

What is the range, extent and type of evidence about topic steroid withdrawal in research literature and social media platforms?

A Protocol for an Evidence and Gap Map

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Background

Topical corticosteroids (TCS) have been the mainstay of treatment for many skin disorders, including chronic conditions such as atopic dermatitis (most common form of eczema), for more than 60 years. Research has shown that TCS are effective⁽¹⁾ but that their use is associated with a number of adverse effects such as atrophy, striae, rosacea, perioral dermatitis, acne and purpura.⁽²⁾ Topical steroid addiction (TSA) is also an adverse effect, first recognised by Sneddon⁽³⁾ in 1969 - although he did not use the word 'addiction'. According to Fukaya et al,⁽⁴⁾ the term 'addiction' was first used by Burry⁽⁵⁾ in Australia in 1973, who described how patients, like their skins, were 'hooked' on TCS and "...afraid to stop using the topical steroids because of the rebound inflammation that would follow" (p. 396). Writing in 1979, Kligman & Frosch⁽⁶⁾ described addiction as an "insidious type of side reaction," often unrecognised, as "both physician and patient may fail to incriminate the steroid" (p. 24). However since then, there has been increasing recognition of TSA and interest in topical steroid withdrawal (TSW), particularly amongst 'patients', as demonstrated by the growth in social media addressing the side effects on those who discontinue long-term use of TCS.^(7, 8, 9)

Within the medical and dermatological communities, there has also been some acknowledgement of TSW. For example, the National Eczema Society and British Association of Dermatologists⁽¹⁰⁾ published a joint statement on TSW in 2021 and, in the same year, the Medicines & Healthcare products Regulatory Agency (MHRA) issued a Drug Safety Alert advising patients to seek medical help if experiencing redness, burning, itching, stinging or peeling of the skin on stopping TCS, all of which are potentially indicative of a 'severe' type of TSW reaction.^(11, 12) The MHRA requested that warnings and precautions for use on TCS are added to the Summary of Product Characteristics and Patient Information Leaflet for prescription-only and pharmacy-only medicines.⁽¹²⁾ Despite these advances, TSA and TSW remains controversial in the medical community⁽¹³⁾ as "doubts still exist whether this condition is legitimate"⁽¹⁴⁾ (p. 1). There is no clear or accepted diagnostic criteria for TSW,^(13, 15, 16) and for many clinicians, it can be challenging to distinguish it from other conditions (e.g. allergic contact dermatitis),^(13, 17) and some see it as an "exacerbation of the underlying skin disease"⁽¹⁶⁾ (p. 551). According to Sheary,⁽¹⁶⁾ it is 'not widely accepted' within the medical community that there may be withdrawal symptoms associated with TCS cessation, and she argues that this may be because TCS have been traditionally recommended for intermittent flares of symptoms rather than long-term use. However, in practice, there are patients who use TCS for years and for some, length of use of TCS could be up to 40+ years.⁽¹⁵⁾

Sheary⁽¹⁶⁾ (p. 551) notes that TCS 'overuse' has never been defined; rather the focus of the literature is on 'inappropriate use' and 'underuse' of TCS,⁽¹⁸⁾ and how to encourage 'correct use'.⁽¹⁹⁾ The

'reluctance to use topical steroids as recommended'⁽²⁰⁾ (p. 1) has been attributed to 'steroid phobia' which has been defined as "...the negative feelings and beliefs related to TCSs experienced by patients and patients' caregivers"⁽²¹⁾ (p. E1). Patient concerns about TSA and TSW have been dismissed as steroid phobia,⁽²⁰⁾ and commonly believed to be a result of 'misinformation' available from a range of sources including health care workers, friends and family, print media, the internet and social media groups.^(21, 22) How medical professionals respond to patients' steroid concerns influences the quality of the 'doctor-patient' relationship, and patients have reported feeling 'ignored' and 'dismissed' by their doctors,⁽²²⁾ and 'blamed' for 'inappropriate use' of TCS.⁽²³⁾ Patients have a desire to be heard and their experiences validated,⁽²²⁾ and Tan et al⁽²²⁾ found that often a decision to stop TCS was not discussed with a doctor and that those no longer seeing their dermatologists cited reasons such as 'it wasn't a two-way conversation' and '[dermatologist] don't accept my opinion'.

