Treatment for Constipation—An Online Search. Readability and Quality of Online Patient Resources

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Abstract

Aim: To evaluate the readability and quality of online patient information regarding treatment for constipation in the English language. **Methods:** By utilizing the Google © website, the keyword "treatment for chronic constipation" was searched. Each webpage was assessed by 2 authors independently for readability using both the Gunning Fog Index (GFI) and the Flesch Reading Ease Score (FRES). The quality of the information produced on each individual website was assessed using the DISCERN instrument. Other parameters that were recorded included the country of origin, the organization type, and whether or not the website was issued a Health on the Net (HoN) certificate. **Results:** This study identified a mean GFI score of 13.2 and a mean FRES score of 48.9. This result indicates poor overall readability. A mean DISCERN score of 37.9 was produced, indicating an overall weak quality of online information on this topic. This study indicated that parameters such as website organization type and the presence or absence of HoN certification impacted the quality of the information websites on this topic. **Conclusion:** This study indicated a poor level of quality and readability of online information on the topic of chronic constipation treatment. Further resources should be directed towards improving website readability and quality. Patients may be advised that if they wish to access online information on this topic, websites that display HoN accreditation will likely produce higher quality information.

Keywords

Clinician–patient relationship, communication, education, patient education, patient engagement, patient expectations, patient safety, quality improvement

Introduction

Individuals can be described as experiencing chronic constipation when they have <3 bowel movements per week and >1 of the following symptoms for >6 months: pain during defecation; lumpy/hard faces; and the sensation of incomplete evacuation (1,2). According to 1 meta-analysis, the pooled prevalence of chronic idiopathic constipation globally in adult patients was 14%. The papers included in these meta-analyses considered both newly reported and repeat cases of chronic idiopathic constipation (3). This number is likely an underestimation considering individuals suffering from constipation do not necessarily seek medical advice (4). Studies have shown that chronic constipation is more commonly seen in women, older individuals and those of a lower socioeconomic status (3).

The Rome IV criteria can be utilised to categories disorders of chronic constipation into 4 subtypes: functional constipation, irritable bowel syndrome with constipation, opioid-induced constipation, and functional defecation disorders including inadequate defecatory propulsion and dyssynergic defecation. The initial management approach for these disorders can include modification of diet, lifestyle, and the use of standard laxatives. Despite the various treatment options available, many patients still report dissatisfaction with their treatment (3,4).

Information from the internet can be a significant factor that influences a patient's treatment decisions (5). Our

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study aims to identify the readability and quality of patient information on this topic online and determine ways in which improvements can be made to the way in which patients access this information.

Consumer-targeted health information websites can enhance the knowledge levels of patients, and therefore improve the quality of care. Patients can access online health information by searching the internet for health information and treatments, participating in online support groups and by consulting with health professionals through the likes of virtual consultations. Health information websites targeted at patients generally include a background or definition in layman terms of the condition discussed, how it is generally diagnosed, the treatment options and advice on when to seek help from a healthcare professional. Websites that encompass any of the above may be considered as "health information" websites. Despite efforts, recent evidence shows that refinement is needed in the design of information systems in this area (6,7). Online healthcare information must be accurate and accessible with a patient-centered focus. The majority of patients with health-related queries tend to initially utilize search engines such as Google. Medical-based websites on the internet lack regulation and may potentially provide inaccurate or harmful information to patients. This paper aims to identify parameters that indicate a higher quality medical information site so that patients can take advice accordingly.

Research has indicated that online medical information pertaining to stomas, breast reconstruction post-mastectomy, carotid endarterectomies, and arteriovenous fistulas have been shown to be of poor quality and readability (7–9). Over 6.75 million health-related searches are performed each day on Google alone (10). The Net Market Share website shows that the most used search engine is Google, controlling over 90% of the global search engine market share in 2020 (9). As Google has been shown to be the most popular search engine, we utilized it in this study to identify search results produced when patients seek information on the treatment of chronic constipation.

