



Allergologia et immunopathologia

Sociedad Española de Inmunología Clínica,
Alergología y Asma Pediátrica

www.all-imm.com



ORIGINAL ARTICLE

OPEN ACCESS

Can urticaria images found on the internet be a source of health information?

Merve Erkoç^a, Makbule Seda Bayrak Durmaz^{b*}

^aDivision of Immunology and Allergy, Adana City Training and Research Hospital, Adana, Turkey

^bDivision of Immunology and Allergy, Ankara Bilkent City Hospital, Ankara, Turkey

Received 2 March 2025; Accepted 8 April 2025

Available online 1 May 2025

KEYWORDS

angioedema;
Google Images;
internet;
photography;
urticaria

Abstract

Background: In parallel with technological developments, patients increasingly benefit from information and communication technologies.

Objective: The aim was to evaluate urticaria images that are available on the internet in two different languages.

Materials and methods: The terms “urticaria” and “ürtiker” were used as search terms on Google Images. One hundred images were saved for each term, and each image was opened via its link. Two specialists in immunology and allergy jointly assessed the uploader information, pixel resolution, characteristics of the urticarial lesions, and image quality of the photos.

Results: A total of 178 images were included, with 87 from the “urticaria” search term and 91 from the “ürtiker” search term—71.3% images had isolated urticaria, 1.7% had isolated angioedema, 0.6% had both urticaria and angioedema, and 26.4% had neither urticaria nor angioedema; 131 photographs depicting urticaria and/or angioedema were analyzed. The majority of urticarial plaques were erythematous (84%), with extremities (32.1%) being the most commonly affected area. Images in the preview on Google Images appeared more blurred and of lower resolution than the images after opening the link (n:99 vs. n:26, p < 0.001 and n:55 vs. n:10, p < 0.001, respectively). The quality of the images was found to be better after opening the link compared to the preview (n:34 vs. n:107; p < 0.001).

Conclusion: Our study found that approximately one-quarter of urticaria images on Google Images did not match true urticarial lesions and were of suboptimal quality in both Turkish and universally accessible English.

© 2025 Codon Publications. Published by Codon Publications.

*Corresponding author: Makbule Seda Bayrak Durmaz, MD, Ankara Bilkent City Hospital, Division of Immunology and Allergy, Çankaya, Ankara, Turkey. Email address: dr.seda_bayrak@hotmail.com

<https://doi.org/10.15586/aei.v53i3.1351>

Copyright: Erkoç M, et al.

License: This open access article is licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). <http://creativecommons.org/>

Introduction

Urticaria, a prevalent dermatological condition, affects up to 20% of individuals globally at some point in their lives.^{1,2} It is a mast cell-mediated disorder arising from the degranulation of cutaneous mast cells, leading to the release of histamine and other mediators. This mediator release initiates a cascade of events that culminates in the hallmark manifestations of the disease—pruritic wheals (hives) and/or angioedema.³

Clinically, urticarial plaques present as localized, superficial swellings in the skin, accompanied by a reflex erythema. Such lesions are often pale or erythematous, may vary in size and shape, and tend to appear suddenly on different parts of the body. They commonly resolve within 24 hours without leaving residual marks, which is a characteristic feature of spontaneous urticaria. In contrast, angioedema involves deeper tissue layers, including the submucosa, lower dermis, and subcutaneous tissues with loose connective structure, and presents as distinct erythematous or flesh-colored swellings that take longer to resolve.^{1,3} In chronic inducible urticaria (CIndU), the characteristics of these plaques, such as size and shape, can sometimes provide clues about triggering factors.^{3,6} However, due to the transient nature of the lesions, when patients apply to a physician for diagnosis and treatment, the lesions may not be visible during examination.⁷ Therefore, patients or physicians may use photographs from the internet to describe the lesions in clinical settings. Additionally, patients or their caregivers may photograph the lesions prior to the clinic visit to aid in diagnosis.^{7,8}

A recent study has shown that almost all (99.6%) chronic urticaria patients use information and communication technologies, and 76.6% of them use web browsers, especially to obtain information about their disease and gain self-management education, and 25.8% use YouTube.⁹ Thereupon, 194 urticaria images on the web were evaluated in terms of content and quality by a major center on urticaria, and they stated that 62.4% of the photographs showed definite urticarial skin lesions.¹⁰

The active use of information and communication technologies by patients with chronic urticaria and their caregivers, the tendency of lesions to resolve spontaneously, and the potential for misinformation encountered online may influence the diagnosis and course of the disease.^{9,11} Therefore, our primary objective was to evaluate urticaria images on Google Images in terms of content and quality, both in the context of our country and in the most universally accessible language—English—to identify potential differences. As a secondary objective, our aim was to identify deficiencies in terms of image content and quality and to provide recommendations for improvement.

