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Evaluating Information Quality of Corona Virus News on Iranian Health Websites

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Abstract

Background: Since websites are the first and most important source of information for the public, a comprehensive evaluation of the news and information content that they provide to the public is essential. This study aims to evaluate information quality of coronavirus news on Iranian health websites.

Results: Evaluating 19 components in each website showed that COVID-19 patient information, self-assessment, and registration system website with a score of 2.85 is at a higher level among the health websites, and essential news and knowledge of corona virus website with the score of 1.1 is in poor quality.

Conclusion: The difference between this study and other studies is in examining the quality of corona virus news. Other studies have examined the quality of health websites. These findings form the basis of recommendations for building a comprehensive, consistent, reliable, up-to-date, high-quality website that can meet people's needs.

Keywords: Information quality; Corona virus; Health websites; Health news

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Background

The Internet has grown and turned to an extensive source of health information [1]. An increasing number of institutions, including governments, medical institutions, and businesses, have created health information portals to provide public health information and meet the growing demand for such information [2]. However, problems like confusion and uncertainty about information quality remain serious. For example, mismatches between the Web-based health information obtained by patients and the actual demands of patients may arise [3]. Hence, it is important to conduct studies focusing on the internet health information.

Online health is defined as the use of digital technologies for healthcare and should enhance the efficiency of medical care, and bring to more precise and personalized medical interventions [4]. To make informed decisions, health information on websites must be reliable and accurate for the community [5]. Health is one of the three types of applied information in the web environment; but because of the freedom of information, almost anyone can create a website and offer expert advice on various topics [6]. Following the outbreak of the COVID-19 pandemic in December 2019, various news sites began publishing news about the disease. In the meantime, specialized news websites in the field of health were created to increase people's knowledge about necessary health care by providing credible and accurate information.

In Iran, out of a population of about 84 million, there are about 59 million Internet users [7]. News websites are one of the most significant sources for people to capture up-to-date news. They also involve the use of communication and information techniques to address the medical challenges faced by patients or to find possible solutions for treating specific medical issues [8]. Especially after COVID-19 outbreak, as during other epidemics, people tend to know how to behave and do to prevent and treat the disease [9].

Lack of control over the content of information published on the Internet has caused the quality of the retrieved information to be questioned. Various studies on the quality of health websites on various topics have shown that, in most cases, the quality of health-related websites is not in good condition and needs more attention [10].

In fact, the evidence shows that no authority is directly responsible for managing Internet resources. Therefore, publishing information on the web is easy and without the least cost, and any person with any level of expertise can publish their health information sources on the web with any degree of credibility. Therefore, a huge collection of information with different quality and is available by authors with different degrees and from different disciplines. As Silberg, et al. [10,11], noted: "It is a medium in which anyone with a computer can work as a writer, editor, and publisher at the same time." Therefore, knowing the quality of health information is very important.

Researchers have studied health information quality by evaluating the websites; such as the Reedit link posts [12], 'gum disease' websites [13], breast cancer [14], bladder cancer, periodontology [15], malaria in pregnancy [16], female fertility [17], male infertility [18], Inflammatory bowel disease [19], and in the recent pandemic they have studied health information quality of COVID-19 [20-25]. It is important that physicians involved in the care of patients participate in the development of informative, ethical, and reliable health Web sites and direct patients to them [26].

Scholars have recognized the importance the usability [27-29] of specific health information on websites and trust in the online health context by evaluating users' viewpoints. Unsurprisingly, relying on online health information is ultimately based on the consumers' trust in the website itself [30-33]. So, there can be Information Overload (IO) which affects participants' judgment of online health information quality [34,35]. Several frameworks are presented to provide some insights to the health practitioners and system developers about the importance of capturing information quality [36-39] and tools [40,41].

Determining the quality of information in the web environment is done regularly and sequentially based on a number of criteria of information quality such as sufficient and comprehensive information, how to access information, no complexity, the relevance of retrieved information to information demands or gaps, appropriateness to information purpose, providing specific and unique information, the degree of accuracy and reliability of information, no error and inaccuracy of information, novelty of information, the degree of completeness of information and coverage of information by a source, relevant and useful information, simplicity and speed of access to information, providing information [42]. A review of web information quality tools shows that various tools have been designed and developed for this purpose, including the checklist of Silberg, et al. HON code, WHO, DISCREN and Medline Plus and AMA criteria [10,42-52].

In various studies, indicators of accuracy, comprehensiveness, readability, design and citations have been mentioned to evaluate the quality of health information.

