

# Readability and Content Characterization of Online Reading Materials for Individuals With Vitiligo

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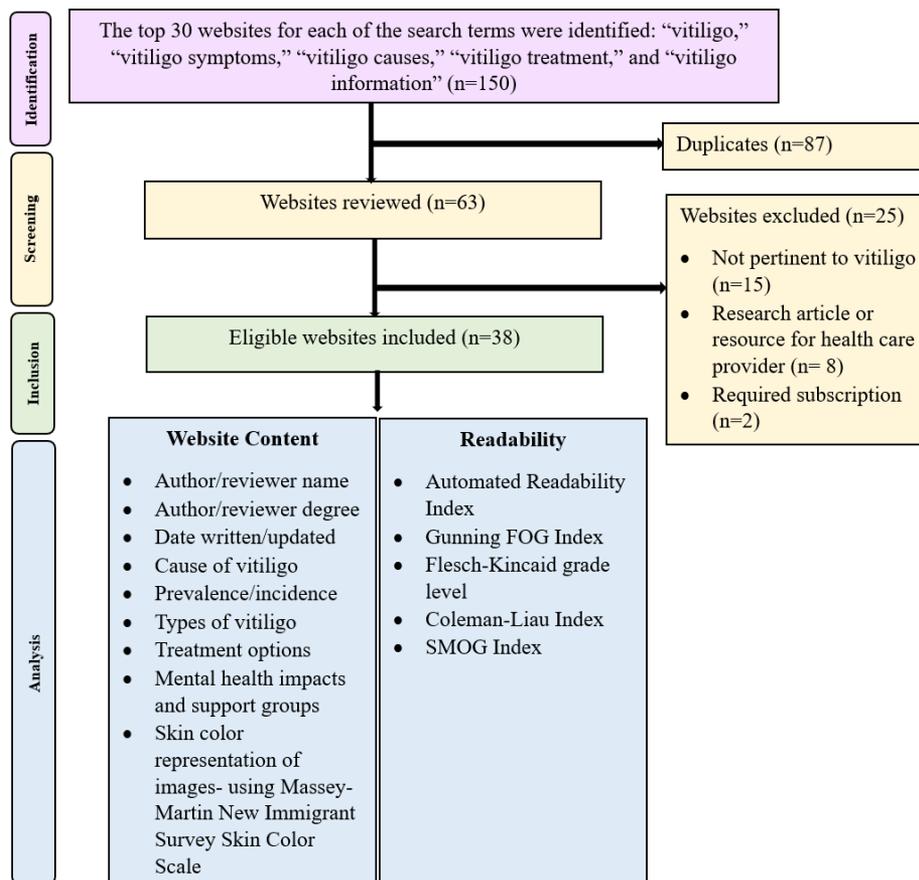
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## To the Editor:

Online health resources expand availability of medical information, however, if written at a reading level that is too advanced, may inadvertently lead to confusion or misunderstanding in those with low health literacy.<sup>1</sup> In certain populations, this can exacerbate health disparities.<sup>1</sup> The American Medical Association (AMA) recommends a sixth-grade reading level or below in the creation of patient resources.<sup>2</sup> The objectives of this study were to determine the readability of online reading materials for vitiligo in the English language and characterize the website content of these resources.

In November 2023, an incognito Google search was performed with the following search terms: “vitiligo,” “vitiligo causes,” “vitiligo symptoms,” “vitiligo treatment,” and “vitiligo information” (Figure 1). The top 30 websites for each search term were screened. Websites requiring a subscription, duplicates, research articles, resources for healthcare providers, and websites not pertinent to vitiligo were excluded.<sup>3</sup> The readability of each website was determined using the validated readability scales available on readabilityformulas.com, including the Flesch-Kincaid grade level, Gunning FOG

**FIGURE 1.** Flow diagram for the selection and assessment of top vitiligo patient education websites on Google.



Index, SMOG Index, Coleman-Liau Index, and the Automated Readability Index. Websites were reviewed for author/reviewer information, date written/updated, website content, and image skin color representation. To rate skin color, the Massey-Martin New Immigrant Survey Skin Color Scale was used. Skin colors 1 to 2 were categorized as light/white, 3 to 5 as medium/brown, and 6 to 10 as dark/black.<sup>4</sup>

Of the 150 websites identified, 38 were eligible. Across the 38 websites, the average reading level was at a tenth-grade level (10.5, range: 8.02-14.9). Less than a third (28.9%, n=11) of websites were written/reviewed by a dermatologist and roughly half (52.6%, n=20) reported the date they were written and/or updated. Of the websites reporting this information, 85.0% (n=17) were written and/or updated within the past two years.