Methods

Using Google © search engine (Google.com), the search string "treatment for chronic constipation" was searched for in Texas, USA. Searches were performed in "incognito" mode on the Google Chrome browser to limit the potential of cookie data affecting the results produced. As most consumers visit fewer than 25 sites found on a given search, with the most accessed links being in the top 5 ranks of the search results, we analyzed the top 70 websites to adequately cover the most commonly visited sites (11). Google settings were set such that only English language results were displayed. The search results displayed per page can vary according to user settings. For the purpose of this study, we utilized the default "10 results per page" setting.

Each website was assessed independently by 2 authors (R.B. and S.G.) for quality and readability. Previous internet usage studies have shown that the first page of Google captures 71% of search traffic links and the first five results on a given search receive 67.7% of clicks (11). Hence, the first 15 websites were analyzed according to organization type.

Website demographics include country of website origin, type of organisation producing the site (commercial company, health care provider, academic institution, charitable organization, layperson, government, or news outlet), and presence of Health on the Net (HoN) Certification status was recorded. The HoN organization provides a listing of websites deemed by the Economic and Social Council of the United Nations to be a reliable and useful source of healthcare-associated information. Registration with this website is entirely voluntary, and all websites undergo examination before certification (12).

Website quality was assessed objectively utilizing the DISCERN instrument. This instrument is composed of 16 questions addressing the reliability and quality of the online content as a source of information about treatment options. The DISCERN instrument was chosen for this analysis as it has been shown to be a reliable and validated instrument for judging the quality of written consumer health information (13). Key topics explored by the DISCERN instrument include the aims of the paper, the relevancy, the information sources utilised to form the publication and treatment advice given to the patient. Each website was rated by the reviewers (R.B. and S.G.) in the context of the subject of the site on a 5-point scale. The 2 aforementioned reviewers were educated on the management of constipation by 2 colorectal surgery attendings (N.L. and S.M.) prior to website review. Individual DISCERN questions scores within 2 points were considered to be in agreement. Disagreement of >2 points led to reassessment of the publication by N.L. with extensive discussion amongst reviewers to arrive at a consensus.

Readability is defined as the ease with which written material can be read and understood. The Flesch Reading Ease Score (FRES) and Gunning Fog Index (GFI) were used to evaluating readability.

The GFI measures the readability of English writing. The index estimates the years of formal education needed to understand the text on a first reading. Lower scores in the GFI indicate material that is easier to read (Table 1).

The FRES rates English on a 100-point scale and is designed to indicate comprehension level. This tool was initially developed by Rudolph Flesch in the early 1900s and was produced initially as a valuable marketing tool. Higher scores indicate material that is easier to read, for example scores of 90-100 are easily understood by an average English-speaking 11-year-old. Scores between 60 and 70 represent a standard readability level, easily understood by 13- to 15-year-old English-speaking students (Table 2).

Table 1. Definition of Formal Education Level Required to Understand Text with Indicated Gunning Fog Index (GFI) Scores.
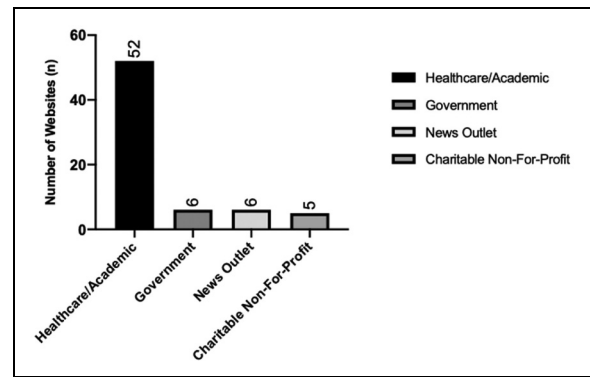
GFI score	Notes
4.9 or lower	Easily understood by an average 4th-grade student or lower
5.0-5.9	Easily understood by an average 5th- or 6th-grade student
6.0-6.9	Easily understood by an average 7th- or 8th-grade student
7.0-7.9	Easily understood by an average 9th- or 10th-grade student
8.0-8.9	Easily understood by an average 11th- or 12th-grade student
9.0-9.9	Easily understood by an average 13th- to 15th-grade student
10.0 and higher	Easily understood by an average college graduate

Table 2. The Flesch Reading Ease Score (FRES) Rates English Text on a 100-Point Scale and is Designed to Indicate Comprehension Level.

