

Hidradenitis Suppurativa Online Documents Readability: An Analysis Including 23 European Languages

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Purpose: Hidradenitis suppurativa (HS) is a complex disease with the vast burden to patients. The aim of the study was to evaluate readability of online electronic materials dedicated to HS.

Patients and Methods: The terms “hidradenitis suppurativa” and “acne inversa” translated into 23 official European Union languages were searched with Google. For each language, first 50 results were assessed for suitability. Included materials were focused on patient’s education, had no barriers and were not advertisements. If both terms generated the same results, duplicated materials were excluded from the analysis. Origin of the article was categorized into non-profit, online-shop, dermatology clinic or pharmaceutical company class. Readability was evaluated with Lix score.

Results: A total of 458 articles in 22 languages were evaluated. The overall mean Lix score was 57 ± 9 . This classified included articles as very hard to comprehend. Across all included languages significant differences in Lix score were revealed ($P < 0.001$). No significant differences across all origin categories and Lix scores were observed (all $P > 0.05$).

Conclusion: Despite the coverage of HS on the Internet, its complexity made it hard to comprehend. Dermatologist should ensure readable, barrier-free online educational materials. With adequate Google promotion, these would be beneficial for both physicians and patients.

Keywords: hidradenitis suppurativa, online education, acne inversa, readability

Introduction

Hidradenitis Suppurativa (HS) is a chronic, inflammatory skin condition that typically occurs after puberty and is characterized by recurring painful nodules, abscesses, sinus tracts, and scarring.¹ It is the most prevalent in the inverse areas of the skin.¹

The estimated prevalence of HS is about 1%, but unfortunately, there is a significant delay of nearly 9 years in the diagnosis and initiation of suitable treatment.^{2–5} Limited understanding of the disease often leads to misdiagnosis of HS by both healthcare professionals and patients.¹ In addition, the affected localized regions (mainly in the intimate area), the clinical presentation, and the long-term nature of the symptoms all serve as major challenges for patients in discussing their disease and seeking medical advice.⁶ While mild HS is typically manageable, traditional methods may not be successful in treating more severe cases of the disease.^{7,8} Biologic treatment has emerged as a promising new therapeutic option in recent research.^{7,8} Although these new medications show great potential, their high cost and limited availability make them uncommon in everyday clinical practice.^{7,8} As a result, HS patients are highly motivated to seek out information on their clinical symptoms, condition and available treatment through online resources, granting them the ability to acquire disease-specific information rapidly and privately.⁵

The increasing trend of using the Internet to make personal health decisions is widely recognized. According to survey results, 70% of American adults who use the Internet selected it as their primary diagnostic resource, making it

the third most favored online activity for personal health purposes.^{8–11} A notable 67% of Internet users consider online health information to be a key factor in their decision-making, emphasizing the importance of reliable sources.¹² It seems reasonable to assume that readability of information found on the Internet is crucial in shared decision-making process between patients and physicians.

There was limited information on the readability of patient electronic materials dedicated to HS. Only readability of HS materials written in English was assessed in previous investigations.^{13–15} These studies classified the examined articles as from dermatologists, non-dermatologists, and non-physicians, potentially limiting the generalizability of their findings.^{13–15} No study examined the correlation between articles abundance and their readability. Finally, previous studies were constrained by the amount of data analyzed. They focused solely on the top 50 results from one Google search in one language, potentially limiting the evidence presented.^{13–15}

The main aim of this study was to conduct multilingual readability analysis of HS-related online materials. Also, prevalence of those materials in included languages was evaluated. The secondary aim was to compare readability of those materials by their source. Finally, correlation between articles abundance and their comprehensibility was examined.