Failure to address the growing discordance between patient concerns and healthcare professionals' response to TSWS alienates dermatology patients, discourages treatment adherence and increases steroid phobia.⁽²⁴⁾ (p. 1).

Many of those alienated from their doctors turn to social media for information and support.⁽²²⁾ Perhaps one of the most important websites is the International Topical Steroid Awareness Network (ITSAN), a non-profit charity that works to raise awareness about Topical Steroid Withdrawal Syndrome (TSWS) and is a global online community where members "comfort, share and support one another."⁽²⁵⁾ Scratch That, UK is another online community for TSW that also aims to provide information and support in an accessible online resource hub.⁽²⁶⁾ That people with TSW are increasingly engaging with social media is shown by the 274% increase in mentions of the hashtag #topicalsteroidwithdrawal on social media platforms between 2016 and 2020.⁽⁷⁾ Bowe et al⁽⁷⁾ suggests that an awareness of the influence of social media platforms on perceptions of TCS could help 'bridge the doctor-patient gap' but it is unclear from existing evidence to what extent medical and dermatological professionals are cognisant of the TSW online communities and the material shared, with their potential for understanding the lived experience of those living with TSW. There has been some interest in the use of the internet and social media by dermatology patients within the dermatological community,^(27, 28, 29) and evidence of social media being used to better understand 'patient perspectives' of living with eczema, for example.⁽³⁰⁾ However, in relation to TSW specifically, there is only one example (to the best of our knowledge) of researchers using social media blogs to understand children's experiences of TSW.⁽³¹⁾ Arguably, data from social media could offer healthcare professionals and researchers one way to gain a greater understanding of people's experiences of living with the symptoms of TSW:

Patients want professionals to recognise the impact of symptoms experienced and feels that recognition would be an important first step to better management.⁽²³⁾ (p. 2)

What is Topical Steroid Withdrawal Syndrome (TSWS)?

TSWS, also known as Topical Steroid Addiction (TSA), Red Skin Syndrome (RSS) and Red Burning Skin Syndrome (RBSS), can be described as a 'distinct adverse effect' of prolonged use of TCS.^(9, 15, 16)

However, the joint statement issued by the National Eczema Society and the British Association of Dermatologists on TSW, suggested that TSWS may represent 'several different skin conditions' (i.e. atrophy, rosacea, acne, peri-oral dermatitis) rather than a 'single clinical entity'.⁽²⁴⁾ Hajar et al⁽⁸⁾ also include other clinical entities such as allergic contact dermatitis in their definition of TSWS. ITSAN describes TSWS as an 'iatrogenic condition', a condition caused inadvertently by a medical treatment, as does Rapaport,⁽³²⁾ who refers to it as an 'iatrogenic problem'. TSA and TSW seem to be used interchangeably in the literature, but TSWS can be regarded as comprising both - the *addiction* phase and the *withdrawal* phase. The addiction phase is when the skin is symptom-free while using TCS, and the withdrawal phase usually occurs within days or weeks of discontinuing the TCS when symptoms may worsen beyond pre-treatment.

