



An Assessment of the Arabic-Language Informational Resources Available to Colon Cancer Patients Online

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Abstract Background: The internet has become a primary source of health information, particularly for cancer patients. This study evaluated the quality of online health information related to colon cancer in Arabic. **Objective:** To assess the reliability, accountability, legitimacy, and readability of Arabic websites providing information on colon cancer. **Methods:** A search was conducted on major search engines using Arabic keywords related to colon cancer. After initial screening, 13 websites were selected for evaluation. The Journal of the American Medical Association (JAMA) benchmarks, DISCERN instrument and website certification (Health on the Net - HON code) were used for assessment. Readability was analyzed using the Flesch Reading Ease Score and Flesch-Kincaid Grade Level. **Results:** Non-government websites, particularly Wikipedia, msdmanuals.com, and primomedico.com, demonstrated higher compliance with JAMA benchmarks. Six websites scored high on the DISCERN instrument, indicating reliable treatment information. Only one website was HON-code certified. Readability analysis revealed that text comprehension is challenging for most websites. **Conclusion:** Private agencies and hospitals managed non-government websites generally outperformed government websites' reliability, quality, and readability. However, overall improvement in Arabic's online health information landscape is essential to enhance accessibility and credibility for colon cancer patients.

Key Words Arabic, colon cancer, online health information, JAMA benchmarks, DISCERN instrument, HON code, readability

1. Introduction

Access to medical and health-related information has increased over the years due to the widespread availability of smartphones and the Internet. The consumption of online health information has also increased with Internet use and social media subscriptions. People tend to seek health information about issues that concern them online due to the ease of access from a wide variety of sources [1]. Health information, including personal blogs, institutional blogs, published journal articles, formal governmental health guidelines, and professional article briefs, is available online.

According to the Centers for Disease Control and Prevention (CDC), more than 60% of adults in the United States have looked for health or medical information online [2]. The frequency of online health seeking is significantly high in China, where urban females comprise the most frequent Internet users for online health information [3]. Many people looking for health information online are motivated by their underlying condition or curiosity [4]. In the United States, approximately 38.5% of the adult population access health

information online without frustration [5].

During the recent COVID-19 pandemic, much of the world population obtained health information from online sources [6]. Telehealth and other mobile applications for medical and health services also increased during the COVID-19 pandemic [7], [8]. Mobile health applications, telehealth applications, and search engines offered more convenient access to health information about COVID-19 management [9].

However, It is concerning that online health and medical information is only sometimes reliable, credible, or accurate [10]. The risk of accessing false and misleading information from untrustworthy online sources is relatively high [11]. Therefore, with the growing use of online health information, assessing the quality of health information available for persons with complex underlying conditions is important to create awareness about the risk of using misleading information.

In 2020, 18.1 million cancer cases were reported globally, according to the World Cancer Research Fund. The global

prevalence of cancer was higher among men than women [12]. Colorectal cancer (CRC) is the most common and the second most deadly cancer worldwide [13]. In 2020, colorectal cancer had an estimated incidence of 1.93 million cases and 0.94 million associated deaths [13]. It is more prevalent in developed countries, with a remarkable upward trend in developing countries [14].

After breast cancer, colorectal cancer is the second most frequent cancer in Saudi Arabia. It ranks third among cancers in women and is the most frequent in men [15]. In addition, the proportion of Saudi patients diagnosed with CRC has increased significantly in the last decade [16]. The median age (years) of CRC diagnosis in Saudi Arabia is 60 for men and 56 for women [17].

Given the burden of CRC on patients, the need for accurate, reliable information for health management is crucial. Not only can access to appropriate and accurate information enhance the prognosis of colon cancer patients, but it also facilitates better management of the disease's long-term impacts from the disease's early stages to its advanced stages [18]. Access to accurate health information is also associated with improved patient emotions, attitudes, and coping skills [19]. Patients also demonstrate reduced anxiety and mood disorders in preparation for better management of potential long-term disease effects [20].

Health information needs of patients with cancer are spread across various domains, including early diagnosis, disease staging, treatment options, and short-term and long-term disease symptoms management [21], [22]. Patients also seek information about disease recovery and long-term prognosis [23]. The CRC treatment information needs are largely met across the patient care continuum compared to the general information needs and information needs specific to the patient treatment status [21]. However, improvements in information needs concerning bowel activity, long-term treatment side effects, mental health, nutrition, diet, employment, and sexual activity have been recommended [21]. However, concerns about the quality of online information conveyed through Arabic are a concern in Saudi Arabia.

