Leung et al. (2023)	CCCA	53	1	51.3	53	212	0	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	2	57.2	153	153	2	56.8	153	NR	NR
	ID 1	Ong et al. (2025)	CCCA	5811	47	53.3	5811	5811	48	49.9	5811	NR	NR
Atopy													
Atopic dermatitis	ID 3	Joshi et al. (2024)	CCCA	201	14	55.4	192	201	3	55.4	192	4.94	1.40-17.47
	ID 8	Kyei et al. (2011)	CCCA	52	2	58	52	224	34	40	224	NR	NR
Asthma	ID 3	Joshi et al. (2024)	CCCA	201	61	55.4	192	201	22	55.4	192	3.55	2.08–6.05
	ID 4	Leung et al. (2023)	CCCA	53	4	51.3	53	212	0	50.3	212	NR	NR

Allergic rhinitis	ID 3	Joshi et al. (2024)	CCCA	201	83	55.4	192	201	21	55.4	192	6.03	3.54–10.26
	ID 4	Leung et al. (2023)	CCCA	53	6	51.3	53	212	0	50.3	212	NR	NR
Contact dermatitis (allergic)	ID 8	Kyei et al. (2011)	CCCA	52	6	58	52	224	18	40	224	NR	NR
Thyroid diseases													
Thyroid disease	ID 1	Ong et al. (2025)	CCCA	5811	44	53.3	5811	5811	38	49.9	5811	NR	NR
	ID 2	Grimes et al. (2024)	CCCA	79	4	54	78	25	1	52	24	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	4	58	52	224	20	40	224	NR	NR
Hypothyroidism	ID 4	Leung et al. (2023)	CCCA	53	3	51.3	53	212	0	50.3	212	NR	NR
Hashimoto disease	ID 5	Jafari et al. (2023)	CCCA	153	8	57.2	153	153	8	56.8	153	NR	NR
Graves disease	ID 5	Jafari et al. (2023)	CCCA	153	3	57.2	153	153	6	56.8	153	NR	NR

Other endocrine disorders													
Hyperparathyroidism	ID 5	Jafari et al. (2023)	CCCA	153	6	57.2	153	153	6	56.8	153	NR	NR
Adrenal nodule	ID 5	Jafari et al. (2023)	CCCA	153	4	57.2	153	153	3	56.8	153	NR	NR
Hormone-related conditions													
Endometrial hyperplasia	ID 5	Jafari et al. (2023)	CCCA	153	4	57.2	153	153	0	56.8	153	NR	NR
Hirsutism	ID 4	Leung et al. (2023)	CCCA	53	2	51.3	53	212	0	50.3	212	NR	NR
	ID 5	Jafari et al. (2023)	CCCA	153	5	57.2	153	153	1	56.8	153	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	22	58	52	224	117	40	224	NR	NR
Uterine leiomyomas	ID 5	Jafari et al. (2023)	CCCA	153	8	57.2	153	153	6	56.8	153	NR	NR
	ID 7	Samrao et al. (2021)	CCCA	427	121	50.1	427	1281	313	50.1	1281	NR	NR
	ID 10	Dina et al. (2018)	CCCA	447	62	48.4	447	486657	16212	47	486657	4.68	3.57–6.12

	ID 11	Narasimman et al. (2020)	CCCA	74	14	46.9	74	96	7	47.4	96	NR	NR
Inflammatory bowel disease													
Crohn disease	ID 5	Jafari et al. (2023)	CCCA	153	2	57.2	153	153	0	56.8	153	NR	NR
Ulcerative colitis	ID 1	Ong et al. (2025)	CCCA	5811	25	53.3	5811	5811	45	49.9	5811	NR	NR
Other gastrointestinal diseases													
Celiac disease	ID 1	Ong et al. (2025)	CCCA	5811	10	53.3	5811	5811	12	49.9	5811	NR	NR
Gastroesophageal reflux disease	ID 4	Leung et al. (2023)	CCCA	53	4	51.3	53	212	0	50.3	212	NR	NR
Liver disease													
Liver disease	ID 7	Samrao et al. (2021)	CCCA	427	8	50.1	427	1281	34	50.1	1281	NR	NR
Malignancies													
Carcinomas	ID 2	Grimes et al. (2024)	CCCA	79	1	54	78	25	0	52	24	NR	NR

	ID 4	Leung et al. (2023)	CCCA	53	5	51.3	53	212	0	50.3	212	NR	NR
Breast cancer	ID 12	Brown-Korsah et al., 2021	CCCA	742	35	62.9	742	224674	4079	62.3	224674	2.61	1.78–3.68
Colorectal cancer	ID 12	Brown-Korsah et al., 2021	CCCA	742	1	62.9	742	224674	701	62.3	224674	0.48	0.027–2.10
Infections													
HIV	ID 5	Jafari et al. (2023)	CCCA	153	7	57.2	153	153	8	56.8	153	NR	NR
Bacterial infection	ID 5	Jafari et al. (2023)	CCCA	153	12	57.2	153	153	9	56.8	153	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	10	58	52	224	22	40	224	NR	NR
Fungal infection	ID 5	Jafari et al. (2023)	CCCA	153	13	57.2	153	153	11	56.8	153	NR	NR
	ID 8	Kyei et al. (2011)	CCCA	52	11	58	52	224	48	40	224	NR	NR