Definitions of TSWS offered in the literature seem to coalesce around two elements - physical dependence on TCS and worsening skin manifestations on withdrawal.^(4, 8, 13, 14, 33) People have reported using an increased quantity and potency of TCS over months to years in order to control their skin condition.^(15, 33) On withdrawal, individuals may experience the rebound with more extensive and more severe skin manifestations which are also morphologically different from the original skin condition.^(4, 13)

Two distinct morphologic syndromes of TSWS have been identified. The erythematoedematous variant is more likely to develop in people with atopic dermatitis, and about 80% of people with atopic dermatitis are in this category.⁽⁸⁾ The most common signs are erythema, scaling, papules, nodules, peeling and swelling; and the most common symptoms are burning/stinging, pruritus, pain and diminished tolerance for emollients. The papulopustular variant is more often seen in people who use TCS for cosmetic reasons, acneiform disorders and pigmentary conditions. The differentiating signs and symptoms of this variant are the prominence of pustules, papules and nodules with swelling and burning/stinging featuring less. Both of these variants may be difficult to differentiate from atopic dermatitis and allergic contact dermatitis because of similarities in symptoms,⁽¹⁵⁾ but specific signs common to TSWS include 'red sleeve sign', 'headlight sign' and 'elephant wrinkles'.^(4, 14, 15, 16, 31, 34) As diagnosing TSWS is challenging, Sheary⁽¹⁵⁾ (p. 214) has proposed a set of diagnostic criteria as a starting point for discussion and future research: it comprises (i)

essential criteria; (ii) key diagnostic criteria; (iii) additional supporting features that may be present. The essential criteria are history of long-term regular use of TCS, itch and erythema. Lio & Chandan's⁽¹⁷⁾ (p. 37) key diagnostic criteria (equivalent to Sheary's 'essential' criteria) are burning, confluent erythema and history of frequent and prolonged TCS use. Hardly surprisingly, most cases of TSWS are self-diagnosed rather than by a dermatologist or clinician.⁽¹⁷⁾

Phases of withdrawal

Fukaya et al⁽⁴⁾(p. 132) proposes the following phases of withdrawal:

- i. An acute red exudative phase where erythema develops from original area and spreads to other areas of the body where TCS have not been applied.⁽³⁴⁾ Depending on the severity, the rebound eruption may be simply erythema or a number of skin manifestations such as papules, pustules, with burning and stinging. The rebound reaction may persist for several days to a few months.
- ii. A dry itchy phase with thickened and desquamative skin which is very sensitive and can be such a 'burden' that people experience depression.
- iii. A recovery phase where the skin starts to gradually improve and sensitivity decreases. Flares may occur intermittently and people may experience excessive sweating and periods of aggravation.
- iv. A recovered phase where the skin returns to its original appearance or to that of the original skin condition (e.g. atopic dermatitis). This period can take weeks and even years.

Although helpful to set out the withdrawal phases, arguably, it presents a rather sanitised version of TSWS as in 'sensitivity', 'aggravation' and 'depression' could almost 'mask' what people actually experience in withdrawal. To some extent, Rapaport⁽³²⁾ (p.18) attempts to counter this by sharing some of his experience of the 'human toll' and the major 'socio-economic-medical ramifications' of TSWS: he lists a suicide, children and young people out of school for up to one and half years, and adults off work and on disability for six to 12 months, as some examples. How long people live through the withdrawal phases varies from four months to two years,^(9, 33) but there is the possibility that it may be as long as five years⁽³⁵⁾ Hence, the need to have a greater understanding of the lived experience of TSWS and its impact on people's lives and their quality of life.

Risk factors

Not everyone who uses TCS will develop TSWS; the MHRA has described TSWS as 'rare'⁽¹²⁾ but it is estimated to occur in approximately 12% of people with atopic dermatitis who use TCS.⁽⁴⁾ The

systematic review evidence shows that adult women are most at risk of TSWS,^(8, 14) though this may be related to the included studies focusing on TSWS in the context of cosmetic use.^(13, 15) Research also shows that infants and children manifest typical signs and symptoms of TSWS such as red skin, red sleeve and elephant wrinkles;⁽¹⁶⁾ Juhász et al⁽³¹⁾ found that children continued to exhibit TSWS symptoms (i.e. shedding, oozing, erythema, pain and itching) 20 months after ending TCS.