FRES score (100 possible)	Test difficulty	Level of understanding
90-100	Easy text	Primary school
70-90	Simple text	Below average reading level
60-70	Standard text	Standard reading level
30-60	Difficult text	Above-average reading level
0-30	Complex text	Graduates

Other tools exist that can be used to assess the clarity of public health information. These include the likes of the Clear Communication Index, developed by the Centers for Disease Control and Prevention in 2019. It consists of a 20-item index that includes parameters such as the "main message," "language used," "information design," "state of the science," "behaviourial recommendations," "numbers," and "risk." Although this tool may be a useful adjunct to analyze any given website in greater depth, it was not included in our statistical analysis for this paper.

Descriptive statistics were calculated for readability and quality scores present as mean (SD) for normally distributed variables or median (range) for skewed distributions. Group means were compared using Welch t-tests for multiple comparisons. The Welch t-test was utilized in this study as samples were assumed to have unequal variances and consist of unequal sample sizes. Inter-observer variability was calculated using the Welch t-test. A p-value of .05 was considered statistically significant. Statistical analysis was conducted with SPSS (SPSS Inc.).

Figure 1. Breakdown of applicable websites by group.

Results

The search performed produced 64,800,000 results. We analyzed the top 70 web pages for this study. Sixty-nine of these were suitable for analysis.

Nine percent (n = 6) of the websites analyzed originated from a news outlet website and 75% (n = 52) were from healthcare or academic websites. The remaining sites were 7% (n = 5) from non-for-profit websites and 9% (n = 6) from government websites, respectively (Figure 1).

Of the top 15 websites, 53% (n = 8) originated from healthcare or academic websites and 27% (n = 4) originated from a news outlet source. The remaining sites were 13% (n = 2) from non-for-profit websites and 7% (n = 1) from government websites, respectively (Figure 2). Eighty percent (n = 12) had HoN accreditation.

Eighty-eight percent (n = 61) of the websites were from the United States of America, 6% (n = 4) were from the United Kingdom, 4% (n = 3) were of Canadian origin, and 1% (n = 1) from Australia (Figure 3).

The mean DISCERN score was 37.9, indicating a poor level of quality within the individual sites. Inter-observer agreement was within the acceptable distribution (p = .005). Website quality was affected by organization type with news outlet sources significantly impacting website quality (p = .018) (Figure 4). Calculations of the T value and F distribution value indicated that although the average value of the DISCERN scores of various websites was different, according to the perception of authors (S.G. and R.B.), the overall variance and spread of the distribution is equal. This indicates that poor quality sites were scored relatively lower and higher quality sites scored higher by both authors. This finding implies a positive result in assessing the uniformity of the DISCERN score.

Website quality was also significantly impacted by the presence of HoN certification (p = .029). Thirty-five percent (n = 24) of the websites displayed HoN accreditation. There was no discernible relationship between website quality and country of origin.