With 423 million speakers, Arabic is an official language in 22 nations. However, just 0.7–1.5% of the online content accessible over the Internet is in this language, even though it is the seventh most widely spoken language in the world [24]. In addition, while the number of Arabic websites and speakers continues to grow, health-related information on Arabic websites is of relatively low quality [25]. Lack of accuracy and specificity, alongside the use of overly simplistic information, are among concerns raised in Arabic online sources of health information from Saudi Arabia, Egypt, and Syria [26]. In addition, data from online sources in Arabic is usually presented in English. However, Egyptian health websites with health information in the Arabic language are more transparent [26].

Initiatives to provide more trustworthy information in Arabic are ongoing in Saudi Arabia. The initiative by the King Abdullah Bin Abdul-Aziz Arabic Health Encyclopedia

(KAAHE) to provide health information for consumers and healthcare professionals in Saudi Arabia is a recent undertaking [27]. However, very little research on the quality of Arabic health information, and colon cancer in particular, has been published.

As a result, there is a growing concern about the quality of health information available on Arabic websites with the increasing Internet consumption. With various criteria available for measuring online information quality, it is possible to assess the quality of Arabic online health information to promote the consumption of high-quality health information. The Journal of the American Medical Association (JAMA) criteria is the most commonly used online information assessment instrument. Initially developed in 1997, JAMA scores on the quality of the website are based on four main criteria, including disclosure of authorship, attribution of sources (references), disclosure of commercial interest and ownership of the website, and currency (date of update) [27].

This study aims to assess the quality of Arabic-language online resources for colon cancer information and to pinpoint Arabic-language websites offering the most comprehensive information for consumers looking for information on colon cancer treatment and health management. The utilization of Internet health information for treatment and disease management is becoming increasingly important due to the incidence of CRC cases and Saudi Arabia's growing Internet population. Nonetheless, there are concerns over the caliber of colon cancer-related online health information that may be found on Arabic websites. In addition, the research on the quality of Arabic health information related to colon cancer is limited. Studies that have attempted to explore the quality of health information on Arabic websites have applied different criteria. However, consensus about the best method of assessing the quality of online health information for consumption has yet to be achieved. As a result, there is a growing need to assess the quality of health information about colon cancer on Arabic websites accessible in Saudi Arabia to determine their relevance and applicability among patients with colon cancer.

2. Methodology

A. Data Source

The major Search engines (Google, Yahoo, Bing) were searched during the (date 18th sep to 20 sep 2022) using words "colon cancer" in Arabic "لنفون سرطان" and rectal cancer" in Arabic "المستقيم سرطان" and colorectal cancer" in Arabic "والمستقيم المنقولون سرطان". The search includes only the first three pages (to add justify selection). The total number of URL links was (225), after duplicate removal there were (67) websites Figure 2.

After that following criteria were applied on the short listed websites to select the final 13 websites.