Materials and Methods

Photograph collection and study desing

On September 14, 2024, the terms “urticaria” and “ürtiker” were searched on Google Images using a private web browser to avoid personalization bias. Our primary goal

was to assess the most visible and accessible visual content online. Therefore, using an approach similar to previous studies investigating online health information and content visibility,^{10,12-14} we evaluated the top 100 search results in both languages, reasoning that they are more likely to be encountered by the general public and therefore may have a greater impact on public perception and health-seeking behavior. For each search term, the first 100 photographs were selected based on relevance and visibility rankings determined by the search engine. Images were accessed via direct links. Duplicates, illustrations, nonphotographic images, and links that failed to open were excluded from the study. As illustrated in the screening process in [Figure 1](#), 178 photographs met the inclusion criteria, while 47 were excluded due to the absence of urticaria and/or angioedema features.

The characteristics of the collected photographs were systematically documented according to the criteria outlined in the “Photograph Evaluation” section. Based on these recorded criteria, the photographs available in both languages were compared and differences were identified. Additionally, deficiencies in the photographic characteristics were identified and highlighted to draw attention to potential areas for improvement.

Photograph evaluation

The collected photographs were assessed based on the following criteria:

- **Assessment of Urticaria/Angioedema:** The presence of urticaria, angioedema, or both in the photograph was recorded; if neither urticaria nor angioedema was present, the condition represented by the lesion was noted.
- **Uploader Information:** The source or uploader of each photo was categorized into the following groups: clinic (referring to the medical institution where the physician works), article, society, medical company, and information source website and media.
- **Photograph Resolution:** The pixel dimensions of each image were recorded when accessed via the link and in the preview section.

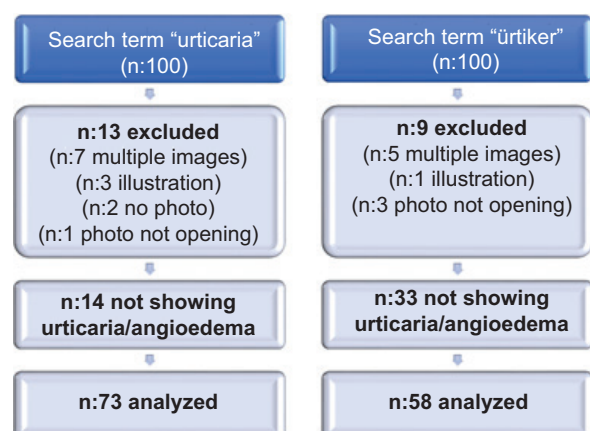


Figure 1 Screening process for the study.

- **Demographic Characteristics:** If the photograph contained features that could be understood in terms of the person's gender (female, male) and age (child, adult), they were recorded; if they could not be understood (e.g., only a lesion), they were recorded as unclassifiable.
- **Characteristics of Urticaria/Angioedema Lesions:** Specific features of the lesions were recorded, including location, plaque characteristics (erythematous, pale), number of lesions, shape (e.g., symptomatic dermatographism, cholinergic), and the presence or absence of itching marks. Although clinical subtype classification based solely on a single photograph may have limitations, visual patterns were noted when clearly identifiable. Acute and chronic spontaneous urticaria generally presents with round or ring-shaped pale or erythematous wheals of various shapes and sizes. The shape of the wheals seen in CIndU is linear in symptomatic dermatographism, whereas the wheals in cholinergic urticaria are usually small (1-3 mm) and pinpoint-shaped.³⁻⁶
- **Photograph Quality:** Photographs were evaluated based on clarity, resolution, and quality, both in the preview section and after the link was opened.

The evaluation of 178 photographs meeting the assessment criteria was conducted by two independent researchers specializing in allergy and immunology, both actively involved in the diagnosis and treatment of urticaria. All photographs were reviewed simultaneously by the two researchers who reached a consensus on all evaluations.