Materials and Methods

The methodology utilized in this study closely resembled that of others author's published works.^{16,17}

Search Method

In this study terms “hidradenitis suppurativa” and “acne inversa” were utilized. Each of them was translated into 23 official European Union (EU) languages. A list of search results was then generated by querying each term in a new session of the Google search engine. Combined search terms such as “hidradenitis suppurativa treatment”, “acne inversa symptoms” and other possible combinations with related words led to similar results lists. They consisted mainly of records that duplicated these obtained with “hidradenitis suppurativa” and “acne inversa”. As a result, combined search terms were not included in the study. Throughout the years, Google remained the most popular internet search engine with over 90% of market share across all devices.¹⁸ Although some patients would prefer using other search engines, their market share was drastically lower, with approximately 3% for Bing, 1% for Yahoo and less than 1% for DuckDuckGo.¹⁸ As a result, these search engines were not included in the analysis. Google often displays articles labeled as “Sponsored” at the top of the search list. These articles were excluded from the analysis. To maintain the credibility of the results, the web browser's private mode was employed and the language for Google Services was set to the language of the searched term.¹⁹ For each session, “Results Language Filter” was encompassed, to ensure that presented results were only in the desired language.¹⁹ This methodology was in accordance with Google's guidelines for searching materials in different languages.¹⁹ Duplicated results were excluded from the analysis if the search results were identical for both terms. The first 50 search results for one term in each language were collected and examined. It was established through previous research that most internet users do not read past the initial 50 hits.^{20–23} Articles related to HS, free to public and focused on patient education were included. Results that were not in the searched term's language, as well as those that required a password or were behind a paywall, were not included in the analysis. Furthermore, scientific articles, videos, personal blogs, online forums, and advertisements were excluded. A website was classified as an advertisement if primarily contained promotional material for a specific drug, medical center, physician and/or did not have focus on patient education.^{17,23} Articles dedicated to medical professionals, physicians, released by regulatory bodies or related to veterinary medicine were ruled out from the analysis. The EU has 24 official languages: Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Irish, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovenian, Spanish and Swedish.²⁴ Google Services did not support Maltese as preferred language of search.²⁵ This language was not included in the analysis.

Readability Assessment

A validated readability measure, Lix was utilized to assess all included materials.^{26,27} Unlike other measures (eg, the Gunning Fogg Index), Lix was proved to be reliable readability measure across several languages (Swedish, Danish, English,

French, German, Finnish, Italian, Spanish, Portuguese).^{17,23,26,27} It is considered by scientific community to be a reliable readability measure for all European languages.^{17,23,26,27} Apart from being easy to calculate and interpret, it bypasses issues with syllabification, which makes it suitable for even such complex languages such as Chinese and Arabic.^{17,23,26,27} The text was transferred to Microsoft Word and then examined, with any unnecessary elements such as affiliations, hyperlinks, figures, legends, disclaimers, adverts, authors information, and copyright notices eliminated. The function “Save as Plain Text” was employed. Microsoft Word was used to proofread and amend any spelling and grammar issues by selecting the appropriate language for the text. Each article was stored as its own file, and the text was subsequently pasted into the Lix calculator on <https://haubergs.com/rix>. The total amount of sentences, words, and average words per sentence, along with the Lix score, were recorded. To interpret Lix score, scale proposed by *Anderson* was utilized.²⁷ Text with score <20 was classified as very easy to comprehend, <30 easy, <40 little hard, <50 hard, and <60 very hard to comprehend.²⁷

Source Classification

Online Shop

Even though the website allowed for online purchases of drugs, prescriptions, laboratory tests, or physician consultations, the released electronic material was not classified as advertisement during the evaluation.

Pharmaceutical Company

The assessed material was not classified as advertisement, it was solely intended for educational purposes and was distributed through the website of a pharmaceutical company (eg, Novartis). The clear presence of brand names, company names, and pop-up adverts in these articles indicated that they were created with a for-profit motive. If there was an option to make purchases on the website, it fell under the category of an “online shop.”

Dermatologic Clinic

Patient electronic material was distributed by the group practice, individual physicians, hospitals, or outpatient clinics. Despite not endorsing any doctor, clinic, or treatment, their non-profit nature was not guaranteed. These web pages contained the necessary contact information, including a phone number, email, and address, for scheduling a consultation or hospital admission. Correspondingly, a website that presented a buying option (such as teleconsultations) was classified as an “online shop.”