B. Inclusion Criteria

- Active- reachable
- Available in Arabic language

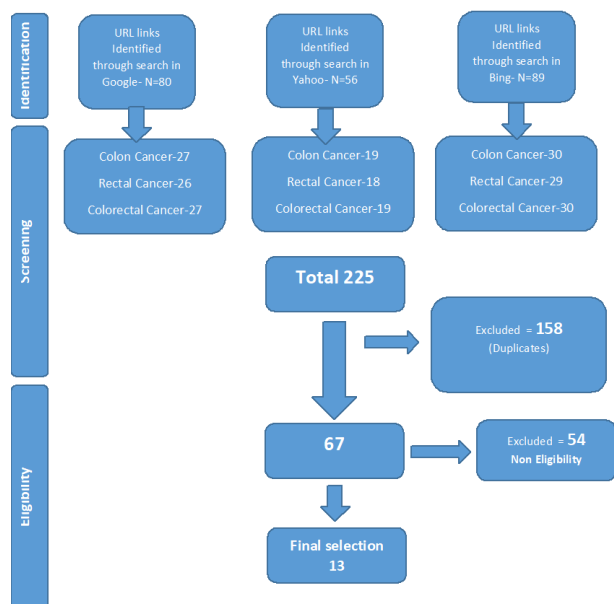


Figure 1: PRISMA Flow diagram for searches

Google	
القولون سرطان Colon Cancer	First – second – third page : 6,530,000
الأمستقيم سرطان Rectal Cancer	First – second – third page: 1,420,000
والأمستقيم القولون سرطان Colorectal Cancer	First – second – third page : 379,000
Yahoo:	
القولون سرطان Colon Cancer	First – second – third page : 2,500,000
الأمستقيم سرطان Rectal Cancer	First page : 2,890,000 Second and Third page : 2,860,000
والأمستقيم القولون سرطان Colorectal Cancer	First page : 1,870,000 Second and Third page: 1,920,000
Microsoft edge – Bing:	
القولون سرطان Colon Cancer	First page: 107,000 Second: 97,100 – Third: 97,000
الأمستقيم سرطان Rectal Cancer	First page : 969,000 Second and Third page :29,400
والأمستقيم القولون سرطان Colorectal Cancer	First page: 21,400 Second and Third page : 21,500

Figure 2: Preliminary Search Results

- Contain colon cancer information

C. Exclusion Criteria

- Language other than Arabic
- Required ID password for access
- Those Mentioning cancer just by hints, audio, visual based
- Marked [AD] in search engine
- Used purely for advertising and news

Following four tools/criteria were used to assess the Accountability, Reliability, Legitimacy and readability.

1) **JAMA Benchmarks** The JAMA benchmarks evaluated each website’s accountability and responsibility [27]. Authorship, attributions, disclosure, and currency are the four main components assessed by this tool. A website must list the authors and contributors, their affiliations, and pertinent qualifications to adhere to

JAMA’s authorship guidelines. Any disclosures, currency, or update date should be noted, and all attributions or references should be listed correctly. Rather, the JAMA Benchmarks assesses the following four criteria which are, **Authorship:** The names of the authors and collaborators, as well as their associations and any pertinent credentials, should be listed. **Attribution:** All content must be cited appropriately, with all pertinent copyright information included in the list of references and sources. **Disclosure:** Any "ownership" of a website, any sponsorship, advertising, underwriting, commercial funding arrangements or assistance, or any conflicts of interest should be clearly and completely stated. This includes agreements where links to other websites are displayed due to commercial interests. Discussion forums should adhere to the same criteria. Currency: When content was submitted and updated (Dates) [27], it should be clear.

2) **DISCERN Instrument** DISCERN is a tool to evaluate a website’s reliability and the appropriateness of its treatment options. A total of 15 questions and a quality rating make up DISCERN. The first eight questions focus on reliability, the following seven ask about the site’s treatment information, and the final question asks about the site’s overall quality. Each question is scored out of a possible 80 on a 5-point scale [28].

DISCERN was applied to our questions, and it was found that questions no 8,9,10, 15,16,18, and 19 were related to treatment-related information. Applying DISCERN criteria for quality assessment and giving 5 (maximum) marks to each "Yes" and 1 mark to each "No," the treatment scores were calculated for each website.

Similarly, Questions 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 17, 20, 21, and 22 were related to reliability-related information. Applying DISCERN criteria for quality assessment and giving 5 (maximum) marks to each "Yes" and one mark to each "No," the reliability scores were calculated for each website.

A score of >80 % – High quality, 41%-80% – Moderate quality, and <40% – Low quality was considered for scoring. Hence, based on DISCERN criteria, all 13 websites were classified according to their reliability and quality of information on treatment choices. It was found that web site 2,3,7,8,12 and 13 had high-quality information, while websites 1,4,5,6,9,10, and 11 had moderate-quality information.

3) **Website certification** Several certification sites have been created to address the challenges of legitimacy and dependability of information on the internet. We examined the most popular certification websites on the internet. The Health on the Net (HON) Foundation is a globally recognized organization that offers a code of conduct seal for websites adhering to its eight principles. Since its introduction in 1995, more than 7300 certified websites in 102 countries have adopted

the HON code [29].

The eight principles are attribution (cite the source(s) of published information, date medical and health pages), privacy (respect the privacy and confidentiality of personal data submitted to the site by the visitor), authority (indicate the qualifications of the authors), complementary (information should support, not replace, the doctor-patient relationship), justifiably (site back up claims relating to benefits and performance), transparency (accessible presentation (clearly distinguish advertising from editorial content)). The third website was the only one with the HON code accreditation (msdmanuals.com).