Literature review is also evidence of the design of various tools for classifying information quality criteria. In that classification, Rocker and Neumann have divided the information quality criteria into three categories: Answer subjective criteria, objective criteria, and process criteria. Mental criteria is an indicator that depends on the needs of users and their previous knowledge and experience, therefore, it is not examined in this study [53].

In this regard, the need to evaluate websites in the Persian language is really significant because of their direct impact on the health of the public in the Persian language societies. Therefore, we aim to investigate the information quality on 4 health websites affiliated to government and official centers in Iran which provide corona virus news. In this study, using a combination of all these tools, a standard researcher-made checklist was designed to assess the quality of website information. This tool is useful for research in that it is a combination of different tools with an innovative approach and evaluates the quality of information instead of evaluating websites.

Methodology

The present study is a descriptive survey that evaluates the quality of coronavirus news information on COVID-19 specialized websites. For this purpose, news sites in this field were reviewed by two researchers from July to September 2020. Our search in Google and Yahoo engines, which according to the Alexa website statistics are two of the most popularly search engines in the world, resulted in 15 websites related to our aim. After excluding 11 websites including duplicate, inaccessible, and non-Persian websites, 4 websites were retained for evaluation **(Figure 1)**.

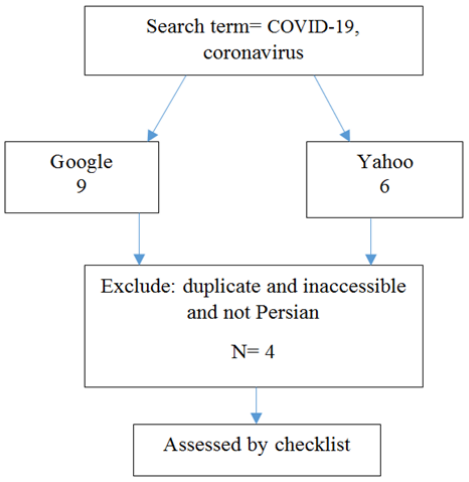

Figure 1: Data collection process.

In order to evaluate the quality of coronavirus information, a researcher-made checklist consisting of 19 components was designed as shown in **Table 1**. To design this checklist, all the tools for evaluating the quality of information on websites were examined. Questions were answered on a scale of one to five. Finally, this checklist was given to the faculty members of the health information management departments of the medical universities of Iran.

S. No	Quality assessment indicators
1	Relevance
2	Intelligibility
3	Accuracy of information
4	Objectivity
5	Update information
6	Information neutrality
7	Comprehensive information
8	Reliability
9	Scientific content
10	Response time
11	Content uniformity
12	Provability
13	Security

14	Credibility
15	Author name
16	Citations
17	Related links
18	Author's organizational affiliation
19	Domain

Table 1: Quality assessment components of coronavirus websites obtained from reviewing different models.

Table 1 shows a checklist of 19 indicators to accurately assess the quality of coronavirus information. In this checklist, each variable was given a degree of importance from one to five. The validity of this tool was confirmed by researchers through faculty members of health information management groups and its reliability was calculated by Cronbach's alpha of 0.98. A checklist was prepared for each website and provided to five faculty members of the Health Information Management Departments of Medical Universities of Iran. Data were extracted from checklists in SPSS software.

Four websites in the field of coronavirus were selected by non-random sampling shown in **Table 2**. Finally, the mentioned databases were examined and audited using quality indicators determined by the researcher.

Findings

Table 3 compares the average score of each component of information quality assessment in the 4 websites mentioned.

It is apparent from **Table 3** that the highest mean of information quality in the studied samples was related to the self-assessment system (2.85). The lowest score was for the essential news and knowledge of corona virus website (1.70). Therefore, the website of the information system, self-assessment, and patient registration with a score of 2.85 is known as the best website in the field of coronavirus in terms of information quality and the new news and knowledge website of the coronavirus with a score of 1.79 is the weakest website. But the major point is that none of the websites are desirable.

It is apparent from **Table 3** that the most relevant information in the field of coronavirus is corona patient information, self-assessment, and registration system website with a mean of 3.7. The average accuracy of the information in the COVID-19 epidemiology committee website is 3.7 and it is the highest average among the websites. Reliability and scientific content with a score of 3 on the coronavirus database of the Public Library Promotion Association (PLPA) is at the highest possible level. Also, the highest average response time is related to this database. The verifiability of news and information with an average of 2.8 in the COVID-19 epidemiology committee is higher than the other 3 websites. Information security and credibility in the corona virus database of the Public Library Promotion Association (PLPA) is higher than other websites. The highest average documentation index (author name, citations, author affiliation) is related to the COVID-19 patient information, self-assessment, and registration system. Domains and links related to news and information are also in their highest average score on this website. **Figure 2** shows the average score of components of quality of COVID-19 information in corona patient information, self-assessment and registration system website.