Non – Profit

If the article met the following guidelines, the source of the patient electronic material was deemed non-profit: 1) Released by a hospital, practice, or clinic with the primary objective of not generating profit; 2) Published by a non-profit organization committed to aiding those with HS, such as “HS Foundation”; 3) was posted on the website, that its main purpose was not to encourage reader to buy certain drug, laboratory test, book physician consultation or other appliances.

Statistical Analyses

Distribution of the data was evaluated with Shapiro–Wilk test. Across all analyzed languages and origins number of words, sentences, words in one sentence and Lix scores were compared with analysis of variance (ANOVA) or Kruskal–Wallis’s test. Univariate linear regression analysis was utilized to examine correlation between mean Lix score of analyzed articles and number of hits. P value equal or less than 0.05 was statistically significant. Microsoft Word and Excel, version 16.59 (Redmond, USA) was used to aggregate the data. JASP version 16.59 (JASP Team, University of Amsterdam) was utilized to conduct statistical analyses.

Ethical Approval

The study did not involve any animals or animal-based materials. Human participants and their materials and data were also not involved in this study. The utilization of Internet data alone made ethical approval unnecessary.

Results

Prevalence

In general, 458 articles were included in the analysis. A total of 306 articles were received with search term “hidradenitis suppurativa” and 152 with “acne inversa”. There were no statistically significant differences in Lix score; number of words, sentences, and words per sentence between articles obtained with translations of “hidradenitis suppurativa” and “acne inversa” ($P = 0.202$; 0.884 ; 0.567 ; 0.089 , respectively). The most prevalent were articles in Polish (40 articles, 9%), Spanish (39 articles, 9%) and English (38 articles, 8%). Languages with the lowest number of articles were Croatian (1 article, 0%), Czech (3 articles 1%) and Slovak (4 articles, 1%). No Irish articles met the inclusion criteria and was included in the analysis. The highest cumulative number of hits was revealed for German (6.8 million), English (6.5 million) and Czech (6.3 million). The lowest number of total hits was observed for Croatia (6.5 thousand), Bulgaria (8.7 thousand) and Latvia (18.9 thousand). Numbers of hits were not available for Hungarian, Irish, Portuguese, Slovenian and for “acne inversa” in Swedish. Number of included websites, searched queries, and hits was presented in [Table 1](#).

Table 1 Number of Included Online Materials and Hits per Language and Search Term

Language	Search term For HS and AI	Total # hits	Included Websites n (%)
Bulgarian	гноен хидраденит	7340	15(30)
	акне инверса	1320	10(20)
Croatian	Višestruki aksilarni apscesi	3960	0(0)
	Invertirane akne	2590	1(2)
Czech	Hidradenitis suppurativa	5,560,000	3(6)
	Reverzní akné	731,000	0(0)
Danish	Hidradenitis suppurativa	38,600	10(20)
	Akne inversa	37,300	3(6)
Dutch	Hidradenitis suppurativa	5,370,000	24(48)
	Acne ectopica	29,600	8(16)
English	Hidradenitis suppurativa	5,580,000	29(58)
	Acne inversa	953,000	9(18)
Estonian	Suppurativa hidradeniit	484	6(12)
	Akne inversa	186,000	0(0)
Finnish	Hidradenitis suppurativa	4,010,000	6(12)
	Taiveakne	5700	8(16)
French	Hidradénite suppurée	16,100	25(50)
	Acné inversée	89,300	11(22)
German	Hidradenitis suppurativa	5,980,000	10(20)
	Acne inversa	787,000	23(46)
Greek	Υδραδενίτιδα πυώδης	134	15(30)
	αντιστροφή ακμη	94,900	9(18)
Hungarian	Hidradenitis suppurativa	N/A	6(12)
	Acne inversa	N/A	3(6)
Irish	Hidradenitis suppurativa	N/A	N/A
	Acne inversa	N/A	N/A
Italian	Idrosadenite suppurativa	28,600	31(62)
	Acne inversa	873,000	6(12)
Latvian	Suppurativa hidradeniits	222	9(18)
	Pinnes otrādi	18,700	0(0)
Lithuanian	Hidradenitas Pūlingas	1500	7(14)
	Acne inversa	987,000	0(0)
Polish	Ropnie mnogie pach	2460	13(26)
	Trądzik odwrócony	45,200	27(54)

(Continued)

Table 1 (Continued).