- 4) **Readability scores** Although we analyzed the websites providing information in Arabic, the readability of the same websites was also checked using the English versions. The ease with which a text can be read and understood is readability. Many scoring systems exist to assess readability.

For our study, FKG Level, or Flesch-Kincaid Grade, was employed. In order to indicate how legible a book is, the Flesch Reading Ease Score was first employed in 1948. The score indicates the approximate degree of education required for an individual to comprehend a given text with ease [30].

A value between 0 and 100 on the Flesch Reading Ease Score represents how easily a document can be understood. Scores around 100 indicate that the paper is elementary to read, while scores around 0 indicate that it is exceedingly complicated and challenging to comprehend. The score can be converted into educational levels using conversion tables. For example, if the score is between 70 and 80, the text would be appropriate for about grade level 7, making it quite easy to read for the average adult [30].

The Flesch Reading Ease score is arrived at by using this equation:

$$\text{Flesch Reading Ease Score} = 206.835 - 1.015 \times \frac{\text{TotalWords}}{\text{TotalSentences}} - 84.6 \times \frac{\text{TotalSyllables}}{\text{TotalWords}} \quad (5)$$

- 5) **Flesch-Kincaid Grade Level** The Flesch-Kincaid Grade Level identifies the minimum educational requirement needed to comprehend a certain work. For example, if a text has a Flesch-Kincaid Grade Level of 9, the reader would need to have completed approximately nine years of education in order to understand the document comfortably. The Flesch-Kincaid Grade Level scores are equivalent to the US grade levels of education (i.e., reached around 9th grade) [30].

The following equation is used to determine the Flesch-Kincaid Grade Level by counting the words, phrases, and syllables in a piece of writing:

$$\text{Flesch-Kincaid Grade Level} = 0.39 \times \frac{\text{TotalWords}}{\text{TotalSentences}} + 11.8 \times \frac{\text{TotalSyllables}}{\text{TotalWords}} - 15.59 \quad (5)$$

The first pages text was selected for calculating the Flesch Reading Ease Score & Flesch-Kincaid Grade

Level. Text from the page was selected in such a manner to avoid selecting advertisements or any irrelevant information or multimedia links (photographs, videos etc.)

3. Results

Table 1 shows that around 7 websites had information about all Colon cancer, Rectal cancer and Colorectal cancer. While 6 websites had information about only one out of the three keywords. Only “Wikipedia” and “clevelandclinicabudhabi.ae” were the two websites that were shown by all the three search engines.

Table 2 summarizes the quality assessment of all the websites using JAMA Benchmarks, DISCERN tool and HON code certification. It was observed that only 4 websites were complying to all the JAMA Benchmarks, while no website was showed zero compliance to JAMA Benchmarks. The authorship criteria was met by only four (30.7%) websites. Attribution criteria was met by 5 (38%) of the websites, and Currency was met by 8 (61.5%) of the websites. All the 13 websites met the disclosure criteria. Table 3 shows the distribution of the websites with the JAMA quality benchmarks.

The DISCERN criteria shows that High scores were obtained by 6 websites (46.15%) while 7 websites (53.8%) obtained a moderate score. None of the websites obtained low score.

Table 4 shows the readability of the selected websites. An average Flesch-Kincaid Grade Level score of 10.68 (Range 8.8-13.5) was observed for the 13 websites and an average Flesch Reading Ease Score of 43.1 (Range 28.7-57.1) was obtained. Only two websites (drbasem-clinic.com and egcancer.com) showed a 10th to 12th grade (Fairly difficult to read) while maximum (10) websites showed a College (Difficult to read) grade. Only one website (primomedico.com) showed College graduate (Very difficult to read) grade.

4. Discussions

The purpose of this study is to evaluate the accuracy of colon cancer health information on websites available in Saudi Arabia and determine their relevance and applicability among patients with colon cancer; for which 13 websites were selected, their relevance and applicability among patients were checked using different scales.

Our study shows only one website having one (7.69%) HON code certification. Similarly, only one (2.7%) of the 36 eligible websites was found to be HON code certified, according to a study by Halboub et al. [24], as complying with the HON code certification is difficult.