Yeast infection	ID 8	Kyei et al. (2011)	CCCA	52	21	58	52	224	112	40	224	NR	NR
Other diseases													
Vitamin D deficiency	ID 4	Leung et al. (2023)	CCCA	53	5	51.3	53	212	0	50.3	212	NR	NR
Anemia	ID 4	Leung et al. (2023)	CCCA	53	3	51.3	53	212	0	50.3	212	NR	NR
Iron deficiency	ID 4	Leung et al. (2023)	CCCA	53	1	51.3	53	212	0	50.3	212	NR	NR
Lung diseases	ID 7	Samrao et al. (2021)	CCCA	427	0	50.1	427	1281	12	50.1	1281	NR	NR
End stage renal disease	ID 7	Samrao et al. (2021)	CCCA	427	5	50.1	427	1281	15	50.1	1281	NR	NR

Table SVII. Methodological quality assessment of included prevalence studies using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Prevalence or Case-control Studies

Methodological quality of the included prevalence studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Prevalence Studies.

Assessment items

Q1. Was the sample frame appropriate to address the target population?

Q2. Were study participants sampled in an appropriate way?

Q3. Was the sample size adequate?

Q4. Were the study subjects and the setting described in detail?

Q5. Was the data analysis conducted with sufficient coverage of the identified sample?

Q6. Were valid methods used for the identification of the condition?

Q7. Was the condition measured in a standard, reliable way for all participants?

Q8. Was there appropriate statistical analysis?

Q9. Was the response rate adequate, and if not, was the low response rate managed appropriately?

ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	JBI score
ID 1	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	7
ID 2	Yes/Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	7
ID 3	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	7
ID 4	Yes/Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	7
ID 5	Yes/Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	7
ID 6	Yes/Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	6

ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	JBI score
ID 7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	8
ID 8	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	7
ID 9	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	7
ID 10	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	7
ID 11	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	6
ID 12	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	8
ID 13	No	Unclear	No	Yes	Yes	Unclear	Yes	Yes	Unclear	4
ID 14	Yes/Unclear	Unclear	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	4
ID 15	Yes/Unclear	Yes	Yes	Yes	Yes	No	Yes	Yes	Unclear	6
ID 16	Yes/Unclear	Yes	Unclear	Yes	Yes	No	Unclear	No	Unclear	3
ID 17	Yes/Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	5
ID 18	Yes/Unclear	Yes	Unclear	Yes	Yes	No	Yes	Yes	Unclear	5
ID 19	Yes/Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	6
ID 20	No	No	No	Yes	Yes	No	Yes	Yes	Unclear	4
ID 21	Unclear	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Unclear	5
ID 22	Unclear	Yes	No	Yes	Yes	Yes	Yes	Unclear	Unclear	5
ID 23	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	6

Table SVIII. Pooled prevalence of comorbidities in patients with central centrifugal cicatricial alopecia (CCCA)

Pooled prevalence estimates were obtained using random-effects meta-analyses based on generalized linear mixed models. Heterogeneity was assessed using the I^2 statistic and τ^2. Outcomes reported by fewer than three studies should be interpreted with caution.

Outcome	k	Pooled prevalence (95% CI)	I^2 (%)	τ^2	*p* for heterogeneity
Hypertension	9	0.52 (0.34–0.70)	93.9	0.90	<0.001
Dyslipidemia	4	0.58 (0.29–0.83)	96.2	0.56	<0.001
Obesity	4	0.37 (0.11–0.74)	97.1	0.95	<0.001
Diabetes (overall)	4	0.16 (0.04–0.45)	20.6	0.37	0.29
Thyroid disease	5	0.05 (0.01–0.18)	96.8	1.21	<0.001
Uterine leiomyomas	6	0.28 (0.08–0.64)	92.9	1.89	<0.001
Seborrheic dermatitis	6	0.23 (0.08–0.49)	86.7	1.14	<0.001
Anxiety	4	0.18 (0.04–0.57)	96.5	1.13	<0.001
Hirsutism	4	0.13 (0.01–0.63)	93.3	2.05	<0.001
Systemic lupus erythematosus	4	0.02 (0.01–0.09)	80.4	0.43	0.002
Vitiligo	3	0.01 (0.005–0.02)	0.0	0.00	0.57
Autoimmune disorders (overall)	3	0.13 (0.01–0.74)	74.9	1.11	0.019
Acne	3	0.25 (<0.001–0.99)	93.9	7.72	<0.001
Vitamin D deficiency	3	0.82 (<0.001–1.00)	93.4	11.28	<0.001
Hyperglycemia / prediabetes	2	0.26 (0.03–0.83)	0.0	0.00	0.73
Depression	2	0.26 (<0.001–1.00)	97.8	0.93	<0.001
Allergic rhinitis	2	0.24 (<0.001–1.00)	92.8	0.66	<0.001