Language	Search term For HS and AI	Total # hits	Included Websites n (%)
Portuguese	Hidrosadenite	N/A	22(44)
	Acne inversa	N/A	7(14)
Romanian	Hidradenita supurativă	5890	17(34)
	Acnee inversa	14,600	10(20)
Slovak	Hidradenitis suppurativa	5,030,000	2(4)
	Acne inversa	912,000	2(4)
Slovenian	Supurativni hidradenitis	N/A	11(22)
	Acne inversa	N/A	N/A
Spanish	Hidrosadenitis supurativa	28,100	30(60)
	Acné inverso	153,000	9(18)
Swedish	Hidradenitis suppurativa	5,400,000	15(30)
	Acne inversa	N/A	6(12)

Abbreviations: HS, Hidradenitis Suppurativa; AI, Acne Inversa; #, number of; N/A, not available.

Readability Evaluation

In general, mean values for analyzed articles were 57 ± 9 for Lix score, 56 ± 53 for number of sentences, 860 ± 732 for number of words and 17 ± 5 for average words in sentence. All differences were statistically significant (all $P < 0.001$) and are presented in [Table 2](#).

Table 2 Readability of Hidradenitis Suppurativa Related Articles in European Languages

Language	Lix Score	#Sentences	#Words	#Words/Sentence
Bulgarian	56±6	55±35	868±618	16±4
Croatian	53±N/A	40±N/A	518±N/A	13±N/A
Czech	60±6	37±36	662±690	17±3
Danish	53±15	38±18	676±345	18±9
Dutch	48±5	67±54	912±731	14±2
English	48±10	93±59	1401±819	16±6
Estonian	64±11	59±47	764±564	15±4
Finnish	68±9	82±72	929±837	11±1
French	56±5	54±49	948±810	19±4
German	56±5	63±38	848±450	14±2
Greek	60±5	42±34	817±605	20±4
Hungarian	64±12	31±14	409±194	14±5
Irish	N/A±N/A	N/A±N/A	N/A±N/A	N/A±N/A
Italian	63±7	53±109	925±1416	21±6
Latvian	58±6	68±81	801±851	13±3
Lithuanian	63±4	37±19	478±268	13±3
Polish	66±6	41±22	581±303	15±3
Portuguese	54±6	33±21	615±384	19±3
Romanian	58±5	64±36	1019±623	17±4
Slovak	60±8	82±107	1210±1541	16±2
Slovenian	55±10	57±44	882±602	16±3
Spanish	54±8	51±40	836±562	19±6
Swedish	49±5	49±28	697±346	15±3

Notes: Data were presented as mean only 1 article in Croatian was included in the analysis, thus standard deviation calculation was irrelevant. No articles in Irish were included. Differences between lix score, number of sentences, words and words/sentence were statistically significant. All $P < 0.001$. Lix was normally distributed, and P was calculated with ANOVA test. Number of sentences, words and average words in sentence were not normally distributed and respective P were calculated with Kruskal–Wallis's test.

Abbreviations: ±, standard deviation; #, Stands for number; N/A, not available.

Articles in English (48 ± 10), Dutch (49 ± 5) and Swedish (49 ± 5) had the lowest mean Lix scores and were the most comprehensible. The highest mean Lix scores were revealed for articles in Finnish (68 ± 9), Polish (66 ± 6) and Hungarian (64 ± 12). Articles in these languages were the most difficult to comprehend. The mean Lix values are presented in Figure 1.