According to the DISCERN tool’s criteria [28], no website received a high score; the mean score for all websites was 31.5 12.55. Although in our study 46.15% of the websites scored a high score. The websites scored an average of 2.08 and 1.05 on the JAMA benchmarks; however, only four (11.1%) fully satisfied all the requirements, similar to our study (only 30%) websites fully satisfying all the criteria. According to the [30], Simple Measure of Gobbledygook,

S.No.	URL	موقعان القولون Colon cancer	موقعان المستقيم Rectal cancer	موقعان القولون والمستقيم Colorectal cancer	Institution	Google	Yahoo	BING
1	Colorectal cancer - Wikipedia	P	P	P	Wikipedia	P	P	P
2	Chronic Disease - Colorectal Cancer (moh.gov.sa)	P	P	P	MOH	P		P
3	Colorectal Cancer - Digestive Disorders - MSD Manual Consumer Version (msdmanuals.com)	P	P	P	msdmanuals	P	P	
4	Colon cancer Bumrungrad Hospital Bangkok Thailand	P			bumrungrad	P		
5	Colorectal Cancer: Signs & Symptoms Colorectal Cancer Stages (clevelandclinicabudhabi.ae)	P	P	P	clevelandclinicabudhab	P	P	P
6	Colon Cancer - What is colon cancer? - Neolife Tip Merkezi	P	P	P	neolife	P		
7	Bowel cancer Symptoms, treatment & specialists (primomedico.com)	P	P	P	Primomedico	P		
8	Colon Cancer Symptoms & Treatment King Hussein Cancer Foundation and Center (khcc.jo)	P	P	P	Khcc.jo	P		P
9	Rectal cancer - Treatment in Nice (che-nice.com)		P		Che-nice	P		
10	Disease Details - Ministry of Health (moh.gov.bh)			P	Moh.gov.bh	P		
11	Colorectal Cancer Screening Programme in Dubai King's College Hospital (kingscollegehospitaldubai.com)			P	kingscollegehospitaldubai	P		
12	Colorectal cancer Egyptian Oncology Center (egcancer.com)			P	egcancer		P	P
13	Colorectal cancer Dr. Bassem Morcos Clinic (drbasem-clinic.com)			P	drbasem-clinic			P

Table 1: Final selected websites' information (N=13)

Criteria	Frequency	Percentage
JAMA Benchmarks	No item met	0
	One item met	4
	Two items met	5
	Three items met	0
	Four items met	4
Authorship - JAMA	Not met Met	9 4
Attribution - JAMA	Not met Met	8 5
Disclosure - JAMA	Not met Met	0 13
Currency - JAMA	Not met Met	5 8
DISCERN	High (>80 %)	6
	Moderate(41%-80%)	7
	Low(<40%)	0
HON code	Certified	1
	Not certified	12

Table 2: Quality assessment of the included websites (n = 13)

and Flesch Reading Ease scales, the average grade levels for readability were 7.2, 7.5, 3.3, 0.6, and 93.5, 19.4, respectively, although it was higher in our study (10.68).

In a study, [31] looked at 24 websites, of which 12 (or 50%) were commercial universities, 2 (8.3%) sponsored, 9 (or 37.5%) were governmental, and 1 (or 4.2%) was from a non-profit. Out of a possible score of 80, the average score on the DISCERN instrument was 42.5 (considered fair), with 50% of commercial websites receiving a score of 41 or lower (bad) and just 11% receiving a score in the good range. The two governmental websites scored poorly; the single non-profit website received a fair rating, and more than two-thirds of the university-sponsored websites received a poor rating (66.7%). The websites' coverage of colonoscopy, screening, and surgical therapy was the most accurate. Only 55% of the websites scored highly for Completeness, indicating that they supplied thorough information, whereas accurate information was found on approximately 94.6% of the websites. Few websites were transparent, with only two offering enough information to authenticate their sources [31]. In our study, the good-performing websites were mostly private (4 out of 6), and only two govt. Websites obtained high scores.

Ten comparative studies were found in a study by Bessell et al. [32]. These studies assessed the effectiveness of using the Internet to deliver weight loss and headache treatment programs, nutrition and cardiac education, pharmaceutical services, and supplemental services. Even though many studies' methodology and quality were subpar, all revealed some favorable influence on health outcomes.