The mean readability score for FRES was 48.9 indicating poor readability, below a standard readability level. A
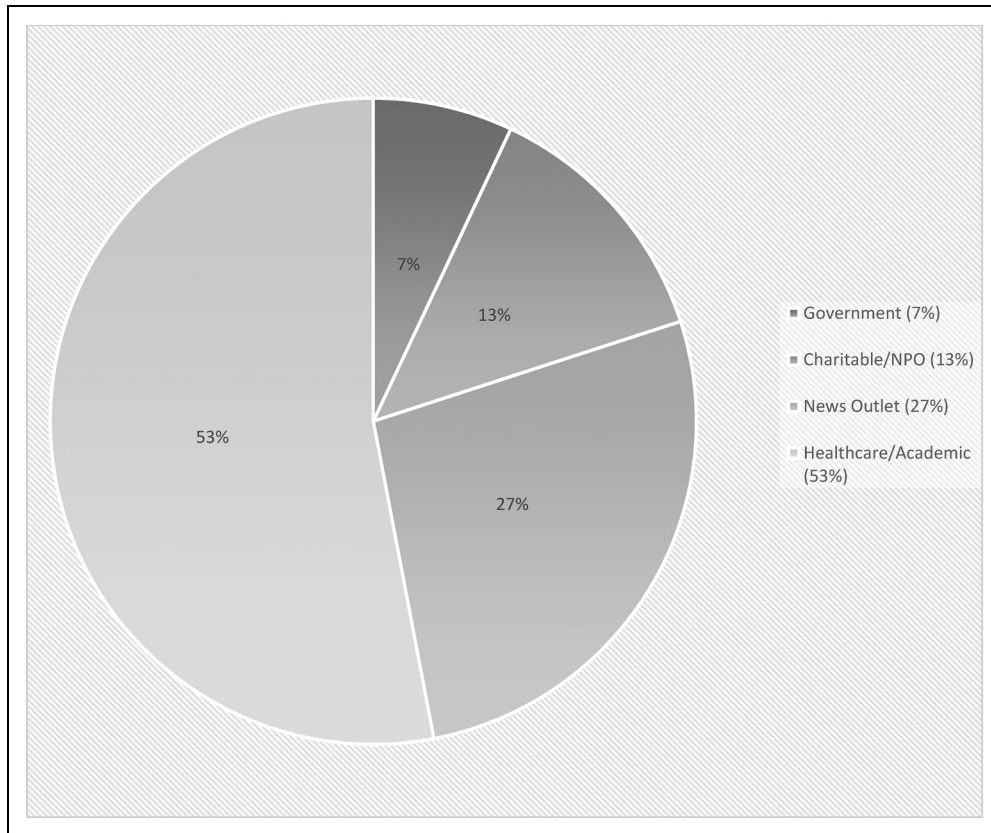
Figure 2. Top 15 websites according to search engine rank order list categorized by the organization.

median GFI score of 13.2 indicates readability easily understood by an average college graduate. There was no noticeable significant correlation identified between readability and website organization type, HoN certification status, country of origin, and website quality.

Figure 3. Country of origin.

Discussion

Developing a patient-focused treatment strategy for chronic constipation integrates a multidisciplinary health team, patient factors, and patient beliefs. The internet has been shown to influence patient beliefs so it is vital that patients receive factual information in an understandable and concise manner (5). However, our analysis of online information pertaining to chronic constipation reveals a vista of poor readability and quality. Although patients currently have access to vast quantities of information, this information may negatively affect the patient's decision-making process. Digital health literacy also plays a role in the extent to which patients follow potentially false health-related information that is presented to them online. Unfortunately, it may not be obvious to all patients when they encounter potential misleading information online. This can prove to be a challenge to healthcare providers or systems if patients are receiving conflicting medical opinions
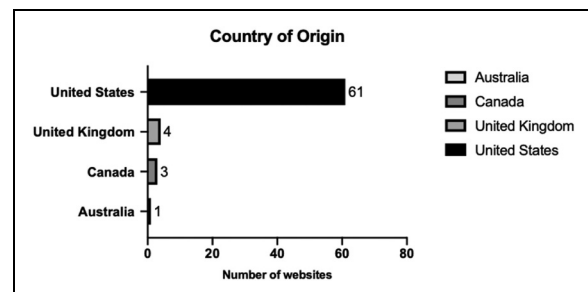
from various sources; some of which are not based on validated research.