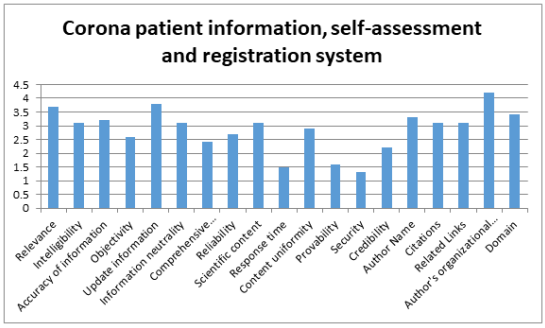

Figure 2: The average score of components of quality of COVID-19 information in Corona patient information, self-assessment and registration system.

It demonstrates that the author's organizational affiliation rates as the highest qualified component with the score of 4.2 and security as the lowest with a score of 1.3. On the other side, most components are in a poor condition. Update information (3.8), relevance (3.7), domain (3.4), author's name (3.3), accuracy of information (3.2) are ranked respectively. Intelligibility, information neutrality, scientific content, citations, related links (3.1) is equal in the 7th place. Content uniformity (2.9), reliability (2.7), objectivity (2.6), comprehensive information (2.4), credibility (2.2), provability (1.6), the response time (1.5), security (1.3) are in the place of 8th to 15th.

Figure 3 shows the average score of components of quality of COVID-19 information in COVID-19 epidemiology committee. As it is clear Accuracy of information rates as the highest qualified component with a score of 3.7 and update information as the lowest with a score of 3.8. evaluating components in the COVID-19 epidemiology committee are ranked as author's organizational affiliation (3.3), relevance (3.1) in the 2nd and third place, and then intelligibility, objectivity and information neutrality in 4th place (3), provability (2.8), credibility (2.7), citations (2.5). In the 8th place, we can see reliability and security (2.4), in the 9th place, comprehensive information, scientific content, and related links (2.3), and in the later place, content uniformity, author's name, and domain (2.2) are identified. The response time (2.1) and update information two are in the place of 11th to 12th.

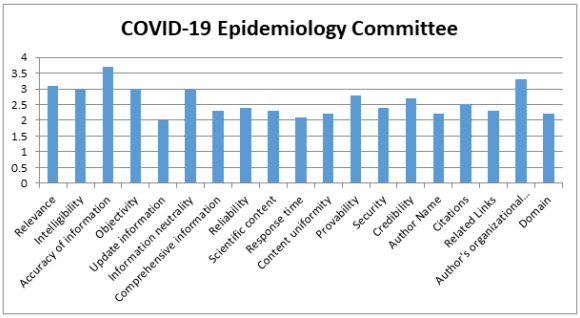

Figure 3: The average score of components of quality of COVID-19 information in Corona patient information, self-assessment and registration system.

S. No	Website Name	Website Address	Affiliated to
1	COVID epidemiology committee 19	Ministry of Health and Medical Education (MOHME)	http://ird.behdasht.gov.ir
2	Corona virus database (Specialized Reference for Specialists)	Iranian Public Libraries Promotion Association	http://ipla.ir/?page_id=2585
3	Corona patient information, self-assessment and registration system	- (MOHME) - Vice- Chancellor's Office in Treatment Affairs -Shahid Beheshti University of Medical Sciences - Management center of Statistics and Information technology	https://corona.research.ac.ir
4	Essential news and knowledge of Corona virus	Shiraz University of Medical Sciences	http://gsia.sums.ac.ir/en

Table 2: Four coronavirus websites created in Iran.

S. No	Essential news and knowledge of corona virus	Corona virus database (specialized reference for specialists)	COVID-19 epidemiology committee	Corona patient information, self-assessment and registration system
1	3.7	3.1	3	1.3
2	3.1	3	2.8	1.5
3	3.2	3.7	1.1	1.3
4	2.6	3	1.2	2
5	3.8	2	1.2	1.5
6	3.1	3	3	1.7
7	2.4	2.3	1.5	2.1
8	2.7	2.4	3	1.7
9	3.1	2.3	3	2.1
10	1.5	2.1	2.7	2.1
11	2.9	2.2	1.5	1.9
12	1.6	2.8	2.5	1
13	1.3	2.4	3.1	1.5
14	2.2	2.7	2.8	1.4
15	3.3	2.2	2.9	2.1
16	3.1	2.5	2.2	3.1
17	3.1	2.3	2.3	2.6
18	4.2	3.3	3.4	1.1
19	3.4	2.2	3.3	2.1
Total	2.85	2.58	2.45	1.70

Table 3: The average scores of information quality components of four websites.