For their study, Grewal et al. [33] looked up colorectal cancer on Google, Yahoo, and Bing. Utilizing the Flesch

Reading Ease Score (FRES), [30], and Gunning Fog Index, readability was evaluated (GFI). The layout and substance of health information online were evaluated using the LIDA tool and the DISCERN instrument. A sub-group analysis compared websites certified by HON code and Information Standards to uncertified websites. Comparable to TIME magazine, the average FRES was 56.3, FKG was 6.9, and GFI was 9.5. The mean DISCERN instrument score was 52.2 (95% CI 45e59.4), and the mean LIDA Tool overall score was 85.6%. This study demonstrates that websites related to colorectal cancer were readable but may be unreliable. Locations that were certified by the government were better than uncertified sites. To give patients credible information they can trust to make wise decisions about their medical care, improvements are needed.

A significant growth in the number of people using the Internet to look up health-related topics may be seen each year. This study aimed to determine whether and how patients were influenced by the health and disease information they found online, as well as whether and how different e-health services could impact the patients' choice of physician. 1000 Polish people participated in a national survey that served as the basis for the study. Computer-assisted telephone interviews were used to conduct the study (CATI). The study demonstrated how e-health services rapidly influence the patient's physician selection. The ability to schedule an appointment online and the practice's website were among the characteristics with the highest ratings. Respondents were influenced by online information on health and disease in many different ways. Under the effect of health information they found online, over half of health Internet users (HI-users) desired to alter their diet and increase their healthy physical activity. Regarding making health-related decisions, 45% of HI users scheduled a doctor's visit due to information they found online, and 40% had queries about diagnosis and treatment. Internet-based information on health and disease influences how patients behave and what health decisions they make [34].

5. Conclusion

Regarding reliability, it can be said that only 2 (15.38% of total) government websites were highly reliable, while 4 (30.7% of total) non-government websites were highly reliable. When it comes to authorship, attribution, dis-

Item Websites	1	2	3	4	5	6	7	8	9	10	11	12	13
Authorship	✓	X	✓	X	X	X	✓	X	X	X	X	X	✓
Attribution	✓	X	✓	X	X	X	✓	X	X	X	X	✓	✓
Disclosure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Currency	✓	✓	✓	X	X	X	✓	✓	✓	✓	X	X	✓

Table 3: Evaluation of quality of content (N=13)

Website	Flesh-Kincaid Grade Level	Flesch Reading Ease Score	Reading Level	Average Words per Sentence:	Average Syllables per Word:
Colorectal cancer - Wikipedia	10.8	46.6	College (Difficult to read)	16.2	1.7
Chronic Disease - Colorectal Cancer (moh.gov.sa)	9	45.9	College (Difficult to read)	8.5	1.8
Colorectal Cancer - Digestive Disorders - MSD Manual Consumer Version (msdmanuals.com)	10.9	46.2	College (Difficult to read)	16.6	1.7
Colon cancer Bumrungrad Hospital Bangkok Thailand	14	32.7	College (Difficult to read)	21.5	1.8
Colorectal Cancer: Signs & Symptoms Colorectal Cancer Stages (clevelandclinicabudhabi.ae)	11.4	34.2	College (Difficult to read)	11.7	1.9
Colon Cancer - What is colon cancer? - Neolife Tip Merkezi	11.3	45.3	College (Difficult to read)	17.5	1.7
Bowel cancer Symptoms, treatment & specialists (primomedico.com)	13.5	28.7	College graduate (Very difficult to read)	17.1	1.9
Colon Cancer Symptoms & Treatment King Hussein Cancer Foundation and Center (khcc.jo)	9.6	44.4	College (Difficult to read)	10	1.8
Rectal cancer - Treatment in Nice (che-nice.com)	9.7	49.4	College (Difficult to read)	13.4	1.7
Disease Details - Ministry of Health (moh.gov.bh)	10.5	31.1	College (Difficult to read)	6.4	2
Colorectal Cancer Screening Programme in Dubai King's College Hospital (kingscollegehospitaldubai.com)	9.9	43.4	College (Difficult to read)	11	1.8
Colorectal cancer Egyptian Oncology Center (egcancer.com)	9.5	55.3	10th to 12th grade (Fairly difficult to read)	15.9	1.6
Colorectal cancer Dr. Bassem Morcos Clinic (drbasem-clinic.com)	8.8	57.1	10th to 12th grade (Fairly difficult to read)	14.2	1.6

Table 4: Readability of the websites (n=13)

closure, and currency, only the non-government websites performed well, which were Wikipedia, msdmanuals.com, primomedico.com and drbasem-clinic.com. According to readability, only two non-government websites (egcancer.com and drbasem-clinic.com) were relatively more straightforward to read and understand. Maximum websites had difficult readability. Overall, it can be said that websites managed by private agencies or hospitals are better managed and are more reliable, quality, and readable.

