



Research Paper

Qualitative Assessment of Iranian Hospital Websites Using WebQEM Method

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Abstract

Background and Objectives: Today, hospital websites are used as a communication tool in many countries of the world. The purpose of the present study is to evaluate the quality and ranking of websites in governmental.

Methodology: This is an applied evaluative study. The research method is a combination of a descriptive survey and the Delphi Technique. Eighty-seven active websites out of 156 websites approved by the Ministry of Health and Medical Education were selected as the sample of the study. Data was collected using data mining tool developed by Olsina et al. The validity and reliability of the tool has, however, been confirmed in previous studies ($\alpha = 0.82$). Descriptive statistics was used to analyze the statistical data and Excel was used for data analysis.

Findings: The evaluation of hospital websites using the four criteria in WebQEM showed that the studied websites were very desirable in terms of the performance score of 0.244, very desirable in terms of efficiency with a score of 0.163, very desirable in terms of reliability with a score of 162.0, and desirable in terms of usability with a score of 0.219. The hospital websites evaluated by WebQEM were in desirable status based on the main criteria; however, they were in undesirable status in terms of secondary criteria, which requires reviewing and improving the conditions.

Discussion: The results of this study can be attributed to the nature of WebQEM method. However, for a more precise evaluation of websites in Iranian hospital, it seems necessary to consider it from the viewpoint of users (patients and doctors).

Introduction

Information Technology (IT) is nowadays known as a valuable instrument for dissemination of information. It has been considered as the index for development and progress of human communities from the 1980s. It can be claimed that information is the source of all human activities (Farhadi et al., 2015).

Information and Communication Technology (ICT) tools, especially hospital websites and E-mail, are capable of changing the plans and methodologies for the enhancement and integration of health and information services, improving the maintenance of personal health information, providing remote health services, and setting the ground for the provision of affordable and inexpensive services to a wide group of individuals (Tahamtan et al., 2012). The professional personnel and the costumers of any active field in health and welfare of human beings require the comprehensive information of that area (Secretariat of the Information and Communication Technology Council, 2004).

A hospital website provides a good system for the transmission of information between the patient, the hospital and the therapeutic team and leads to the attraction of more clients to hospitals. Marketing through hospital websites has witnessed considerable growth in recent years, from 2009 to 2016 (Tahamtan et al., 2012).

The significance of medicine and the provision of relevant services are not hidden to anyone. Various instruments are used in contemporary world for health information such as websites, smartphones, electronic dashboards, pocket PCs and Emails. The selection of the type of instrument depends on the patients' demands, service providers, and medical centers (Ghazi Saeedi et al., 2015).

In his study, Militaru (2011) used the WebQEM method for the qualitative evaluation of three Romanian universities websites. This research was a mixed study including the survey method and the Delphi technique. The findings showed that the websites of Romanian Universities are desirable in terms of the usability with an average score of 61.35, very desirable in terms of reliability with an average score of 93.54, very desirable in terms of efficiency with an average score of 87.8, and desirable in terms of functionality with an average score of 75.6.

Olsina and Rossi (1998) used the WebQEM quality assessment method for the quantitative evaluation and comparison of the quality of websites. Olsina et al. (1999) introduced WebQEM as a quantitative assessment for the evaluation of the quality of websites and their applications. A description of the measurement of quality indices enabled website designers to perceive and develop website products. The research findings showed that the websites of universities in Spain were desirable in terms of usability, reliability, and efficiency; however, they were categorized as average in terms of functionality. Silfianti and Diana (2018), in their study entitled "The analysis of quality and services on PT. Kereta Api Indonesia website concerning the users by means of web quality evaluation method (WEBQEM)" explained that the mentioned website needed to pursue more appropriate strategies for its development. The other aspect that was found in need of improvement was the controversies in understandability of the website content; however, the users were sufficiently satisfied with the usability.

Alibeyk et al. (2011), in a qualitative evaluation of the central library's websites of Medical Sciences Universities in Iran using WEBQEM, concluded that the studied websites are very desirable in terms of "reliability", desirable in terms of "efficiency", and average in terms of "usability" and "functionality".

In his study in 2010, Pashazadeh showed that websites under study were desirable in terms of reliability and efficiency but average in terms of usability and functionality.