Ethical considerations

Google is a publicly accessible, free platform. This study involved the analysis of publicly available content retrieved from Google. No human or animal data were used and no personal or identifiable information was collected. Therefore, in accordance with the previously published studies employing similar methodologies, ethics committee approval was not required.^{10,15}

Statistical analysis

Statistical analyses were performed using the IBM SPSS (Statistical Package for the Social Sciences) 27 program. Descriptive statistics were presented as frequency and percentage for categorical variables and as median (minimum-maximum) values for continuous variables. Independent group comparisons for categorical variables were performed using the χ^2 or Fisher's exact test. Dependent categorical groups were compared using the Mc-Nemar test. A Type 1 error level of less than 5% was considered statistically significant.

Results

Features of photos in Google image "ürtiker" search result

When the keyword "ürtiker" was entered into Google Images, 91 of the first 100 images were included in the study because they met the evaluation criteria. Among these images, the majority of the photographs (n:66 [72.5%]) were uploaded by the clinics (Figure 2). Since 58 of the evaluated photographs represented urticaria/angioedema, their evaluation criteria were analyzed in these photographs. Of the images reflecting demographic characteristics (16 images, 27.6%, showed only lesions), 27 (46.6%) were male. Forty-four (75.9%) photographs were of individuals in the adult age group. In terms of diagnosis, 55 photographs (94.8%) were compatible with urticaria, 3 (5.2%) were compatible with angioedema, and none represented both urticaria and angioedema. In addition, the majority of the photographs were consistent with spontaneous urticaria (n = 53, 91.4%), two (3.4%) were consistent with symptomatic dermatographic urticaria, and only one was consistent with cholinergic urticaria. Only two photographs (3.4%) had itching marks. The majority of the photographs were of the extremities and the back of the trunk, followed by the front of the trunk and the head

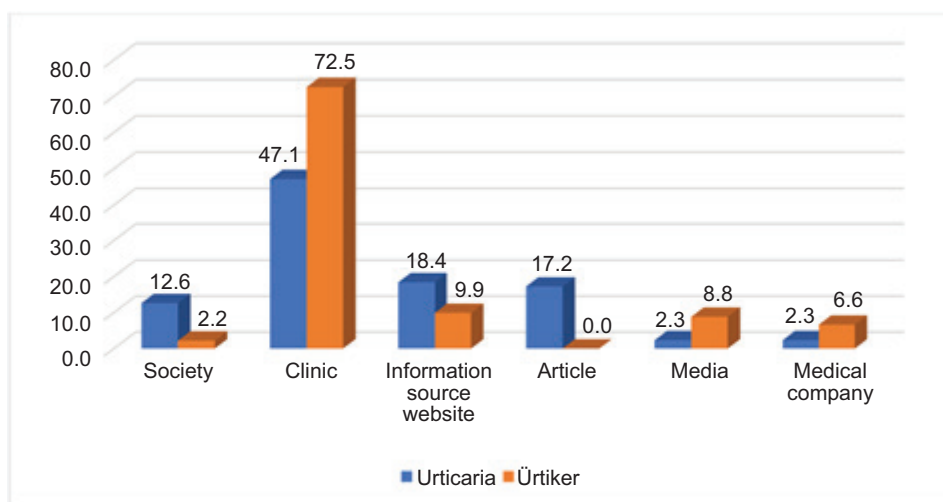


Figure 2 The uploader information of photos.

(the detailed locations of the lesions are given in [Table 1](#)). When the photographs in Google Images were evaluated on the preview screen, 42 (72.4%) of the photographs were blurry, 9 (15.5%) exhibited good resolution, and 14 (24.1%) were evaluated as good to very good quality. After opening the link, these features were evaluated as 10 (17.2%), 48 (82.8%), and 50 (86.2%), respectively. The detailed features of the photographs evaluated from the Turkish search and the photograph features are given in [Table 2](#).

Features of photos in Google image “urticaria” search result

When the keyword “urticaria” was entered into Google Images, 87 of the first 100 images were included in the study because they met the evaluation criteria. Among these images, the majority of the photographs (n: 41 [47.1%]) were uploaded by the clinics ([Figure 2](#)). Since 73 of the evaluated photographs represented urticaria/angioedema, their evaluation criteria were analyzed in these photographs. Of the images reflecting demographic

characteristics (36 images, 49.3%, showed only lesions), 27 (37%) were male. Fifty-four (74%) photographs were of individuals in the adult age group. In terms of diagnosis, 72 photographs (98.6%) were compatible with urticaria, 1 (1.4%) was compatible with both urticaria and angioedema, and none represented angioedema. In addition, the majority of the photographs were consistent with spontaneous urticaria (n:68, 93.2%), three (4.1%) were consistent with symptomatic dermatographic urticaria, and four (5.5%) were consistent with cholinergic urticaria. Only two photographs (2.7%) had itching marks. The majority of the photographs were located in the extremities, followed by the back and front trunk, respectively (the detailed locations of the lesions are given in [Table 1](#)). When the photographs in Google Images were evaluated on the preview screen, 57 (78.1%) were blurry, 7 (9.6%) exhibited good resolution, and 20 (27.4%) were evaluated as good to very good quality. After opening the link, these features were evaluated as 16 (21.9%), 51 (69.9%), and 57 (78.1%), respectively. The detailed features of the photographs evaluated from the English search and the photograph features are given in [Table 2](#).