6. Recommendations

Improvements are needed to give patients trustworthy information they can rely on to make educated decisions about their medical care. Health experts should suggest and assist in creating websites with clear, high-quality surgical information.

Shortly, websites should display information about their readability and accuracy scores. In the long run, we suggest that national cancer services create accurate and understandable information about the detection and research of colorectal cancer. The website must offer sufficient details on the available treatments, particularly how each will impact the patient’s quality of life. Clinicians can then give patients access to these websites before and after appointments so that they are completely informed.

Conflict of interest

The authors declare no conflict of interests. All authors read and approved final version of the paper.

Authors Contribution

All authors contributed equally in this paper.

References

- Iftikhar, R., & Abaalkhail, B. (2017). Health-seeking influence reflected by online health-related messages received on social media: cross-sectional survey. *Journal of Medical Internet Research*, 19(11), e382.
- CDC, 2011. Use of the Internet for Health Information: United States, 2009. [online] cdc.gov. Available at: <https://www.cdc.gov/nchs/products/databriefs/db66.htm> [Accessed 11 October 2022].
- Xiong, Z., Zhang, L., Li, Z., Xu, W., Zhang, Y., & Ye, T. (2021). Frequency of online health information seeking and types of information sought among the general Chinese population: cross-sectional study. *Journal of Medical Internet Research*, 23(12), e30855.
- Jia, X., Pang, Y., & Liu, L. S. (2021, December). Online health information seeking behavior: a systematic review. In *Healthcare* (Vol. 9, No. 12, p. 1740). MDPI.
- Finney Rutten, L. J., Blake, K. D., Greenberg-Worisek, A. J., Allen, S. V., Moser, R. P., & Hesse, B. W. (2019). Online health information seeking among US adults: measuring progress toward a healthy people 2020 objective. *Public Health Reports*, 134(6), 617-625.
- Mulrennan, S., & Colt, H. (2020). Medical information and social media in the time of COVID-19. *Respirology* (Carlton, Vic.), 25(6), 578-579.
- Monaghesh, E., & Hajizadeh, A. (2020). The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. *BMC Public Health*, 20, 1-9.
- Alharbi, N. S., AlGhanmi, A. S., & Fahlevi, M. (2022). Adoption of health mobile apps during the COVID-19 lockdown: a health belief model approach. *International Journal of Environmental Research and Public Health*, 19(7), 4179.
- Zhao, X., Fan, J., Basnyat, I., & Hu, B. (2020). Online health information seeking using “COVID-19 patient seeking help” on Weibo in Wuhan, China: descriptive study. *Journal of Medical Internet Research*, 22(10), e22910.
- Chen, Y. Y., Li, C. M., Liang, J. C., & Tsai, C. C. (2018). Health information obtained from the internet and changes in medical decision making: questionnaire development and cross-sectional survey. *Journal of Medical Internet Research*, 20(2), e47.
- Marar, S. D., Al-Madaney, M. M., & Almousawi, F. H. (2019). Health information on social media: Perceptions, attitudes, and practices of patients and their companions. *Saudi Medical Journal*, 40(12), 1294.
- World Cancer Research Fund, 2021. Worldwide cancer data | World Cancer Research Fund International. [online] WCRF International. Available at: <https://www.wcrf.org/cancer-trends/worldwide-cancer-data/> [Accessed 11 October 2022].
- Xi, Y., & Xu, P. (2021). Global colorectal cancer burden in 2020 and projections to 2040. *Translational Oncology*, 14(10), 101174.
- Dekker, E., Tanis, P. J., Vleugels, J. L., Kasi, P. M., & Wallace, M. (2019). Pure-AMC. *Lancet*, 394, 1467-80.
- Almatroudi, A. (2020). The incidence rate of colorectal cancer in Saudi Arabia: An observational descriptive epidemiological analysis. *International Journal of General Medicine*, 977-990.
- Alyabsi, M., Algarni, M., & Alshammari, K. (2021). Trends in colorectal cancer incidence rates in Saudi Arabia (2001–2016) using Saudi National Registry: early-versus late-onset disease. *Frontiers in Oncology*, 11, 730689.
- Alsanea, N., Abduljabbar, A. S., Alhomoud, S., Ashari, L. H., Hibbert, D., & Bazarbashi, S. (2015). Colorectal cancer in Saudi Arabia: incidence, survival, demographics and implications for national policies. *Annals of Saudi Medicine*, 35(3), 196-202.
- Chen, C. C., Yamada, T., & Smith, J. (2014). An evaluation of healthcare information on the Internet: the case of colorectal cancer prevention.