Previous studies, similar to ours, have found the presence of HoN certification to positively impact website quality (14,15). Thirty-six websites did not have HoN certification. These websites were either denied HoN certification upon application or did not apply for it. Eighty percent of the top 15 website search results had HoN certification. This may suggest that higher-quality websites are concentrated at the top of the search ranking list. Along with HoN certification and the DISCERN instrument, JAMA has identified four pillars (authorship, attribution, disclosure, and currency) to evaluate health care website quality and readability (16). To date, there is no clear worldwide recognized scoring
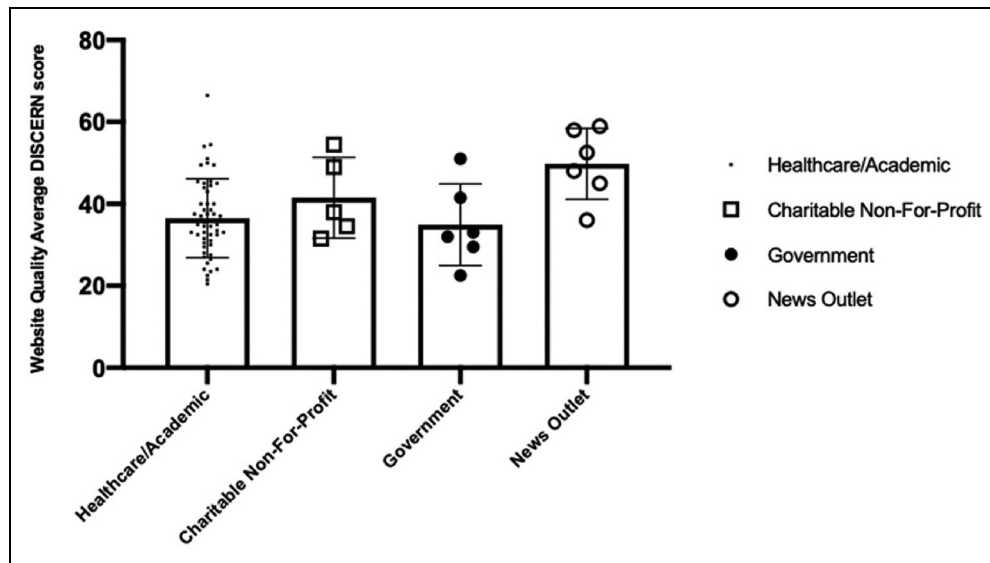
Figure 4. Website quality DISCERN scores ($p < .018$).

tool for healthcare website quality assessment or website quality evaluation tool for healthcare website publishers (17–19).

The majority of the websites examined were from the United States. As the treatment options for constipation may be affected by cultural practices, the information found may be skewed towards western-medicine treatment practices.

There are a number of limitations to our study. Our web search reflects a snapshot in time on a single search engine in a constantly changing online experience. Moreover, although the DISCERN instrument is ultimately an objective scoring tool, there is some subjective, user-dependent analysis when using the instrument. Hence, using 2 separate authors to rate websites utilizing the DISCERN instrument was useful in limiting bias in this study. Furthermore, FRES and GFI readability scores rely on the number of words in a sentence and the numbers of syllables in a word, which may not in some circumstances reflect the reading level. Finally, online nontextual information, such as videos and posters, was not assessed in this study.

However, we believe our study includes scoring systems that assess the usefulness of online patient information on the topic of chronic constipation to conclude that improvements to readability and overall website quality are needed. In addition, there is an increasing importance for healthcare professionals to be able to direct patients towards reliable websites with high-quality information to keep them informed.

Conclusion

In conclusion, the quality and readability of online information regarding the treatment of chronic constipation are poor. Our study identified that websites that received an "HoN" accreditation generally produced higher quality patient information results. However, it may be quite unfeasible to expect patients to target specifically HoN accredited sites without prior education from healthcare providers on the subject of sourcing high-quality patient information. Since the start of the COVID-19 pandemic, pop-up banners have been employed both by search engines and social media companies to encourage users to be more critical of health-related information posted online. Utilizing automated tools such as this may allow patients to be more responsible when absorbing health-related information from the internet. Healthcare workers themselves may also need to be educated on tools such as DISCERN, the GFI, Flesch reading ease scores, and the Clear Communication Index to provide patients with accurate information on how best to choose websites that provide accurate and factual medical advice in a clear manner. To facilitate this education of healthcare providers, medical universities may consider including in the curriculum further education on existing tools. In a society where there is a growing interest and reliance on online information, equipping healthcare workers with this knowledge can ensure patients are not misled by poor quality information. Future studies may also look at involving other search engines, including tools such as the Clear Communication Index to further compare search engine results and investigate the quality and readability of online information available on further chronic conditions.

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