The exact reason why some individuals develop TSWS is not clear but there are some risk factors noted in the literature. As already noted, studies that consider TSWS in the context of cosmetic use find that women are more at risk,^(8, 14) but studies that look at TSWS in the context of inflammatory skin conditions, find that an equal number of men and women are at risk.⁽¹⁵⁾ Length of use of TCS could vary from two months to over 40 years^(14, 15, 31) and prolonged and frequent TCS use, usually of moderate- to high-potency,^(8, 14) are considered to be risk factors. Atopy is also considered to be a risk factor for TSWS.^(15, 34) Sheary⁽¹⁵⁾ also suggests that a history of using oral corticosteroids for skin symptoms may indicate a more 'severe clinical picture' with a potential increased risk of 'overusing' TCS leading to TSWS.

Treatments

The treatments for TSWS range from total cessation^(33, 34) to tapering off TCS.⁽⁶⁾ There is no consensus on how to manage withdrawal, with Rapaport & Rapaport⁽³³⁾ (p. 552), for example, arguing that there must be total cessation:

There is no 'step-down' phase, since the vasoconstriction would continue no matter how low the potency of the corticosteroids used, so the overall problem would not be helped.

Others, such as Cotter et al⁽²⁴⁾ finds it 'deeply concerning' to read 'harrowing' accounts of people's experiences of going 'cold turkey' when treatments or therapies exist to alleviate the symptoms. These therapies include pharmacological treatments such as antibiotics to prevent infection, systemic steroids, antihistamines, topical calcineurin inhibitors such as dupilumab, and sedatives; and non-pharmacological treatments such as dietary changes, psychological support, cold water and ice, emollients and UVB therapy.^(16, 31, 33, 36) Some believe that the difference between total cessation and tapering is small,⁽⁴⁾ and Hajar et al⁽⁸⁾ had difficulty in identifying the added benefits of either approach.

What is an Evidence and Gap Map (EGM)

Evidence and Gap Maps (EGMs) provide an overview of the available evidence on a particular topic, theme or policy area. EGMs are a "systematic evidence synthesis product"⁽³⁾ (p. 1) and are used to highlight gaps in the evidence base, show where there is an abundance of evidence, and increase the

‘discoverability’ and use of the evidence. The most common maps are ‘effectiveness maps’ but, as noted by White et al,⁽³⁾ maps may be made of any body of literature (e.g. CoVid-19: Living Map of the Evidence <https://eppi.ioe.ac.uk/eppi-vis/Review/Index>). EGMs are displayed as matrices and in an effectiveness map, for example, the rows display the interventions and the columns display the outcomes, with each cell in the matrix showing studies with evidence on the corresponding intervention and outcome. EGMs are produced following the same principles as systematic reviews; importantly, EGMs show what evidence is available, not what the evidence says.

Why is it important to develop the EGM?

The limited acceptance of TSWS as a distinct condition within the medical and dermatological communities has had implications for research. The National Eczema Association (NEA) set up a task force to understand TSA/TSW in 2013 which resulted in the publication of a systematic review of 34 studies two years later.⁽⁸⁾ This systematic review was updated in 2021 with a total of eleven studies. The limitations highlighted by the authors included the paucity of studies available⁽¹⁴⁾ and the low quality of the available evidence.⁽⁸⁾ Cotter et al’s⁽²⁴⁾ call for dermatologists to support and develop research to better understand the nature of TSWS has been augmented by a recent ‘patient community call’ for *high quality* research in TSWS.⁽²³⁾ This call emerged from the Centre of Evidence Based Dermatology at the University of Nottingham, where researchers, in collaboration with people living with TSWS, identified key areas of research that should be addressed to form an evidence base to inform practice.⁽²³⁾ Howells et al⁽²³⁾ observed that the absence of research on the lived experience of TSWS has meant that people with TSWS have felt unsupported by dermatologists and medical professionals when reporting symptoms. Therefore, we propose to include social media posts from individuals with TSWS on their experiences as evidence in the EGM. An EGM informed by this patient-researcher collaboration will show where evidence exists and what type of evidence exists across these key research topic areas, and where research is non-existent.