- International Journal of Environmental Research and Public Health, 11(1), 1058-1075.
- [19] Mekuria, A. B., Erku, D. A., & Belachew, S. A. (2016). Preferred information sources and needs of cancer patients on disease symptoms and management: a cross-sectional study. *Patient Preference and Adherence*, 1991-1997.
- [20] Dau, H., Safari, A., Saad El Din, K., McTaggart-Cowan, H., Loree, J. M., Gill, S., & De Vera, M. A. (2020). Assessing how health information needs of individuals with colorectal cancer are met across the care continuum: an international cross-sectional survey. *BMC Cancer*, 20(1), 1-12.
- [21] Shea-Budgell, M. A., Kostaras, X., Myhill, K. P., & Hagen, N. A. (2014). Information needs and sources of information for patients during cancer follow-up. *Current Oncology*, 21(4), 165-173.
- [22] Mayer, D. K., Terrin, N. C., Kreps, G. L., Menon, U., McCance, K., Parsons, S. K., & Mooney, K. H. (2007). Cancer survivors information seeking behaviors: a comparison of survivors who do and do not seek information about cancer. *Patient Education and Counseling*, 65(3), 342-350.
- [23] Alnaim, L. (2022). Evaluation of the quality of online colon cancer patient information in the Arabic language. *Asian Journal of Pharmaceutical Research and Health Care*, 14(3), 154-160.
- [24] Halboub, E., Al-Ak'hali, M. S., Al-Mekhlafi, H. M., & Alhadj, M. N. (2021). Quality and readability of web-based Arabic health information on COVID-19: an infodemiological study. *BMC Public Health*, 21(1), 1-7.
- [25] Al Huziah, M., Al Kahtany, M., Al Ammari, R., Al Faiz, R., Boyer, C., & Altuwaijri, M. (2009). Assessment of online health information for Arabic sites. MS Project Report. KSAU_HS.
- [26] Aldabbagh, D., Alsharif, K., & Househ, M. S. (2013). Health information in the Arab world. *ICIMTH*, 1, 297-299.
- [27] Silberg, W. M., Lundberg, G. D., & Musacchio, R. A. (1997). Assessing, controlling, and assuring the quality of medical information on the Internet: Caveant lector et viewer—Let the reader and viewer beware. *Jama*, 277(15), 1244-1245.
- [28] DISCERN - The DISCERN Instrument [Internet]. [cited 2022 Nov 19]. Available from: http://www.discrim.org.uk/discrim_instrument.php
- [29] Net, O. (2000). HON code of conduct for medical and health web sites. *Am J Health Syst Pharm*, 57(13), 1283.
- [30] Flesch Kincaid Calculator | Good Calculators [Internet]. [cited 2022 Nov 20]. Available from: <https://goodcalculators.com/flesch-kincaid-calculator/>
- [31] Effenberger, M., Kronbichler, A., Shin, J. I., Mayer, G., Tilg, H., & Perco, P. (2020). Association of the COVID-19 pandemic with internet search volumes: a Google Trends™ analysis. *International Journal of Infectious Diseases*, 95, 192-197.
- [32] Bessell, T. L., McDonald, S., Silagy, C. A., Anderson, J. N., Hiller, J. E., & Sansom, L. N. (2002). Do Internet interventions for consumers cause more harm than good? A systematic review. *Health Expectations*, 5(1), 28-37.
- [33] Grewal, P., & Alagaratnam, S. (2013). The quality and readability of colorectal cancer information on the internet. *International Journal of Surgery*, 11(5), 410-413.
- [34] Bujnowska-Fedak, M. M., & Węgierek, P. (2020). The impact of online health information on patient health behaviours and making decisions concerning health. *International Journal of Environmental Research and Public Health*, 17(3), 880.