Table 1 Demographic and urticaria/angioedema depiction features of photographs.

	‘urticaria’ (n = 73) n (%)	“ürtiker” (n = 58) n (%)	Total (n = 131) n (%)	p-value
Urticaria and/or angioedema				
Urticaria	72 (98.6)	55 (94.8)	127 (96.9)	0.099
Angioedema	0 (0.0)	3 (5.2)	3 (2.3)	
Urticaria and angioedema	1 (1.4)	0 (0.0)	1 (0.8)	
Location				
Extremity	26 (35.6)	16 (27.6)	42 (32.1)	0.070
Front trunk	17 (23.3)	10 (17.2)	27 (20.6)	
Back trunk	20 (27.4)	16 (27.6)	36 (27.5)	
Head	2 (2.7)	10 (17.2)	12 (9.2)	
Not identified	8 (11.0)	6 (10.3)	14 (10.7)	
Wheals				
Erythematous wheals	65 (89.0)	45 (77.6)	110 (84.0)	0.074
Pale wheals	8 (11.0)	10 (17.2)	18 (13.7)	
Not shown	0 (0.0)	3 (5.2)	3 (2.3)	
Number of wheals				
0	0 (0.0)	3 (5.2)	3 (2.3)	0.219
< 20	30 (41.1)	24 (41.4)	54 (41.2)	
20-50	31 (42.5)	20 (34.5)	51 (38.9)	
> 50	12 (16.4)	11 (19.0)	23 (17.6)	
Spontaneous urticaria	68 (93.2)	53 (91.4)	121 (92.4)	0.750
Symptomatic dermatographism	3 (4.1)	2 (3.4)	5 (3.8)	1.000
Cholinergic urticaria	4 (5.5)	1 (1.7)	5 (3.8)	0.382
Itch mark	2 (2.7)	2 (3.4)	4 (3.1)	1.000
Gender				
Female	10 (13.7)	15 (25.9)	25 (19.1)	0.029
Male	27 (37.0)	27 (46.6)	54 (41.2)	
Not identified	36 (49.3)	16 (27.6)	52 (39.7)	
Age				
Child	8 (11.0)	13 (22.4)	21 (16.0)	0.011
Adult	54 (74.0)	44 (75.9)	98 (74.8)	
Not identified	11 (15.1)	1 (1.7)	12 (9.2)	

Table 2 Evaluation results of photographs in terms of blur, resolution, and quality.

	“urticaria” (n = 73) n (%)	“ürtiker” (n = 58) n (%)	Total (n = 131) n (%)	p-value
Blurry*	57 (78.1)	42 (72.4)	99 (75.6)	0.453
Resolution*				
Poor	35 (47.9)	20 (34.5)	55 (42.0)	0.256
Average	31 (42.5)	29 (50.0)	60 (45.8)	
Good	7 (9.6)	9 (15.5)	16 (12.2)	
Quality*				
Bad/average	53 (72.6)	44 (75.9)	97 (74.0)	0.673
Good/very good	20 (27.4)	14 (24.1)	34 (26.0)	
When the link opens				
Same	16 (21.9)	11 (19.0)	27 (20.6)	0.678
Better	57 (78.1)	47 (81.0)	104 (79.4)	
Blurry**	16 (21.9)	10 (17.2)	26 (19.8)	0.505
Resolution**				
Poor	8 (11.0)	2 (3.4)	10 (7.6)	0.161
Average	14 (19.2)	8 (13.8)	22 (16.8)	
Good	51 (69.9)	48 (82.8)	99 (75.6)	
Quality**				
Bad/average	16 (21.9)	8 (13.8)	24 (18.3)	0.232
Good/very good	57 (78.1)	50 (86.2)	107 (81.7)	

*: Google Images preview photo; **: Photo when the link is opened.