This evidence and gap map will identify the range, extent and type of evidence about TSWS in the research literature and on social media platforms. It aims to raise awareness and understanding of TSWS within the medical and dermatological communities,⁽²³⁾ and will be an important resource to guide both researchers and clinicians in the prioritisation of research topics for further research. It also aims to increase the accessibility and use of existing evidence (including social media posts from people living with TSWS) by the medical and dermatological communities, as well as by the TSWS patient community and the patient organisations such as ITSAN, Scratch UK and the National Eczema Association.

Aims and Objectives of the EGM

The aim of this EGM is to:

- identify the range, extent and type of evidence on topical steroid withdrawal syndrome (TSWS) in the research literature and social media platforms.

Specific research objectives are to:

- identify reviews, both systematic and non-systematic;
- identify primary research on TSWS including case reports, case series, cross-sectional studies;
- identify qualitative studies relating to experiences of living with TSWS;
- identify content on lived experiences of TSWS in blogs and posts on Instagram and Reddit;
- identify gaps in evidence where further primary research is needed.

Methods

This map will identify areas of evidence and gaps in evidence across research topics specific to TSWS, charted from the first known mention of TSA in the research literature in 1968 to the present.

Framework development and scope

We have developed the topics in our years-research topics framework by drawing upon Howells et al's⁽²³⁾ proposed building blocks for high quality research in TSWS. These building blocks were the outcome of an online workshop discussion between researchers, people living with TSWS and Scratch That. We will also consult with our PPI colleague (AS) and refine the scope of the research topics and additional topics will be added if identified within the included evidence.

Dimensions

Years by decades (rows in map)

- 1968-1979
- 1980-1989
- 1990-1999
- 2000-2009
- 2010-2019
- 2020-2023

Research Topics (columns in map)

- Diagnosis

- Diagnostic criteria (or lack of)
- Risk factors
 - Prolonged and frequent use of TCS
 - Prolonged use with moderate to high potency TCS
 - Use of oral corticosteroids for skin symptoms
 - Increased permeability of stratum corneum
 - History of atopy
 - Inflammatory skin conditions
 - Using TCS on face
 - Gender
- Triggers
 - Concomitant drug use
 - Weather (season changes)
 - Diet
 - Exercise
 - Hormones (e.g. menstrual cycle, pregnancy)
 - Stress
 - Temperature (esp. overheating)
 - Sweat
 - Vaccination
 - Illness
 - Anniversary flare
 - Pollen
 - Mould
 - Alcohol
 - Fragrance
 - Sun exposure
 - Soap/cosmetics
- Disease mechanisms
 - Rebound vasodilation
 - Tachyphylaxis
 - Dysregulation of Glucocorticoid Receptor
 - Dysregulation of Cortisol Production by Keratinocytes
 - Rebound Cytokine Cascade Secondary to TCS Induced Barrier Impairment

- Alteration in water content of stratum corneum
- Inhibit collagen synthesis
- Allergy to corticosteroid
- Demodex mite
- Epidemiology
 - Prevalence and incidence of TSWS across populations
 - Patterns and phases in TSWS
 - Awareness of TSWS as a condition
- Prevention
 - Interventions/measures to help clinicians prevent addiction phase of TSWS
 - Interventions/measures to inform people using TCS on risk of prolonged use
 - Alternative therapies to TCS
- Physical symptoms (skin)
 - Itch
 - Rash (including redness, papules, erythema)
 - Plaques/Lesions
 - Pustules
 - Scaling
 - Dryness/ flaking
 - Cuts
 - Oozing/Crustiness
 - Burning/Stinging
 - Smell
 - Skin pain (other than burning pain)
 - Telangiectasias
 - Vesiculation
 - Purpura
 - Photo-sensitivity
 - Facial hot flashes/facial warmth
 - Thickening of outer layer of skin
 - Striae
 - Sensation of tightness
 - Edema
 - Skin atrophy