A majority of the websites (97.4%, n=37) mentioned the cause of vitiligo and most (57.9%, n=22) discussed prevalence and/or incidence data. The reporting of vitiligo treatment options varied across websites (Table 1). Several websites described the psychosocial impacts of vitiligo (78.9%, n=30) and vitiligo support groups (71.1%, n=27). Among the 25 websites featuring photographs of individuals with vitiligo, light/white (72.0%, 18/25) and medium/brown (69.0%, 17/25) skin colors were most

**TABLE 1.**

Website Content and Image Representation Across Online Health Resources for Individuals With Vitiligo	
Website Content (n=38)	Number (%)
Reported name of author/reviewer	13 (34.2%)
Written or reviewed by a dermatologist	11 (28.9%)
Date written/updated reported	20 (52.6%)
Cause of vitiligo reported	37 (97.4%)
Prevalence/incidence reported	22 (57.9%)
Types of vitiligo reported	25 (65.8%)
Mention of mental health impacts	30 (78.9%)
Mention of support groups	27 (71.1%)
Treatment Options	
Phototherapy	34 (89.5%)
Surgical treatment/grafting	30 (78.9%)
Topical steroids	29 (76.3%)
Camouflage	26 (68.4%)
Depigmentation	24 (63.2%)
Topical calcineurin inhibitors	23 (60.5%)
Oral steroids	13 (34.2%)
Ruxotilinic	13 (34.2%)
Vitamins/antioxidants	11 (28.9%)
Skin color representation (n=25)	
Light/white	18/25 (72.0%)
Medium/brown	17/25 (69.0%)
Dark brown/black	12/25 (48.0%)

often represented, whereas dark/black skin colors (48.0%, 12/25) were least represented.

With the expanding role of social media/internet as an information source, this study emphasizes the importance of creating readable, diverse, comprehensive, and where applicable, evidence-based vitiligo reading materials. Similar to a prior study analyzing vitiligo websites in the Arabic language, no websites met the AMA's recommended sixth-grade reading level.<sup>5</sup> If the readability of content is too advanced, this limits the usability of online health information among individuals with low health literacy.<sup>1,5</sup> This is especially important considering that low levels of literacy are a prevalent problem in the United States (US), with the US Department of Education estimating that about 54% of adults in the US ages 16 to 74 read at a level below the sixth grade.<sup>6,7</sup> Further, prior studies have noted certain populations are more vulnerable to experiencing low health literacy.<sup>8</sup> Some of these groups include racial/ethnic minorities, immigrants, individuals with lower educational attainment, and those speaking a non-English language at home.<sup>8</sup> Dermatologists, authors, and reviewers of vitiligo reading materials should consider the AMA's grade level recommendations in the creation and dissemination of online educational resources for individuals with vitiligo. In addition, dermatologists have an essential role in directing those with vitiligo to credible and comprehensive online reading materials. Advancements in these areas can promote digital health equity, increasing the usability of educational resources among marginalized communities.

## DISCLOSURES

Dr Elbuluk has served as a consultant, advisory board member, and/or speaker for Avita, Incyte, VisualDx, Beiersdorf, Unilever, Eli Lilly, Galderma, Pfizer, La Roche Posay, L'Oreal, McGraw Hill, Dior, Medscape, Abbvie, Takeda, Sanofi. She has received royalties from McGraw-Hill. She has stock options in VisualDx. AMH has no disclosures to report.

## REFERENCES

- Rodriguez F, Ngo S, Baird G, et al. Readability of online patient educational materials for coronary artery calcium scans and implications for health disparities. *J Am Heart Assoc.* 2020;9(18):e017372. doi:10.1161/JAHA.120.017372
- Weis BD. Health literacy: a manual for clinicians. American Medical Association Foundation and American Medical Association; 2003. <http://lib.ncfh.org/pdfs/6617.pdf>
- De DR, Seivright J, Yee D, et al. Readability, quality, and timeliness of patient online health resources for urticaria. *J Am Acad Dermatol.* 2022;86(5):1182-1185. doi:10.1016/j.jaad.2021.04.089
- Lamb JE, Stone AX, Davis EM, et al. Visual learning equity: a course auditing system of skin color in preclinical medical education. *Fam Med.* 2023;55(6):375-380. doi:10.22454/FamMed.2023.766642
- Alghanemi L, Sanad SA, Alzahrani FS, et al. The evaluation of the informational content, readability, and quality of online information related to vitiligo in the Arabic Language. *Cureus.* 2022;14(10):e30497.
- Rothwell J. Assessing the Economic Gains of Eradicating Illiteracy Nationally and Regionally in the United States. Barbara Bush Foundation for Family Literacy. September 2020. Accessed June 3, 2024. [https://www.barbarabush.org/wp-content/uploads/2020/09/BBFoundation\\_GainsFromEradicatingIlliteracy\\_9\\_8.pdf](https://www.barbarabush.org/wp-content/uploads/2020/09/BBFoundation_GainsFromEradicatingIlliteracy_9_8.pdf)
- Schmidt E. Reading the Numbers: 130 Million American Adults Have Low Literacy Skills, but Funding Differs Drastically by State. American Public Media. Available from: <https://www.apmresearchlab.org/10x-adult-literacy>. Accessed June 3, 2024.
- Health People 2030. Language and Literacy. Office of Disease Prevention and Health Promotion. N.d. Available from: <https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/language-and-literacy>. Accessed June 3, 2024.

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