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# Scratching the surface: a review of online misinformation and conspiracy theories in atopic dermatitis

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## Summary

Misinformation is one of the greatest threats to global health. Atopic dermatitis (AD) is a common skin disorder with a complex multifactorial aetiology, rendering it susceptible to misinformation. Little is known about the content of misinformation regarding AD online. We performed a review of AD-related misinformation available online, via PubMed for scientific papers and Google for nonscientific websites. Key areas of misinformation were identified, including 'simple cures' for AD, diet, chemicals, dust, vaccines, red skin syndrome and alternative therapies. Patients with AD and their families are vulnerable to misinformation given the severe impact of AD on quality of life. Dermatologists must be aware of the false AD-related content being shared online, and be prepared to refute and rebut misinformation by providing appropriate evidence.

The World Health Organization has declared the 'infodemic' – an overabundance of information and rapid spread of misleading or fabricated news, images and videos – as one of the greatest threats to global health.<sup>1</sup> Atopic dermatitis (AD) has a complex multifactorial aetiology, involving skin-barrier dysfunction, dysbiosis and T helper 2 cell-skewed immune pathways.<sup>2</sup> Sophisticated scientific concepts are at higher risk of formulation and dissemination of misinformation.<sup>3</sup> One recent study showed that over two-thirds of YouTube videos related to AD were of poor or very poor scientific quality.<sup>4</sup> Little is known about the specific content of misinformation regarding AD online.

## Report

We performed a literature review via PubMed using the search terms 'atopic dermatitis' OR 'atopic eczema' OR

'eczema' AND 'misinformation' OR 'disinformation' OR 'conspiracy theories'. This search identified 133 abstracts, which were reviewed for suitability, of which one was considered appropriate for inclusion.<sup>4</sup> Given the unvalidated nature of the content we sought to identify, a Google search was also performed using combinations of the search terms 'atopic dermatitis', 'atopic eczema', 'eczema' and 'misinformation', 'disinformation' and 'conspiracy theories'. The first 10 pages of each Google search were reviewed for novel information. The searches were performed in January 2021.

Thematic analysis of search results identified key areas of misinformation, including 'simple cures' for AD, diet, chemicals, dust, vaccines, red skin syndrome and alternative therapeutic regimens (Fig. 1).

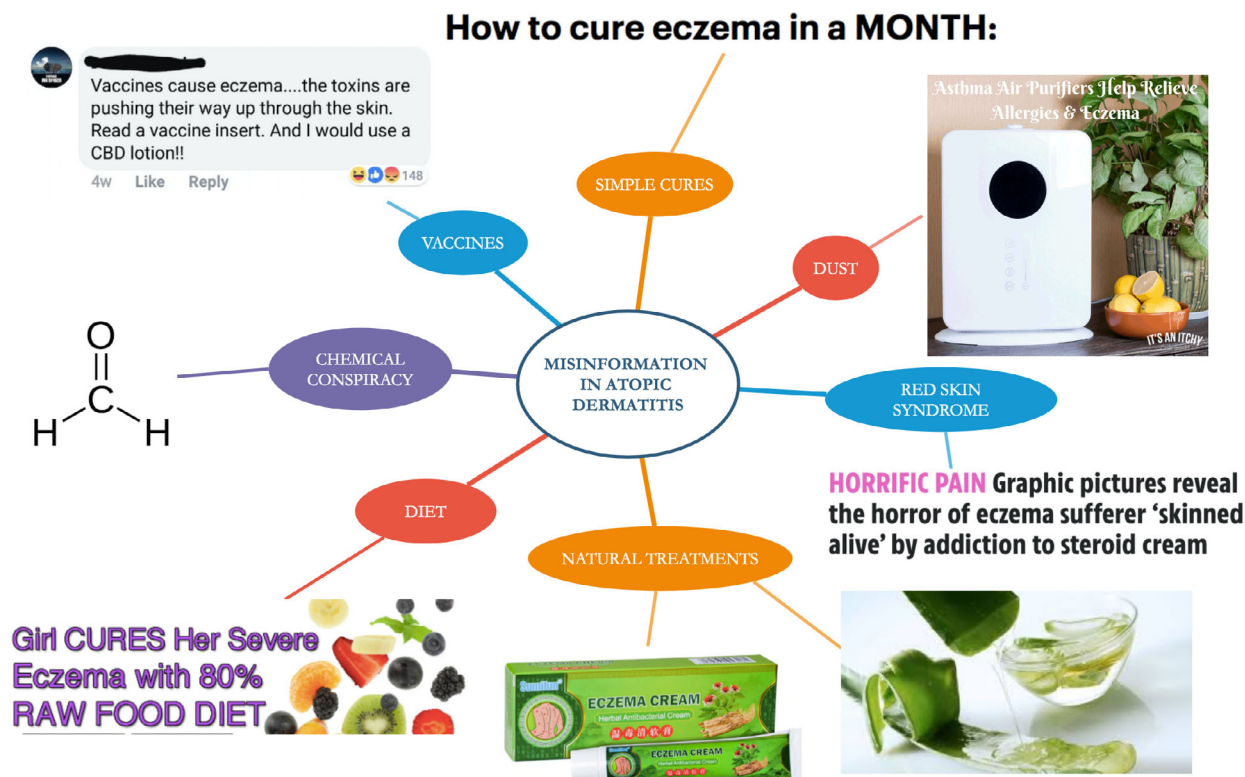
Simple cures for AD were frequently mentioned, suggesting that AD was caused by a minor issue and could be reversed by avoidance of relevant trigger(s). Various causes were suggested, including foods, chemicals, dust, vaccinations emollients and topical steroids. This did not consider that the aetiology of AD involves multiple factors and that avoidance of specific individual environmental exposures is unlikely to be helpful.