As it is shown in **Figure 4**, the author's organizational affiliation with a score of 3.4 is at the top of the list, and accuracy of information with a score of 1.1 is at the lowest place. The 2nd and 3rd belong to domain (3.3) and security (3.1). Relevance, information neutrality, reliability, and scientific content (3) are equally in fourth place before the author's name (2.9). Intelligibility and credibility (2.8), response time (2.7), provability (2.5), related links (2.3), citations (2.2), comprehensive information and content uniformity (1.5), objectivity and update information (1.2) and accuracy of information (1.1) are respectively ranked in 6th place to thirteenth place.

Figure 5 presents the ranks of components in essential news and knowledge of corona virus website. As it is seen, citations with a score of 3.1 are at the top of the list, and provability with a score of 1 is at the lowest place. After related links (2.6), comprehensive information, scientific content, response time, author's name, and domain (2.1) equally are at the third place. Objectivity (2), content uniformity (1.9), information neutrality and reliability (1.7), intelligibility and update information (1.5), credibility (1.4), relevance and accuracy of information (1.3), author's organizational affiliation (1.1) are ranked in fourth to 11th place, respectively.

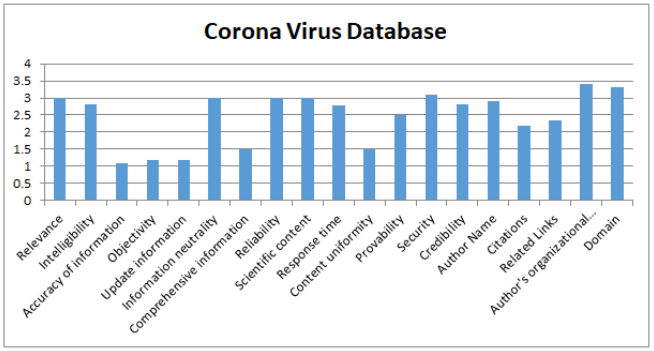

Figure 4: The average score of components of quality of COVID-19 information in Corona patient information, self-assessment and registration system.

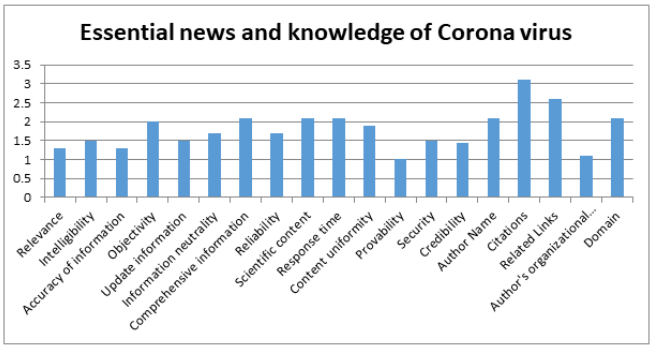

Figure 5: The average score of components of quality of COVID-19 information in Corona patient information, self-assessment and registration system.

Discussion

Technology development has transformed the health industry in terms of delivery of services. Health websites need to provide valuable, accurate, accessible, objective, and understandable information to their users. People rely on the information provided through health websites designed and maintained by official authorities.

The success of the websites depends on their quality as perceived by the end users. If end users perceive that the websites are not trustworthy, not easy to access or not accurate, among other things, they will be discouraged from using the resources and services and may look to other sources to fulfill their information needs [54]. Incorrect information on these websites can endanger people's health and lead to serious consequences. The present study showed that the quality of news and information on coronavirus websites is not in a good condition in Iran.

This study has identified 19 components related to information quality in health websites. There are several researches on information quality evaluations which highlighted some points in this field; such as that poor information quality happens because of lack of structured and formal IQM practices in health care organizations [55].