- Skin sensitivity
- Hypopigmentation
- Hyperpigmentation
- Blue tinge (severe vasodilation)
- Skin infection
- Physical symptoms (non-skin)
 - Temperature regulation
 - Hair loss
 - Increased hair growth
 - Weight loss
 - Fatigue
 - Libido
 - Sleep loss
 - Pain, including nerve pain
 - Fever
 - Lymphadenopathy
 - Feeling faint
 - Nail loss/nail infections
 - Growth delays (esp. children)
 - Mobility issues
- Symptoms (mental)
 - Depression, anxiety, stress
 - Suicidal thoughts
 - Emotional fluctuations
 - Post-traumatic disorder
 - Self-image (positive, negative e.g. loss of self-confidence)
 - Resilience
- Symptoms (systemic)
 - Primary adrenal insufficiency (Addison's Disease or hypoadre)
 - Secondary adrenal insufficiency
 - Hyperglycaemia
 - Glaucoma/cataract
 - Benign intracranial hypertension
- Relationships

- At home (family, partners, children under stress)
- At work and in education
- With doctors and dermatologists
- With other therapists (e.g. naturopath)
- With other people with TSWS (often via social media)
- Activities of everyday living
 - Work
 - School/College/University
 - Social life
 - Holidays/leisure
 - Self-care
- Beliefs/Attitudes
 - Belief that patient has been 'misusing' TCS
 - Belief that TSWS does not exist
 - Belief that information on TCS from doctors is inadequate
 - Mistrust of medical professionals
 - Fear of steroids and medications
 - Patient expectations/understanding of TSWS symptoms (prior to cessation)
 - Alternative sources of information on TSWS
 - Belief in importance of perseverance (in coping with TSWS)
- Treatments/Interventions for management of withdrawal
 - Complete cessation
 - Tapering
 - Antibiotics
 - Dupilumab
 - Methotrexate
 - Cyclosporine
 - Montelukast
 - Ruxolitinib
 - Antihistamines
 - Analgesics
 - Anxiolytics/Antidepressants
 - Sedatives
 - Antifungals

- Topical immunomodulators
- Adrenocorticotrophic hormone (ACTH)
- Platelet rich plasma (PRP)
- Intravenous immunoglobulin (IVIG)
- Non-steroidal creams: Tacrolimus (topical immunomodulators)
- Non-steroidal creams: Pimecrolimus (topical immunomodulators)
- Non-steroidal creams: Other
- Emollients/Moisturisers
- Emollient with a corticosteroid
- Hot/cold treatments
- Wet wraps/compresses
- Dry dressings/compresses
- Diet changes
- Avoidance of cosmetics, soaps, moisturisers, lotions etc.
- Alternative remedies (e.g. supplements, meditation)
- Light therapy, laser therapy
- Psychosocial therapy/support (e.g. counselling)
- Online support
- Systemic steroids
- Restart topical steroids
- Acne treatments
- Antiseptic (prevent secondary infection)
- Clothing interventions
- Bathing interventions
- Treatment costs
 - Cost implications of TSWs treatment options

Filters for presentation

The map will have a range of filters such as type of evidence (reviews, quantitative research, qualitative research, social media – blogs, social media – Instagram and Reddit, and Guidelines); population age (infants (0-3years), children (4-12 years), adolescents (13-18 years) and adults (18+ years) and location of evidence (UK, Europe, US, Canada, Australia, New Zealand etc).

Search methods and sources

A search will be conducted for published and unpublished literature via academic databases, web-searching, and through blogs and social media sites (Instagram and Reddit).

Published research

We will search MEDLINE and EMBASE (via OvidSp) and CINAHL (via EBSCOhost) using a combination of subject headings and free text terms for steroids, topical application, and terms for withdrawal/addiction. We will also review the included studies in related systematic reviews and carry out forwards and backwards citation chasing. Any key journal identified in this field during the search process will be hand-searched.