Fakhrzad et al. (2011) showed that electronic health recording is not only a method for integrating information and representing the status of patients as well as a dynamic source for health care, it also provides accessibility to information and clinical records, the training of electronic communications, multifaceted management, and the promotion of health level of society. Therefore, utilizing the unique advantages of

electronic health record could tackle most of the problems of the medical system on the condition that the managers and medical recording teams are completely familiar with the system or design it according to their own needs and demands.

Ghazi Saeedi et al., (2015) in their study entitled "Necessitates of Using Dashboards in Health Information Management", showed that interaction with dashboard could help in decision making depending on the type of input data, increase the quality of clinical cares, and reduce the costs of health and care. Concerning the current status of health information systems and uninterrupted increase of data in this area, dashboard is a critical tool for managers and employees in health organizations.

Dastani and Sattari (2017) studied all hospital websites in Khorasan Razavi Province and realized that only 59% of the hospitals in this province have active websites. Most websites were categorized as very weak (51%), average (26.5%) and weak (16.3%). Concerning the criteria of content, performance, management, and the manner of using website and designing, the findings indicated that the studied websites had an undesirable status. Out of 16 selected high quality websites, only websites of Sina, Javad-al-Aeme and Razavi hospitals of Mashhad, the capital of the province, had a desirable status.

Ostadzadeh and Mehrabani (2017) evaluated and ranked the websites of Iranian Sports Federations using Websites Quality Evaluation Tool (WQET). The results of the evaluation of 47 websites showed that the components and the features of WQET are not sufficiently taken into account. Some features such as the ease of searching, understandable maps, tables, images, external links, documented statistical and research findings, and the presence of a map did not get high scores.

Comprehensive records have been prepared for the maintenance and inspection of most tools and places; however, the maintenance and creation of health records have not been seriously taken into account. Quick and easy access to comprehensive medical records of people requires the electronic version of documents and strong user interface. Currently, almost all individuals and doctors have accepted that a great part of health or medical records of patients are inaccessible. It is possible to access health electronic profiles both through websites and through information systems. As far as the users (patients, treatment teams etc.) require efficient and accessible tools, the role of websites as strong tools will be highlighted.

Nowadays, hospital websites are used in most countries as a communicative tool for multiple purposes ranging from the introduction of the hospital and the treatment sectors and personnel, to the employment of workforce, to reception and provision of online services, and to accessibility to electronic medical records, and etc. The evaluation of the quality of hospital websites seems necessary since they are considered as a valuable and important source of information as requested by the hospital, the patients and the doctors since it is almost impossible to perform quality control of the published contents, the provided services, and the efficiency of hospital websites without their evaluation. Regular review and evaluation of websites in terms of their structure and content and consequently specifying the strengths and weaknesses will provide appropriate strategies for policy- and decision-makers.

On this basis, the following questions will arise:

1. How are the websites of Iranian governmental hospitals evaluated concerning the main criterion of usability and its secondary criteria (overall understandability of the website, feedback and guidance features, aesthetic issues, user interface, etc.), the main criterion of functionality and its secondary criteria (search and retrieval, navigation and browsing, content), the main criterion of reliability and its secondary criterion (no defect), and the main criterion of efficiency and its secondary criteria (accessibility and implementation) in WebQEM?
2. How are the websites of Iranian governmental hospitals ranked using the results obtained from WebQEM?

Among the methods for assessing the quality of websites, WebQEM has some benefits one of which being a systematic, quantitative, step-by-step method for the evaluation of the website. One of the strengths of WebQEM is its evaluation through consecutive classifications down to the smallest components and measurable features. The evaluation of the smallest components leads to the evaluation of the main criteria in the checklist, which will, at the end, lead to a final evaluation and ranking of hospital websites. Therefore, this study has been carried out with the aim of achieving a qualitative evaluation and ranking of websites in Iran's governmental hospitals using WebQEM.

Methodology

The present study is a practical and cumulative assessment. Cumulative assessment deals with the effects of one program. This is a quantitative study and is usually used as the basis for decision making regarding the continuation of a program (Powell, 1998).

The current study employs the combination of a descriptive survey and the Delphi technique. The statistical population includes all hospital websites in Iran active under the supervision of the Ministry of Health and Medical Education (based on the manual of journals and websites of the Ministry of Health and Medical Education, 2014) including 156 websites. From this population, a sample of 87 hospital websites was selected due to the integration of the population of the research, lack of standards, and assessable and active websites. The private hospitals, clinics and health centers are not included in the statistical population of the study.