Comparative results of Google Images

Urticaria was shown more frequently in English searches (n:73, 83.9% vs. n:58, 63.7%; p:0.002). When comparing Turkish search results with English search results in terms of age and gender, the result was statistically significant (p = 0.011, p = 0.029, respectively). When we compared the two groups, Turkish and English, no statistically significant difference was found between the blurriness, resolution, and quality in the preview (p = 0.453, p = 0.256, p = 0.673, respectively). Similarly, no statistically significant difference was found between the blurriness, resolution, and quality after the link was opened (p = 0.505, p = 0.161, p = 0.232, respectively). When the Turkish and English search results of the photos were compared in terms of being similar or better after the link was opened, no significant difference was observed (p = 0.678) (the findings are detailed in Table 2). In the preview phase, 99 photos were rated as blurrier compared to 26 photos rated as blurrier after opening the link (p < 0.001). Similarly, 34 photos were classified as good or very good quality in the preview phase, increasing to 107 photos after the link was accessed (p < 0.001). Furthermore, while 76 photos were rated as having better resolution during the preview, this number rose to 121 after opening the link (p < 0.001). The blurriness, good resolution, and good-very good quality features of the photos in the preview and after the link was opened, according to the pixel median value, are shown in Figure 3.

Discussion

In the information age, although technological advancements offer many conveniences, concerns persist regarding

the reliability and quality of health-related content available on social media and the internet. In our study conducted on September 4, 2024, we searched for the term “urticaria” in both Turkish and English on Google Images and included 178 photos that met the evaluation criteria in the study and analyzed 131 photos that described urticaria and/or angioedema. Our findings show that one-quarter of these photographs did not contain urticaria lesions; there was no significant difference between the two languages in terms of lesions and photo quality but there were differences in terms of gender and age.

The internet is widely utilized for accessing information across various domains, including healthcare. Studies indicate that access to health information can enhance patients’ self-management and positively impact their quality of life; yet, there is also evidence that accessing misinformation poses a potential threat.^{9,16,17} Recently, a global-scale study involving a large cohort of patients with urticaria evaluated patterns of internet usage, specifically examining the frequency with which patients search for health information online. The study reported that 99.6% patients used communication tools, with 77% using them specifically to obtain health information and develop self-management skills.⁹ Another study, conducted in 2022, assessed the quality of urticaria-related images online (on Google Images and Shutterstock), revealing that approximately two-thirds of the photographs depicted urticarial lesions.¹⁰ In our study, conducted approximately two years after this study, which assessed the content and quality of urticaria photographs in the literature, we found that slightly more than four-fifths of images retrieved from English language (n:87) search results showed urticaria lesions, indicating an increase over time (62.4% vs. 83.9%, respectively).¹⁰ Additionally, in the images evaluated during

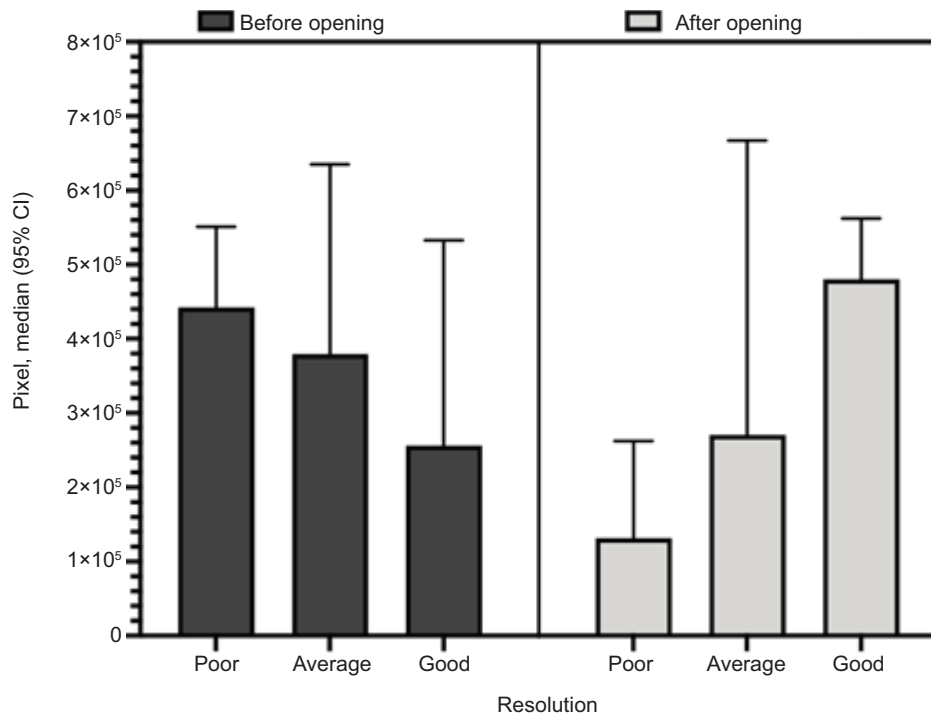


Figure 3 Features of the photos in the preview and after the link was opened according to the pixel median value.