Unpublished research

We will search ProQuest Theses and Dissertations and Conference Proceedings Citation Index (via Web of Science).

Web-searching

We will search for the phrases 'topical steroid withdrawal' and "topical steroid addiction' on Google using the approach recommended by Briscoe⁽³⁷⁾ for additional relevant studies.

Blogs

We will search for blogs using 'topical steroid withdrawal' and 'topical steroid addiction' in combination with the word 'blogs' on Google. We will also carry out a targeted search for topical steroid withdrawal on the blogging sites Wordpress, Medium and Blogspot.

Instagram

We will search for the most recent posts featuring #TopicalSteroidWithdrawal. The most recent 100 posts that include text will be copied into an Excel spreadsheet for screening and coding, along with the date of the post and a URL link. Posts not relating to topical steroid withdrawal, posts advertising products, posts that are not in English, or posts that only include links or hashtags will not be copied.

Reddit

We will copy the text, date and URL from the most recent 100 posts under the subreddit Topical Steroid Withdrawal (r/TS_Withdrawal) and paste into a spreadsheet for screening and coding.

Inclusion criteria

Population - People experiencing TSWS (includes infants, children and adolescents), either via complete 'sudden' cessation of TCS or complete cessation of TCS via 'tapering' approach.

Exposure – Topical corticosteroids (TCS)

Outcomes – Effects of withdrawal – physical, psychosocial, guidance and resources (produced and used), knowledge and attitudes (both HCPs and people experiencing withdrawal) and information seeking and sharing by people experiencing withdrawal.

Exclusion criteria:

- Any reports about side effects of corticosteroids that are not specific to withdrawal;
- Any blogs, Instagram and Reddit posts that describe TSWS, signs and symptoms, treatments etc. using material from other sites or academic articles but are not grounded in personal experience;
- Any blogs, Instagram and Reddit posts that describe (and promote) treatments such as creams, oils etc. and are not presented within the context of an individual's TSW experience.

Study type:

- Research - any studies that investigate or describe topical steroid withdrawal. Letters describing case reports, commentaries and opinion pieces will also be included.
- Examples of lived experiences – Blogs or posts identified via Instagram or Reddit that describe the experience of living with TSW or caring for someone with TSW will be included.

Data collection and analysis

Screening and study selection

Titles and abstracts and full texts (i.e. research papers) will be screened independently following the inclusion criteria (by NO and MR) and disagreements will be resolved with a third reviewer (JTC), if necessary. The blogs and posts identified in Instagram and Reddit will be checked by two reviewers for inclusion. The study selection process will be detailed using a PRISMA-style flowchart with the reason for exclusion of each record retrieved at full text reported.⁽³⁸⁾

Data extraction

A standardised data extraction coding set will be developed in EPPI-Reviewer software and piloted on a selection of included studies and social media content. It will be used to collect the information, detailed below, from each included item (i.e. research paper, blogs, Instagram and Reddit posts). Items will be defined as a single study which may include multiple reports/publications. Data extraction will be performed by one reviewer (NO) and checked by a second (MR), with disagreements being resolved through discussion with another reviewer (JTC), where necessary.

Author

- Person living with TSWS
- Carer/Family member
- Academic/Clinician

Type of Evidence

- Reviews
- Quantitative studies
- Qualitative studies
- Social media – blogs
- Social media – Instagram and Reddit
- Guidelines/Reports/Discussions/Editorials

Population Age

- Infants (0-3 years)
- Children (4-12 years)
- Young person (13-18 years)
- Adults (18+ years)

Location of evidence

- UK
- Ireland
- USA
- Canada
- Australia
- India
- New Zealand
- Japan
- Taiwan
- Singapore
- China
- Etc.