Exclusion of multiple different foods was incorrectly recommended to 'cure' AD, including dairy, eggs,

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**Figure 1** Themes of online misinformation related to atopic dermatitis identified by literature and search engine review. Images retrieved from (clockwise from top): Daily Mail Online, itchyworld.com, The Sun Online, asiancare.ru, ebay.co.uk, Daily Mail Online, wikipedia.org and facebook.com.

nuts, fish and gluten-containing foods. Vegan diets were reported to 'cure eczema in days'. In AD, disruption of the skin barrier increases the risk of food allergy due to cutaneous exposure to food protein, leading to allergic sensitization,<sup>5</sup> but food allergies do not directly cause AD. In fact, inappropriate dietary restriction in AD can paradoxically increase the risk of true food allergy.<sup>6</sup> Fad diets were also recommended for 'leaky gut syndrome', based on a false hypothesis that normal foods can increase intestinal permeability and cause AD.

Several chemicals have been mistakenly cited as causes of AD. The 'formaldehyde conspiracy' claims that the presence of formaldehyde in food and cleaning products causes AD. The 'detergent conspiracy' suggests that the recent increase in AD prevalence is secondary to an increase in the use of washing detergents. Dust has also been incorrectly implicated as a cause of AD. Air purifiers have been touted, usually by companies selling these devices, to both prevent and cure AD. While house dust mite allergy might exacerbate cutaneous as well as airway allergic disease, there

is no evidence that dust particles cause AD. AD has also infrequently been attributed to 5G wireless technology.

Some websites claim that vaccines elicit immune responses or contain ingredients that provoke AD in genetically susceptible individuals. One homeopathy company frequently shared disinformation about 'poisonous' vaccines causing AD. The example of smallpox vaccination causing eczema vaccinatum has been extrapolated to suggest that all vaccines cause AD. Vaccine-related misinformation undermines the safety of this vital public health measure, especially important in the COVID-19 pandemic.

Several websites misleadingly claim that topical treatments cause AD. One website claims that emollients induce AD and promises that their digital program (£49) cures AD. 'Red skin syndrome', also referred to as 'topical steroid addiction', is a popular topic on eczema internet forums and tabloid newspapers. One proponent of this theory claims that AD is caused by topical steroid addiction and offers a teledermatology service to cure it, with testimonials to

support this mode of treatment. The National Eczema Society and the British Association of Dermatologists have released a joint paper to address these concerns.<sup>7</sup>

'Natural' remedies are also frequently recommended to treat AD, such as apple cider vinegar, calendula and witch hazel, which are all unproven therapies. One 14-month old child in Canada died of septic shock, exacerbated by nutritional deficiencies, following prolonged nutritional restriction and use of 'natural remedies' as treatments for AD.<sup>8</sup> 'Natural' Chinese herbal ointments are frequently used by parents who have concerns about prolonged use of topical steroids. However, it is known that a significant proportion of these products contain superpotent topical steroids, ironically placing patients at increased risk of adverse effects.<sup>9</sup> One dermatologist, whose regimen is frequently mentioned in our outpatient department, recommends a combination of corticosteroid, emollient and fusidic acid, combined in one formulation. This approach may cause antimicrobial resistance and dilutes the effectiveness of topical steroids.

AD is associated with significant disruption to quality of life.<sup>2</sup> Patients and families are desperate for any potentially beneficial treatment and exposure to misinformation may reduce adherence to evidence-based strategies. Misinformation regarding AD has serious consequences, and some of the endorsed treatments are potentially lethal. The use of the word 'cure', especially if benefit from the suggested intervention seems implausible, should be a red flag that the information is incorrect. Information from companies selling products should also be viewed sceptically.

Robert Proctor, Professor of History of Science at Stanford University, has declared this era the 'golden age of ignorance'. Healthcare professionals can stop the spread of false information by refuting or rebutting misleading health information and by providing appropriate evidence to accompany their refutation.<sup>10</sup> Dermatologists should be aware of AD-related misinformation circulated by charlatans and be prepared to combat incorrect information to optimize care.

### Learning points

- Misinformation is a major threat to global health.
- AD has a multifactorial aetiology. Complex concepts are more susceptible to misinformation.
- Key areas of misinformation related to AD online include 'simple cures', diet, chemicals,

dust, vaccines, red skin syndrome and alternative therapies.

- Some of these theories can be dangerous, especially relating to severe dietary restriction or to potentially deadly treatments.
- Patients with AD and their families are susceptible to misinformation given their desire for effective treatment.
- Dermatologists can stop the spread of misinformation relating to AD by refuting or rebutting incorrect information and by providing appropriate evidence to accompany their refutation.

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