that period, the most common localization of lesions was the extremities, and similarly in our study, although at a slightly lower rate, the extremities remained the most frequently represented site (n:86 [54.1%] vs. 34 [39.1%] 26 [35.6%], respectively). Consistent with the previous study, our study also found that the number of images depicting both urticaria and angioedema was notably lower than the co-occurrence rates reported in the literature.^{10,18} Although an increase was observed in the number of images representing urticaria in our study, given the rapid evolution of internet content, along with differences in the timing of searches, and differences in the number of urticaria images evaluated, we would have expected a higher representation of urticaria images. We believe that the minimal differences observed in our results indicate that there is still no standardized system for verifying health information before it is uploaded to the internet.

In our study, the proportion of photographs representing symptomatic dermatographic urticaria and cholinergic urticaria was found to be near the lower limit of the reported ranges in the literature (3.8% vs. 2-28.5% and 3.8% vs. 5-11%, respectively).¹⁹ However, the representation of urticaria lesion photographs by gender was not consistent, with more males depicted than females.²⁰ Age representation in the photographs, however, was found to be consistent with the literature.²¹

The transient nature of urticarial lesions suggests the need for photographic evaluation during clinical assessment. Two key studies evaluated the rate at which patients bring photos of their own urticaria lesions to appointments, the diagnostic contribution of these photos, and their quality.^{7,8} Both studies indicated that approximately 70% of patients brought photos; that a large number had

no active urticarial lesions during examination; and that these images were useful for diagnostic and clinical evaluation. For patients without active lesions who did not bring photos, Google Images can offer visual references to support diagnosis. However, in our study, the preview images on Google Images were often blurry, low in resolution, and below average in quality, posing a potential risk of misinterpretation, especially for patients attempting self-diagnosis. By contrast, the full size images were clearer, with better quality and resolution. We also observed that photos with higher pixels were of better quality after the connection was opened. Hence, we believe that using full-sized images instead of previews may offer more reliable diagnostic support; however, given that approximately 25% of the images depict different lesions, we recommend that images be reviewed for accuracy by dermatology experts before being presented to patients.

Social media has become a primary source of dermatological information for many individuals. A concerning aspect is that it can include treatments or procedures that lack evidence, are ineffective, or potentially harmful. Public reliance on advice from nonprofessionals on social media can lead to negative outcomes. Dermatological recommendations on these platforms are prone to misinformation and false claims, often including promotions or advertisements.²²⁻²⁴ In one study, urticaria-related YouTube videos posted by physicians were found to be of higher quality, reliability, and utility, whereas videos uploaded by nonprofessionals were more popular and had higher view counts.²⁵ In our study, comparing English and Turkish Google Image search results, we found that content from Turkey was primarily uploaded by clinics; however, accurately depicted images of urticaria were less common.

We emphasize the need for a control mechanism, including images uploaded by healthcare professionals. No significant differences in resolution, clarity, or quality were found between images in both languages. To provide more diagnostically useful images, we believe that collaboration between healthcare professionals and visual media quality experts is essential, with final images reviewed for accuracy before publication.

While some studies suggest that patients seeking health information online can improve the patient-doctor relationship, a study in China found that longer internet usage was associated with decreased trust in doctors.²⁶⁻²⁸ Patients can use online information to prepare for visits, ask better questions, and understand their doctor's explanations.²⁶ We believe that accessing accurate online information and discussing it with doctors during appointments could strengthen this relationship. Our findings align with studies emphasizing the need to improve the quality and accuracy of online information about urticaria.²⁹ Although we observed a slight increase in correctly depicted urticaria images compared to previous studies, this increase is still insufficient, highlighting risks of misinterpretation, incomplete information, and possible misdiagnosis. A key strength of our study is underscoring the need for stricter oversight of online health content, identifying gaps in current images, and suggesting improvements.