No articles in included languages had mean Lix score <30 or <40 and were classified as easy or little hard to comprehend. Articles in Dutch, English and Swedish were classified as hard to comprehend. Articles in remaining languages were classified as very hard to comprehend. The highest average number of sentences per article were found for English (93 ± 59), Slovak (82 ± 107) and Finnish (82 ± 72). The lowest average number of sentences were found for Hungarian (31 ± 14), Portuguese (33 ± 21) and Czech (37 ± 35). Articles in English (1401 ± 819), Slovak (1210 ± 1541) and Romanian (1018 ± 623) had the highest mean number of words. The opposite was observed for articles in Hungarian (409 ± 194), Lithuanian (478 ± 268) and Polish (581 ± 303). The highest mean number of words per sentence was observed for Italian (21 ± 6), Greek (20 ± 4) and Portuguese (19 ± 3). The opposite was revealed for articles in Finnish (11 ± 1), Latvian (13 ± 3) and Lithuanian (13 ± 2).

Readability and Origin

There was no statistically significant difference between Lix score and origin of the articles ($P = 0.670$). Differences between origin of the article and words/sentence ratio per article were also not statistically significant

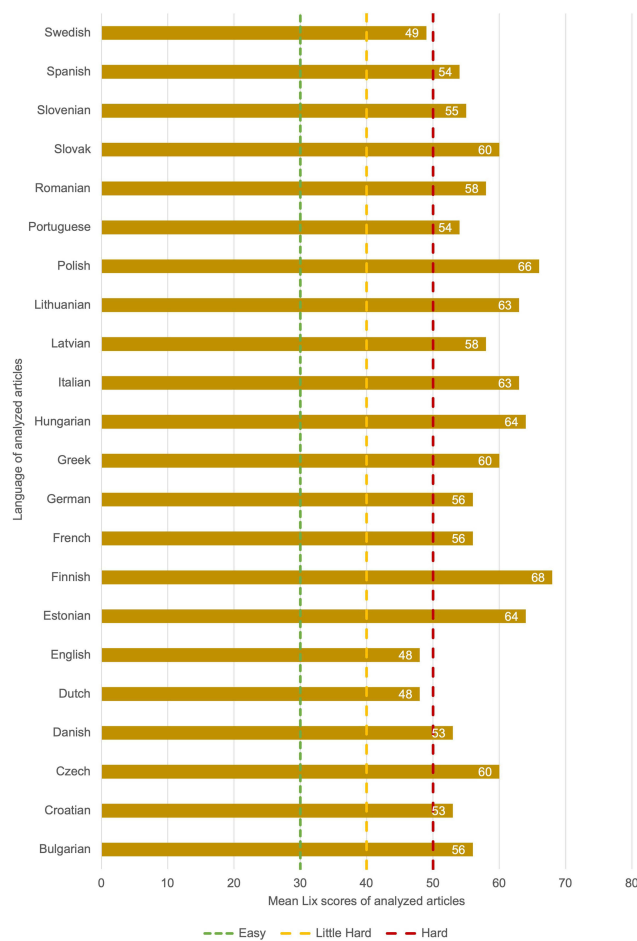


Figure 1 Title: Mean Lix scores of articles in the included languages.

Notes: Readability of hidradenitis suppurativa online articles in European languages. No articles in Irish met inclusion criteria. Maltese language was excluded. Google engine did not support this language. Easy refers to Lix score <30 and classifies text as easy to comprehend. Little hard refers to Lix score <40 and classifies text as little hard to comprehend. Hard refers to Lix score <50 and classifies text as hard to comprehend.

Table 3 Readability of Hidradenitis Suppurativa Related Articles by Their Origin

Source	Lix score	# Sentences	# Words	# Words/Sentence
Non-profit	56 ± 9	57 ± 60	878 ± 821	17 ± 5
D. Clinic	56 ± 9	49 ± 38	749 ± 504	17 ± 4
Online-Shop	58 ± 9	75 ± 51	1148 ± 720	16 ± 5
P. Company	58 ± 11	46 ± 39	713 ± 573	16 ± 5
P value	0.670*	0.015	<0.001	0.679*

Notes: All values were presented as mean Lix was normally distributed, and *P* was calculated with ANOVA test. Number of sentences, words, and average words in sentence in article were not normally distributed and respective *P* were calculated with Kruskal–Wallis's test. *These results were not statistically significant.