Data collection was done through Olisna et al.'s (1999) checklist based on WebQEM including the four criteria of usability, functionality, reliability, and efficiency as presented by Niazi and Karbala Aqaei (2014). The validity and reliability ($\alpha = 0.82$) of the checklist have been confirmed in Niazi and Aqaei's study. In this study, the Delphi technique was used to determine the value of each component of WebQEM in hospital websites. Ten experts (managers of hospital websites, designers of hospital websites, experts in health information area, IT experts, and experts in knowledge and information sciences) expressed their opinion on the weighting of WebQEM criteria. Then the average of weights allocated to each criterion was considered as the final weight of that criterion.

At the end of weighting, the scoring of the main criteria in WebQEM was done by the researcher through observing the selected hospital websites in Iran. This was obtained through summation of the multiplication of their weights by the score allocated by the researcher after the study and the observation of the studied websites (Equation 1).

$$\text{WebQEM score} = \sum \text{Allocated weight} * \text{the score given by researcher}$$

Equation (1): Calculation of the scores of main and secondary criteria in WebQEM

It is noteworthy that the secondary criterion, i.e. the lack of defect, includes two other secondary criteria of various errors and the lack of link errors. Xens link sleuth 1.3/8 was used to evaluate the lack of link errors and Internet Explorer (8) and Firefox (21) were used to evaluate the lack of various errors.

Moreover, concerning the secondary criterion of data accessibility which is possible through the evaluation of the support of the text version of a website and the readability of photos in the website, "Only text view" in "Extension" of Firefox browser was used to view the text which provides the possibility of observing the text version of the website.

Moreover, Equation (2) was used to evaluate the readability of website photos:

$$X = 100 - \left(\text{Number of photos without alt} * \frac{100}{\text{Total number of photos}} \right) \text{ Evaluation of readability of websites}$$

In order to obtain the number of all photos and the number of photos with Alternative text¹ feature, the studied websites from Woo rank (www.woorank.com) and Seo and Website review (www.SeoChat.com) using Google Chrome (28) were used to obtain the readability of the photos of the studied websites. The evaluation of Windows accessibility was done through Internet Explorer and Firefox.

To evaluate the speed of the hospitals' websites, Equation (3) was used:

$$X = \frac{\text{The speed of all pages}}{\text{The size of website}} \quad (3)$$

The information related to the speed of all pages of the website and the size of the website was obtained from Chat Seo² and Webpagetest³.

After evaluating and assessing the main and secondary criteria of the checklist in WebQEM, the collected data were entered into Excel 2010 and then the data were described using frequency and percentage and were used to respond the research questions.

Findings

The results of the evaluation of the websites based on the main criteria of WebQEM are presented in Table 1.

As indicated in Table 1, the criterion of usability with an average score of 0.209 out of 0.3 shows that 81.6% of the studied websites are desirable, 12.64% are average and 5.76% are very desirable. Moreover, the functionality with an average score of 0.244 out of 0.3 indicates that 75.86% of the studied websites are very desirable, 22.98% are desirable and 1.14% are at an average level. Moreover, the criterion of reliability with an average score of 0.162 out of 0.2 indicates that 56.32% of the studied websites are very desirable, 20.68% are desirable, 13.79 % are at an average level, and 9.19% undesirable. Moreover, the criterion of efficiency with an average of 0.163 out of 0.2 indicates that 56.32% of the studied websites are very desirable, 33.33% are desirable, and 10.34% are at an average level. At the end, Iranian hospital websites, with an average score of 0.781 out of 1 have a desirable status. Based on the data, from all active hospital websites in Iran, 51.72% are desirable, 45.97% are very desirable, and 2.29% are at an average level. The highest score resulting from the WebQEM method, which is 0.907, belongs to Milad Specialized Hospital of Tehran and the lowest score, 0.577, belongs to Imam Khomeini Hospital of Tehran (Table 1).

Table1: The evaluation of Iranian Governmental Hospital Websites based on the main criteria of WebQEM

Index	Results of evaluation											SD
	Very undesirable		Undesirable		Average		Desirable		Very desirable		Mean	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%		
Usability	0	0	0	0	11	12.64	71	81.60	5	5.76	0.209	0.023
Functionality	0	0	0	0	1	1.14	20	22.98	66	75.86	0.244	0.022
Reliability	0	0	8	9.19	12	13.79	18	20.68	49	56.32	0.162	0.048
Efficiency	0	0	0	0	9	10.34	29	33.33	49	56.32	0.162	0.030

1 "Alt" tag describes the subject inferred from the photo. This tag could be used as an alternative text for images in case of error in loading to make users inform of the function and concept of photo if not displayed.