Our study's primary limitations include the use of only Google Images and the dynamic nature of online content, which can lead to variability in results. Another factor, similar to two sides of a coin, is the local language search results, which can be perceived as either a limitation or a strength, depending on the perspective. We believe that it is important for local health policies to comprehensively evaluate local language search results, identify deficiencies, and offer suggestions for improvement. Additionally, due to the limited visibility of full body features in most images, we were unable to definitively assess the skin phototype or ethnicity of individuals depicted. However, based on visual inspection using the Fitzpatrick Skin Phototype Classification system, the majority of the images appeared to reflect lower phototype categories (Types I-III). This may limit the generalizability of our findings to individuals with high phototypes (Types IV-VI), as lesion visibility and diagnostic accuracy may vary across different skin phototypes.³⁰

Conclusion

We recommend vigilance by both healthcare professionals and patients regarding online misinformation. We advocate for a regulatory system to oversee online health content and encourage healthcare professionals to provide accurate, evidence-based information through online platforms. We believe that systematic evaluation of online health information is valuable and effective, and we support the expansion of such work to improve content quality.

Acknowledgments

Not applicable.

Authors Contributions

ME: Concept, design, supervision, data collection and/or processing, analysis and/or interpretation, literature search, writing manuscript, critical review. MSBD: Concept, design, supervision, data collection and/or processing, analysis and/or interpretation, literature search, writing manuscript, critical review.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Funding

The authors declare that this study received no financial support.

References

- Maurer M, Pereira MP, Kolkhir P. The definition, classification, and history of urticaria. *Immunol Allergy Clin North Am.* 2024;44(3):407-19. <https://doi.org/10.1016/j.iac.2024.03.001>
- Zuberbier T, Abdul Latiff AH, Abuzakouk M, Aquilina S, Asero R, Baker D, et al. The international EAACI/GA(2)LEN/EuroGuiDerm/APAAACI guideline for the definition, classification, diagnosis, and management of urticaria. *Allergy.* 2022;77(3):734-66. <https://doi.org/10.1111/all.15090>
- Kolkhir P, Gimenez-Arnau AM, Kulthanan K, Peter J, Metz M, Maurer M. Urticaria. *Nat Rev Dis Primers.* 2022;8(1):61. <https://doi.org/10.1038/s41572-022-00389-z>
- Fok JS, Katelaris CH. Urticaria and mimickers of urticaria. *Front Allergy.* 2023;4:1274031. <https://doi.org/10.3389/falgy.2023.1274031>
- Matos AL, Figueiredo C, Goncalo M. Differential diagnosis of urticarial lesions. *Front Allergy.* 2022;3:808543. <https://doi.org/10.3389/falgy.2022.808543>
- Fukunaga A, Oda Y, Imamura S, Mizuno M, Fukumoto T, Washio K. Cholinergic urticaria: Subtype classification and clinical approach. *Am J Clin Dermatol.* 2023;24(1):41-54. <https://doi.org/10.1007/s40257-022-00728-6>
- Amsler E, Soria A, Doutre MS, Urticaria Group of French Dermatological S. Importance of patients' photographs for urticaria diagnosis. *J Allergy Clin Immunol Pract.* 2019;7(8):2927-8. <https://doi.org/10.1016/j.jaip.2019.05.028>
- Ali Z, Sorensen JA, Zhang DG, Ghazanfar MN, Allerup JAC, Maurer M, et al. Smartphone photographs of chronic urticaria taken by patients are of good quality and useful in the clinic. *Dermatology.* 2024;240(3):357-61. <https://doi.org/10.1159/000535027>
- Maurer M, Weller K, Magerl M, Maurer RR, Vanegas E, Felix M, et al. The usage, quality and relevance of information and communications technologies in patients with chronic urticaria: A UCARE study. *World Allergy Organ J.* 2020;13(11):100475. <https://doi.org/10.1016/j.waojou.2020.100475>
- Zhang DG, Sorensen JA, Pedersen NH, Ali Z, Kocaturk E, Maurer M, et al. Online depiction of urticaria is often flawed and does not reflect the spectrum of clinical manifestation. *Dermatology.* 2024;240(3):507-13. <https://doi.org/10.1159/000535932>
- Stukus DR. How Dr Google is impacting parental medical decision making. *Immunol Allergy Clin North Am.* 2019;39(4):583-91. <https://doi.org/10.1016/j.iac.2019.07.011>