Abbreviations: P, pharmaceutical; D, dermatology, #, number of; ±, standard deviation.

(*P* = 0.679). The lowest mean number of words was observed for articles released by pharmaceutical companies (713 ± 573) and dermatology clinic (749 ± 504). The opposite was observed for online shops (1148 ± 720) and non-profit organizations (878 ± 821). Articles released by online shops (75 ± 51) and non-profit organizations (57 ± 60) had the highest number of sentences per article. Dermatologic clinics (49 ± 38) and pharmaceutical companies (46 ± 39) released articles with the lowest number of sentences per article. Detailed data was presented in Table 3.

Prevalence and Readability

Univariate linear regression analysis was calculated to examine correlation between number of Google search hits and readability of included articles. No significant correlation was revealed ($R^2 = 0.086$, *P* = 0.224).

Discussion

Presented results suggests that while the internet offers a wealth of knowledge about HS, the comprehensiveness of the available materials is not optimal. This fact is underscored by the classification of materials in any included languages as easy to comprehend. The materials in Dutch, English, and Swedish were the only ones out of 23 languages that were classified as little hard to comprehend. The readability level of materials in other languages was classified as very hard. The results indicated that the origin of online materials had no effect on this difficulty. The included materials across all source classes showed no statistically significant differences in readability levels. The data presented that the volume of information did not translate to clarity when it comes to online HS-related content. There was no correlation between the number of hits and the mean Lix scores. These facts bring following implications.

HS is a complex disease that poses difficulties in diagnosis. It was demonstrated that the identification of HS following the primary manifestation of symptoms varied between 3 and 10 years, while most of the research found a delay of 6 to 10 years.²⁸ It was observed that individuals affected with HS typically consult with an average of three or more physicians and get a minimum of three incorrect diagnoses prior to receiving an accurate diagnosis of HS, which is most frequently made by a dermatologist.^{29,30} In recent survey, only 23.7% primary care physicians reported feeling confident in diagnosing HS.³¹ Both physicians and patients educate themselves on the Internet.³² The availability of professional literature on HS in non-dermatology journals is limited.³³ Doctors commonly utilize online materials intended for the public to make clinical decisions.³² It seems reasonable to assume that low readability of online materials dedicated to HS make the diagnostic process of HS more time-consuming and laborious. Information seeking doctors could be distracted and deterred by low comprehensibility of online materials. Failure to obtain the necessary information could result in a prolonged delay in making a diagnosis. Patients who seek to educate themselves on their symptoms could encounter difficulties in understanding online resources that lack clarity and coherence. The age of the Internet led patients to search for information about their symptoms and compare their own diagnosis with the medical knowledge of their doctor during a face-to-face appointment. Patients' remarks and arguments during appointments can

help guide the physician towards the correct diagnosis. Consequently, it could be concluded that the lack of readable HS online resources may impact the timeliness of HS diagnosis. Due to progressive nature of HS, timely diagnosis is paramount.³⁴ Even short delays in a diagnosis lead to irreversible scarring.²⁸

HS was associated with smoking, obesity, and other risk factors for cardiovascular disease.^{35,36} Many experts consider HS to be a systematic inflammatory disease because of its associations with inflammatory bowel disease (IBD), axial spondyloarthritis and autoinflammatory syndromes.³⁵ Cutaneous IBD – Crohn's disease, was identified as an important differential diagnosis of HS.³⁷ All of these make the HS a disease that requires complex diagnostic and behavioral interventions. Despite the positive impact of smoking cessation and weight loss on clinical outcomes in patients with HS,^{35,36} these interventions require the patient's cooperation. Colonoscopy is recommended to rule out Crohn's disease.³⁸ Lack of understanding about the disease could make patients reluctant to undergo this intimate and invasive procedure. Similarly, HS management involves long term pharmacological treatment, surgical procedures and the full resolution of the disease could not be guaranteed.^{35,36} This requires patient's patience and compliance, what is hard to ensure without proper education. All of these, underscore an overwhelming need in improvement of online materials readability dedicated to HS.