2 www.SeoChat.com

3 www.webpagetest.org

The evaluation of Iranian hospital websites based on secondary criteria of usability, functionality, reliability, and efficiency is presented in Table 2.

According to the results of Table 2, the secondary criterion of the understandability of site with an average score of 0.058 out of 0.09 indicates that 47.12% of the studied websites are in an average status, 45.9% are desirable, and 5.47% are very desirable, with only 1.14% having an undesirable status. Moreover, the secondary criterion of feedback and guide with an average score of 0.046 out of 0.09 indicates that 57.47% of the websites are desirable, 33.33% are average, 8.04% are very desirable, and 1.14% are undesirable. The secondary criterion of aesthetic and user interface with an average of 0.047 out of 0.06 shows that 62% of the studied websites are desirable, 29.8% are very desirable, and 9.1% are at an average level. The secondary criterion of miscellaneous features with an average score of 0.039 out of 0.06 indicates that 57.47% of the studied websites are desirable, 37.9% are undesirable, 3.44% are very desirable, and 1.14% are at an average status (Table 2).

Concerning the results of Table 2, the secondary criterion of search and retrieval with an average score of 0.043 out of 0.09 reveals that 91.95% of the websites under study are at an average level, 5.47% are very undesirable, and only 2.2% are very desirable. The secondary criterion of navigation and browsing with an average score of 0.09 out of 0.09 indicates that the studied websites are very desirable. The secondary criterion of content with an average score of 0.11 out of 0.12 shows that 80.45% of the studied websites are very desirable, 14.94% are of an average status, and 5.7% are very desirable. Moreover, according to the results of Table 3, the main criterion of reliability has just one secondary criterion of lack of defect and its average score of 0.162 out of 0.2 indicates its desirable status. Moreover, 56.32% are at a very desirable status, 20.68% are desirable, 13.79% are average, and 9.19% are undesirable (Table 2).

Therefore, according to the results of Table 2, the average score of the secondary criterion of functionality, which is 0.076 out of 0.1, indicates that 73.7% of the studied websites are desirable, 36.78% are very undesirable, 11.49% are undesirable, and 8.04% are at an average level. The secondary criterion of accessibility with an average score of 0.087 out of 0.1 indicates that this criterion is at a very desirable status. Therefore, 58.69% of he studied websites are very desirable, 22.98% are average and 18.39% are desirable. In this regard, 56.32% of the studied websites are very desirable, 22.98% are undesirable, and 20.68% are desirable (Table 2).

Table 2: The evaluation of Iranian hospital websites based on usability, functionality, reliability, and efficiency criteria

	Index	Very undesirable	Undesirable	Average	Desirable	Very desirable	Mean	SD
Usability	General understandability	0%	1.14%	47.12%	45.9%	5.74%	0.058	0.012
	Feedback and guide	0%	1.14%	33.33%	57.47%	8.04%	0.064	0.011
	Aesthetic and user interface	0%	0%	9.1%	62%	29.8%	0.047	0.008
	miscellaneous features	0%	37.9%	1.14%	57.47%	3.44%	0.039	0.12
Functionality	Final result	0%	0%	12.64%	81.60%	5.76%	0.209	0.023
	Search and retrieval	5.47%	0%	91.95%	0%	2.2%	0.43	0.012
	Browsing and navigation	0%	0%	0%	0%	100%	0.090	0.00
	Content	0%	0%	14.94/5	5.7%	80.45%	0.11	0.017
Reliability	Final result	0%	0%	1.14%	22.98%	75.86%	0.244	0.022
	Lack of defect	0%	9.19%	13.79%	20.68%	56.32%	0.162	0.048
Efficiency	Implementation	0%	11.49%	8.04%	43.7%	36.78%	0.076	0.023
	Accessibility	0%	0%	22.98%	18.39%	58.69%	0.087	0.016

The rankings of Iranian hospital websites in WebQEM is presented in Table 3. Table 3 indicates that in WebQEM, Milad Specialized Hospital with a score of 0.907 out of 1 ranks the first and Imam Khomeini Hospital with a score of 0.577 out of 1 ranks the last. An overview of Iranian hospital websites in the first to the third row after evaluating through WebQEM indicates that Milad Specialized Hospital, Khorshid Educational, Research and Medical Complex of Isfahan and Firouzgar Educational and Medical Center of Tehran occupy the first to the third rank, respectively. This ranking is according to the main criteria of WebQEM (Table 3).