12. Singh AG, Singh S, Singh PP. YouTube for information on rheumatoid arthritis—A wakeup call? *J Rheumatol*. 2012;39(5):899-903. <https://doi.org/10.3899/jrheum.111114>
13. Vural Solak GT, Erkoç M, Solak Y. Understandability and actionability of audiovisual patient education on epinephrine auto-injector. *Asthma Allergy Immunol*. 2024;22:58-66. <https://doi.org/10.21911/aa.438>
14. Durmaz MSB, Sevimli N. Evaluation of Youtube™ videos that are informative on ‘how to use subcutaneous immunoglobulin?’ *Asthma Allergy Immunol*. 2024;22:316-23. <https://doi.org/10.21911/aa.2024.661>
15. Samur ES, Topsakal KG, Aksoy M. YouTube as a source of parents’ information for craniosynostosis. *Orthod Craniofac Res*. 2024;27(Suppl 1):141-9. <https://doi.org/10.1111/ocr.12732>
16. Chou WS, Oh A, Klein WMP. Addressing health-related misinformation on social media. *JAMA*. 2018;320(23):2417-8. <https://doi.org/10.1001/jama.2018.16865>
17. Fox S PK. Chronic disease and the internet. Pew Internet & American Life Project, Washington, DC. March 2010.
18. Antia C, Baquerizo K, Korman A, Bernstein JA, Alikhan A. Urticaria: A comprehensive review: Epidemiology, diagnosis, and work-up. *J Am Acad Dermatol*. 2018;79(4):599-614. <https://doi.org/10.1016/j.jaad.2018.01.023>
19. Sanchez-Borges M, Ansoategui IJ, Baiardini I, Bernstein J, Canonica GW, Ebisawa M, et al. The challenges of chronic urticaria part 1: Epidemiology, immunopathogenesis, comorbidities, quality of life, and management. *World Allergy Organ J*. 2021;14(6):100533. <https://doi.org/10.1016/j.waojou.2021.100533>
20. Bernstein JA, Bouillet L, Caballero T, Staevska M. Hormonal effects on urticaria and angioedema conditions. *J Allergy Clin Immunol Pract*. 2021;9(6):2209-19. <https://doi.org/10.1016/j.jaip.2021.04.021>
21. Saini S, Shams M, Bernstein JA, Maurer M. Urticaria and angioedema across the ages. *J Allergy Clin Immunol Pract*. 2020;8(6):1866-74. <https://doi.org/10.1016/j.jaip.2020.03.030>
22. da Cruz BL, Minato A, Mourao IB, Pereira DN, de Oliveira MH, Schmitt JV. Using the internet to obtain dermatological information on patients from the public health network: A cross-sectional study. *An Bras Dermatol*. 2022;97(4):528-31. <https://doi.org/10.1016/j.abd.2020.12.015>
23. Trepanowski N, Grant-Kels JM. Social media dermatologic advice: Dermatology without dermatologists. *JAAD Int*. 2023;12:101-2. <https://doi.org/10.1016/j.jdin.2023.05.004>
24. Borg JA, Chhoeung S, Georgiou DN, Hau BNC, Gayan TAK, Latifi S, et al. Social media advice for dermatologists. *Skinmed*. 2024;22(5):340-5.
25. Kaya O, Solak SS. Quality, reliability, and popularity of YouTube videos on urticaria: A cross-sectional analysis. *Ital J Dermatol Venerol*. 2023;158(4):347-52. <https://doi.org/10.23736/S2784-8671.23.07588-6>
26. Tan SS, Goonawardene N. Internet health information seeking and the patient-physician relationship: A systematic review. *J Med Internet Res*. 2017;19(1):e9. <https://doi.org/10.2196/jmir.5729>
27. Stevenson FA, Kerr C, Murray E, Nazareth I. Information from the internet and the doctor-patient relationship: The patient perspective—A qualitative study. *BMC Fam Pract*. 2007;8:47. <https://doi.org/10.1186/1471-2296-8-47>
28. Gao Q, Wang X, Lin Z, Liao Z. Internet usage time and trust in doctors: Evidence from China. *BMC Public Health*. 2024;24(1):2891. <https://doi.org/10.1186/s12889-024-20395-y>
29. De DR, Seivright J, Yee D, Hsiao JL, Shi VY. Readability, quality, and timeliness of patient online health resources for urticaria. *J Am Acad Dermatol*. 2022;86(5):1182-5. <https://doi.org/10.1016/j.jaad.2021.04.089>
30. Johnson J, Johnson AR, Jr., Andersen CA, Kelso MR, Oropallo AR, Serena TE. Skin pigmentation impacts the clinical diagnosis of wound infection: Imaging of bacterial burden to overcome diagnostic limitations. *J Racial Ethn Health Disparities*. 2024;11(2):1045-55. <https://doi.org/10.1007/s40615-023-01584-8>