



# Quality of Patient-Oriented Online Information for Type 2 Diabetes: A Descriptive Study

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## Background

- The internet has changed patient access to medical information and has become the primary source patients use for their medical knowledge.<sup>1,2</sup>
- It can widely vary in its accuracy as well as the difficulty in reading and compensability.
- Type 2 diabetes has a global prevalence of 10.5% in 2021 and an estimated 32.2 million individuals diagnosed in the United States.<sup>3</sup>
- The American Medical Association (AMA) recommends the reading level of patient-oriented information be no higher than 6<sup>th</sup> grade.<sup>4</sup>

## Methods

- An internet query for the search terms “Type 2 Diabetes,” “Metformin,” “Insulin,” and “Ozempic Diabetes” was performed using Google incognito.
- The top 10 relevant, patient-oriented websites were included for each search terms.
- Scientific articles and advertisement links were excluded.
- The following readability statistics were collected: number of sentences, number of words, number of complex words, percentage of complex words, average words per sentence and average syllables per word.
- This was used to calculate readability indices including calculated: Flesch Kincaid Grade Level (FKGL) and Gunning Fog Index (GFI).

## Results

- Among the 40 websites, the average FKGL, which indicates the United States grade level necessary to understand the material, was 7.13 (SD: 0.80, range 5.7-8.7) and the average GFI, which represents the educational level needed to understand the text, was 8.78 (SD: 1.05, Range 6.8-11.1; Table 1).
- The search term “Insulin” had both the highest FKGL as well as GFI showing and the search term “Ozempic Diabetes” had the lowest FKGL and was tied for the lowest GFI.

Table 1: All Search Terms

Search Term	Flesch Kincaid Grade Level	Gunning Fog Score
Type 2 Diabetes	7.3	8.4
Metformin	6.9	9.0
Insulin	7.5	9.4
Ozempic Diabetes	6.8	8.4

Table 2: Search Term “Type 2 Diabetes”

Website	Flesch Kincaid Grade Level	Gunning Fog Score
mayoclinic.org	7.8	8.3
clevelandclinic.org	8.3	10.7
medlineplus.gov	8.5	7.8
niddk.nih.gov	6.3	7.9
cdc.gov	6.6	6.8
diabetes.org	6.8	7.2
webmd.com	7.0	8.0
health.harvard.edu	7.7	10.1
healthline.com	6.9	8.6
mountsinai.org	7.1	8.6

Table 4: Search Term “Insulin”

Website	Flesch Kincaid Grade Level	Gunning Fog Score
clevelandclinic.org	8.7	11.1
wikipedia.org	8.5	9.3
medicalnewstoday.com	7.5	9.9
diabetes.org	6.9	7.6
mayoclinic.org	7.2	8.0
niddk.nih.gov	8.0	9.7
healthline.com	7.0	9.4
webmd.com	6.2	7.6
medlineplus.gov	7.5	10.1
betterhealth.vic.gov.au	7.8	10.9

Table 3: Search Term “Metformin”

Website	Flesch Kincaid Grade Level	Gunning Fog Score
webmd.com	6.4	8.9
mayoclinic.org	7.1	8.7
medlineplus.gov	7.9	10.2
health.harvard.edu	7.6	9.8
nhs.uk	5.7	9.3
clevelandclinic.org	7.4	8.7
wikipedia.org	8.1	8.1
medicalnewstoday.com	6.5	8.8
diabetes.org.uk	5.4	8.2
healthline.com	7.2	9.3

Table 5: Search Term “Ozempic Diabetes”

Website	Flesch Kincaid Grade Level	Gunning Fog Score
health.ucdavis.edu	6.9	8.6
diabetes.org.uk	5.9	8.0
webmd.com	6.8	8.5
mayoclinic.org	7.3	8.8
healthline.com	6.9	8.5
uchealth.org	7.2	9.3
health.harvard.edu	5.8	8.0
wikipedia.org	7.7	7.7
nbcnews.com	6.0	7.0
novocare.com	7.1	9.2

## Conclusions

- Only four of the 40 websites had a FKGL less than 6.0.
- These findings demonstrate that online education for diabetes is more complex than recommended by the AMA for patient-oriented information.
- While there is a plethora of information online for patients to investigate, much of it may be too complex for the public to understand.
- Patients may misinterpret the medical information, possibly increasing their frustration and distrust in the medical system as they try to advocate for their own care.
- Limitations of this study include the website selection being only based off website population on a specific day.
- It is important to understand the type of information patients may be consuming online so we can better communicate with and educate our patients.

## References

- <sup>1</sup> Wald HS, Dube CE, Anthony DC. Untangling the web—the impact of internet use on health care and the physician-patient relationship. Patient Educ Couns. 2007;68(3):218–224.
- <sup>2</sup> Wang L, Wang J, Wang M, et al. Using internet search engines to obtain medical information: a comparative study. J Med Internet Res. 2012;14(3):e74.
- <sup>3</sup> Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, Stein C, Basit A, Chan JCN, Mbanya JC, Pavkov ME, Ramachandran A, Wild SH, James S, Herman WH, Zhang P, Bommer C, Kuo S, Boyko EJ, Magliano DJ. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract. 2022 Jan;183:109119.
- <sup>4</sup> Weis BD. Health literacy: a manual for clinicians. American Medical Association Foundation and American Medical Association; 2003.