The use of technology has not been given much attention in the information quality literature. The variations of user expertise, skills, knowledge and usage frequency are important criteria to look upon [56]. Research has shown that most of the content on health information websites is not written by medical professionals [57]. Therefore, there is a risk that the available health information may be misleading or dangerous [58]. In Balter's study, patients with back pain were advised not to use the Internet as a source of information unless the site was evaluated and had evidence-based content [59]. Allen also concluded that the web environment is not a reliable source for patients and physicians in the field of laparoscopy [60]. In a study, it is stated that viral infectious websites are not of satisfactory quality according to the guidelines of the World Health Organization (WHO) and Silberg, and users should be cautious in using this information. In the studies of Hirasawa, et al. the average quality of information on websites related to the mediterranean diet was reported to be 33.8, which indicates the poor quality of the information evaluated [61]. Chang, et al. did not observe the principle of documenting as one of the indicators of information quality [62,63].

Health news, including depression information presented on the Internet, is at a low level in terms of quality and credibility of information [64], which is in line with the results of the present study and all confirm the poor quality of health information on websites.

In this study, we showed the quality of information in COVID-19 is not proper. It can be due to its rapid outbreak and also it was identified in early December 2019 [65]. On the other side, there had not been clear instructions to prevent its outbreak.

It is required to urge and promote the use of the websites of official public health organizations when seeking information on COVID-19 preventive measures [66,67].

Conclusion

Due to effective on-going treatments and vaccine research, COVID-19 is primarily concerned with preventive measures, so it is essential to conduct an important review of the quality and nature of publicly available information. Despite the acute condition of the corona pandemic, the need for qualified news is essential to prevent coronavirus infection. It should be noted that the news published on the Internet in the form of news websites have different quality indicators that were examined in this article. Methods for determining the quality of medical content on websites vary. In recent years, many tools have been made available to review health information websites. However, the difference between this study and other studies is in examining the quality of coronavirus news. Other studies have examined the quality of health websites.

Research Recommendations

A review of the literature shows that there is no reliable tool for assessing the quality of health information in news sites at the local level. Therefore, the researchers of this article suggest that instead of evaluating health websites, while discussing the quality of health information, we should use native tools that are appropriate to the status of internal information to weigh the information on the web. On the other hand, due to the increasing prevalence of COVID-19 disease, the need to pay attention to the news content in this area is more important than ever. Managers and administrators of news websites should pay enough attention to the quality of health information in the production or presentation of coronavirus information and thus increase the awareness of the audience. Users of news and news information should also be careful in using these resources and use the information in consultation with relevant experts. In order to evaluate the quality of information, it is necessary to pay attention to 3 approaches: In the first approach, health information should be considered only as a commodity that has a single existence. In the second approach, the quality of information is measured according to the type of audience. In the discussion of the quality

of health information, the indicator of comprehensibility or reliability is a subjective criterion and cannot be easily measured. In the third approach, having a critical view is important. Just having a high score in the mentioned indicators does not indicate the high weight of information quality. The discussion of the quality of health information in coronavirus news sites evolves with the challenge of the three fields of pure information quality, the discussion of the subjectivity of some concepts, and having a critical view alongside the quality assessment checklist. Therefore, researchers believe that in designing new indicators to evaluate the quality of health information in news sites, these three approaches should be considered by health and media researchers. According to the results of the present study and considering the unfavorable status of information produced in coronavirus news sites, it is recommended to constantly monitor the published news information in the databases and evaluate it using valid indicators.

Research Limitations

The literature review shows that most of the articles are in the field of evaluating the quality of websites and fewer articles have discussed the quality of information as an independent product on the web. Due to the lack of literature related to this discussion, this study is sufficient to discuss the quality of health websites.

Additionally, only Persian language websites have been studied in this paper. Therefore, these results may differ from the results of other studies in other languages.

Future Work

As mentioned, the prerequisite for success in pandemic situations in any era is the ability to inform and the importance of quality and credibility of news as an information product. Given that there are no restrictions on the dissemination and creation of web pages on the Internet, government and qualified organizations should increase the knowledge of individuals in critical situations by creating appropriate information resources.

Therefore, researchers intend to create a platform dedicated to educating and informing people about coronavirus. This knowledge hub has two sections for the general public and specialists.

In this knowledge hub, information sources and news related to coronavirus are selected from reliable sources and adopted by 19 components identified in this study and made available to the public.

This knowledge hub includes appropriate text, videos, books, and articles in order to specifically raise the level of public knowledge and provide relevant information in an online space for experts and researchers. This knowledge hub is being prepared in both Persian and English languages.

Declarations

Ethical approval and consent to participate is not required.

Consent for Publication

Not applicable.

Availability of Data and Material

Data is available on the websites addresses studied in this paper. The collected data by authors is not available.

Competing Interests

The authors declare that they have no competing interests.

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