Similar results were presented for other dermatological diseases, such as psoriasis, urticaria and rosacea.^{39–41} In this new era of immunomodulators in dermatology, it is crucial to ensure easily accessible and comprehensive online resources for patient education.^{39–41} Internet resources became a backstage factor in making successful shared therapeutic decisions between physicians and patients. The HS patients are not exempt. Dermatologist should take actions to ensure readable online materials for the HS patients. In the present study, no source was associated with better readability. Other studies revealed that web pages written by the dermatologist were more comprehensive and medically accurate than others.^{13,14} A potential solution could be to share medically validated materials from reputable dermatology institutions, including clinics and non-profit organizations, that are accessible and easy to understand. The authors identified only one such action undertaken by the HS tertiary referral center.⁴² Despite being clear, accurate, and free of barriers, the material's low placement on the Google search results list made it hard to find. Web promotion is available through the Google search engine.⁴³ By promoting a website, it gains visibility and is more likely to be clicked on by users as it appears at the top of search results list.³⁶ Promotion of verified comprehensible materials that are attractive for the Internet users could be a potential solution. Top-searched materials could resolve doubts of patients with HS and then lead to satisfying diagnostic and therapeutic outcomes.

Present study had following limitations. First, Lix score was originally designed to evaluate comprehensibility of newspaper articles in Swedish.²⁷ Although it was validated on various languages as reliable measure of readability (Swedish, Spanish, Portuguese, Italian, French, Finnish, German, English, Danish),^{26,27,44,45} no studies that evaluated Lix in other included languages were found. However, Lix is recognized by scientific community as reliable readability measure for all European languages.^{17,26,27} It could be not also excluded, that different readability thresholds would be suitable for other included languages. The results of a Google search may fluctuate depending on the location and date of the search.²⁵ The study was performed in Poland and Google search results were evaluated between 23 January 2024 and 31 January 2024. Selection of Google as the search engine could also bias the results. Google promotes certain materials due to commercial reason. Top positions of the articles could be not only related to user's interest. As a result, inclusion of the first 50 articles could lead to some bias. Despite their role as sources of information for patients, advertisements and other social media platforms were not included in the study. Quality of the included articles was not evaluated. This was outside the intended scope of study, but it is a potential area for further research.

Conclusion

The Internet ensures plenty of barrier free online materials related to HS. The readability of the presented information was revealed to be very low. The absence of easily comprehensible HS information on the Internet can contribute to delayed diagnosis, which is a lengthy process by itself. Diagnostic, management, and treatment of HS rely on patient's cooperation, compliance, and patience. Without proper educational materials this could be difficult to achieve. Presented finding suggested a great need for dermatologist involvement in creation of comprehensible, multilingual online information for patients and medical professionals about HS. Optimizing the Google search engine for these websites

could be favorable. The significant number of hits for HS-related search terms further emphasizes the importance of this topic for the public.

Data Sharing Statement

The datasets generated and analyzed in the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

The study did not involve any animals or animal-based materials. Human participants and their materials and data were also not involved in this study. The utilization of Internet data alone made ethical approval unnecessary. Informed consents from patients were not applicable.

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Disclosure

Jacek C. Szepietowski has served as an advisor for AbbVie, LEO Pharma, Menlo Therapeutics, Novartis, Pierre Fabre, Sienna Biopharmaceuticals, and Trevi; has received speaker honoraria from AbbVie, Eli Lilly, Janssen, LEO Pharma, Novartis, Sanofi-Genzyme, Sun Pharma, and Berlin-Chemie Mennarini; has served as an investigator; and has received funding from AbbVie, Amgen, Galapagos, Holm, Incyte Corporation, InflaRX, Janssen, Menlo Therapeutics, Merck, Boehringer Ingelheim, Novartis, Almirall, Pfizer, Regeneron, Trevi, and UCB. Other authors report no conflicts of interest in this work.

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