Outcome	k	Pooled prevalence (95% CI)	I^2 (%)	τ^2	*p* for heterogeneity
Asthma	2	0.17 (<0.001–1.00)	89.5	0.60	0.002
Anemia	2	0.15 (<0.001–1.00)	89.6	0.84	0.002
Fungal infection	2	0.13 (0.001–0.95)	82.3	0.18	0.017
Bacterial infection	2	0.12 (0.001–0.93)	79.8	0.15	0.026
Anxiety/depression	2	0.10 (0.08–0.13)	0.0	0.00	1.00
Diabetes type 1	2	0.07 (<0.001–1.00)	97.9	1.01	<0.001
Androgenetic alopecia	2	0.07 (<0.001–0.94)	0.0	0.00	0.40
Atopic dermatitis	2	0.06 (0.003–0.64)	0.0	0.00	0.42
Breast cancer	2	0.05 (0.006–0.30)	0.0	0.00	0.62
Carcinomas (overall)	2	0.04 (<0.001–1.00)	71.9	0.60	0.06
Hypothyroidism	2	0.04 (<0.001–0.75)	0.0	0.00	0.42
Sjögren syndrome	2	0.01 (0.004–0.05)	0.0	0.00	0.56

CCCA, central centrifugal cicatricial alopecia; CI, confidence interval; I^2, proportion of total variability due to between-study heterogeneity; τ^2, between-study variance.

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Table SIX. Summary of association meta-analyses between central centrifugal cicatricial alopecia (CCCA) and comorbidities

Pooled odds ratios (ORs) were calculated using random-effects meta-analyses of case–control studies. Heterogeneity was assessed using the I^2 statistic and τ^2. Outcomes reported by fewer than three studies should be interpreted with caution.

Outcome	k	Pooled OR (95% CI)	I^2 (%)	τ^2	p_heterogeneity
Diabetes type 2	7	1.70 (0.90–3.23)	88	0.41	<0.001
Hypertension	6	1.54 (0.88–2.69)	90.1	0.39	<0.001
Uterine leiomyomas	4	2.25 (1.10–4.58)	94.4	0.41	<0.001
Systemic lupus erythematosus	4	1.53 (0.90–2.58)	14	0.07	0.32
Anxiety	3	3.27 (1.22–8.79)	73.5	1.37	0.0231
Dyslipidemia	3	4.46 (1.09–18.25)	96	1.48	<0.001
Hirsutism	3	2.76 (0.37–20.68)	73	2.19	0.02
Seborrheic dermatitis	3	1.17 (0.76–1.80)	5	0.00	0.35
Thyroid disease	3	1.12 (0.75–1.67)	0	0.00	0.87
Obesity	3	0.98 (0.77–1.26)	0	0.00	0.48
Vitiligo	3	1.02 (0.69–1.51)	14	0.00	0.31
Allergic rhinitis	2	11.77 (1.55–89.24)	56	1.44	0.13
Asthma	2	7.43 (0.85–64.69)	59	1.69	0.12
Carcinomas	2	7.32 (0.16–333.99)	68	5.15	0.08
Autoimmune overall	2	2.29 (0.45–11.66)	36	0.77	0.21
Depression	2	1.93 (0.65–5.70)	86	0.53	0.01
Diabetes type 1	2	1.89 (0.10–34.75)	77	3.60	0.04
Bacterial infection	2	1.76 (0.96–3.22)	0	0.00	0.44
Sjögren syndrome	2	1.57 (0.57–4.33)	19	0.27	0.27
Acne	2	1.28 (0.66–2.48)	0	0.00	0.59

Outcome	k	Pooled OR (95% CI)	I^2 (%)	τ^2	p_heterogeneity
Atopic dermatitis	2	1.07 (0.05–22.33)	90	4.31	<0.001
Fungal infection	2	1.07 (0.62–1.87)	0	0.00	0.73
Anxiety/depression	2	0.80 (0.50–1.59)	0	0.00	0.76

CCCA, central centrifugal cicatricial alopecia; CI, confidence interval; I^2, proportion of total variability due to between-study heterogeneity; τ^2, between-study variance.

Table SX. PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	*Title page*
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	*Abstract*
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	*Reported on: Introduction, paragraphs 1–3*
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	*Reported on: Introduction, final paragraph*
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	*Methods – Eligibility criteria*
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	*Methods – Information sources and search strategy*
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	*Supplementary Table S1*
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	*Methods – Study selection and data extraction*
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	*Methods – Study selection and data extraction*
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	*Methods – Study selection and data extraction*
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	*Methods – Study selection and data extraction*