Publication years

- 1968-1979
- 1980-1989
- 1990-1999
- 2000-2009
- 2010-2019
- 2020-2021
- 2022-2023

Type of Review

- Systematic
- Non-systematic

Study design

- RCT
- Comparative studies
- Observational studies (includes cross-sectional, cohort and case control studies)
- Case series
- Case report/history
- Qualitative

Steroids

- Topical Corticosteroids
- Beclometasone
- Betamethasone
- Clobetasol
- Desonide
- Desoximetasone
- Fludrocortide (flurandrenolide)
- Fluocinolone
- Fluocinonide
- Fluticasone
- Hydrocortisone
- Methylprednisolone
- Mometasone

- Predonisolone acetate
- Triamcinolone
- Systemic steroids

Duration of TCS use

- Less than 6 weeks
- Less than 6 months
- 6 months – a year
- 1-10 years
- More than 10 years

Length of time off TCS

- Up to 7 days
- Up to 1 month
- Up to 3 months
- Up to 6 months
- Up to 12 months
- 1 year +

Area of body affected

- Scalp
- Eyes/eyelids
- Face
- Neck
- Arms
- Hands
- Legs
- Feet
- Trunk
- Genitalia
- Area distant from TCS application
- Entire body

Reasons for stopping TCS

- Awareness of side effects (e.g. skin thinning)

- Lack of durable benefit
- No longer effective
- Did not want to use anymore
- Awareness of TSWS as a condition
- Anticipation of improved skin at end of withdrawal process
- Relative diagnosed with TSWS
- Doctor advised to stop
- Inadvertent withdrawal
- Required to participate in a study

Names of Syndromes/Conditions

- Red skin syndromes
- Steroid-induced rosacea
- Topical corticosteroid-induced rosacea-like dermatitis
- Topical corticosteroid-induced acne
- Steroid-induced perioral dermatitis
- Pustular dermatosis

Diagnosis

- Self-diagnosis (or caregiver diagnosis)
- Medical professional/dermatologist
- With support from social media
- Diagnosis of TSWS not confirmed
- Patch testing or photo-testing used for exclusion of alternative diagnoses

Quality of Evidence

We will not evaluate the quality of the evidence as we aim to include all study designs (because of anticipated low number of studies, particularly in relation to the lived experience of TSWS, and low quality of evidence) and evidence from social media such as blogs, Instagram and Reddit posts.

We will differentiate between systematic and non-systematic review: a review will be identified as *systematic* if it reports i) a research question, ii) search sources and a reproducible search strategy, iii) inclusion and exclusion criteria, and iv) selection/screening methods.⁽³⁹⁾

Methods for mapping

EPPI reviewer will be used for data extraction and to code and produce the EGM. Studies will be entered into an interactive map in order to show the distribution of the evidence across the research topics. The map will have multiple layers so that evidence can be identified by population group, location of evidence and accessibility of evidence. The surface or initially visible layer of the map will show the six types of evidence, each represented by a different coloured bubble (1 = reviews, 2 = quantitative research, 3 = qualitative research, 4 = social media – blogs, 5 = social media – Instagram and Reddit, 6 - Guidelines) in a matrix of years by research topics. All cells in the map will be clickable leading the map user to the next layer of the map, showing the available evidence for that particular research topic and year. The map user will see a graphical representation of the evidence in the form of bubbles with dimensions (bubble diameter) and colours, determined by the number and type of evidence available. Filters for population groups, location of evidence, study design, authors etc. will enable the map reader to look for all studies/evidence, for example, on children and TSWS.

Stakeholder Involvement

One of the co-authors lives with TSWS and has been advising on the project since its inception.

Dissemination

How the findings will be disseminated will be developed as the findings of the study emerge.

Access to the map will be shared with organisations such as ITSAN and Scratch That and more widely via social media such as Twitter and Instagram. We will write a plain language summary to share with organisations for their newsletters and we will offer to write blogs on organisational websites as well as for the University of Exeter's.

The EGM and the accompanying report will be published in an academic journal.

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