Table 3: The results of ranking Iranian governmental hospital websites using WebQEM

Row	Name of Hospital	WebQEM score
1	Milad Specialized Hospital	0.907
2	Khorshid Educational, Research and Medical Complex of Isfahan	0.889
3	Khorshid Educational, Research and Medical Complex of Isfahan	0.877
4	Amir A'alam Hospital of Tehran	0.875
5	Sina Hospital of Karoun	0.874

Discussion

In this study, Iranian hospital websites were evaluated using WebQEM based on the main criteria of usability, functionality, reliability, and efficiency. In terms of the main criteria in WebQEM, the studied hospital websites had a desirable status. Moreover, concerning the results of the present study, the criteria of functionality, efficiency and reliability were very desirable and that of usability was desirable. As far as hospitals in Iran follow the standard defined by the Secretariat of Health Information and Communication Technology Council (takfab) for designing their websites, they have the least standard features of a website.

The results of Olsina et al.'s (1999) study indicate that the websites of universities of Spain are in the first rank, and therefore desirable, in terms of reliability, in the second rank in terms of efficiency, in the third rank in terms of usability and desirable, and in the fourth rank in terms of functionality and in an average status. As seen, none of studied websites are in undesirable and very undesirable statuses. Moreover, concerning the results of Olsina et al., it can be claimed that the present study is consistent with the mentioned study. Moreover, the results of Alibeyk et al.'s (2011) study indicate that the websites of the central libraries at universities of medical sciences in Iran are desirable in terms of reliability, desirable in terms of efficiency, and average in terms of usability and functionality. None of the studied websites in the aforementioned study are in undesirable and very undesirable statuses which is in line with the present study. In Alibeyk et al.'s (2011) study, the difference in rankings of the main criteria and the average score from the present study is because of the difference in the number, type and identity of the hospitals in the statistical population. Therefore, the results of this study are in line with the results of Olsina et al. (1999) and Alibeyk et al. (2011).

Iranian hospital websites are in a very desirable status in terms of aesthetic user and user interface features, which indicates the stability of the main nodes of the website. Other features discussed in the aesthetic and user interface criteria are style and aesthetic features. From this point of view, Iranian hospital websites were in an average status. Most hospital websites have followed a very similar design and style such that at the first glance, they all seem to have used the same template, i.e., common fonts and prevailing colors such as blue and white.

These fonts and colors are quite visible. In contrast, websites such as that of Milad Specialized Hospital have a beautiful style, and matching fonts and colors with beautiful images and animations have created a good harmony which looks very eye-catching to the end users.

In terms of some features such as print, download and email, the studied websites were in very a desirable condition. In so far as hospital services include announcement of the programs of clinics and wards, physician attendance plans and patient admission guides, the accessibility of print, download, and email features can be helpful. The status of hospital websites is relatively desirable in terms of foreign language support, 60.91% of websites support English, while 39.08% of websites do not.

The findings of Diana and Silfianti (2018) showed that Indonesia needs to follow a more appropriate strategy concerning the development of its websites. Moreover, another aspect which, in the researcher's opinion, should be approved in Indonesia is the controversies in understandability of the contents of websites. However, the users of the studied websites in Indonesia are completely satisfied with the usability of websites, which is in line with the findings of this study concerning the secondary criterion of usability.

The results of Alibeyk et al.'s (2011) study on qualitative evaluation of the library websites of the universities of medical sciences in Iran using WebQEM showed that these websites are in average status in terms of usability. Therefore, the results of the present study do not match with those of Alibeyk et al. (2011), Pashazadeh (2010), Dastani and Sattari (2017), and Ostadzadeh Mehrabani and Mohammadi (2017) with regard to the usability index.

The criterion of "content" which entails the relation of content and online services is very desirable. The secondary criterion of online services also requires the development and increase of efficiency. Out of the studied websites, 14.94% lacked such a feature. Web online services include news groups, file transmission services and online services. The existence of this criterion leads to increased interactions between users and authorities on the one hand, and provide a strategy for rapid transmission and dissemination of information and news on the other hand. Other criteria related to the main criterion of functionality are very desirable.

The results of the current study showed that 93.10% of the studied websites are very desirable and 6.89% are very undesirable in terms of the secondary criterion of search mechanism related to "functionality". Moreover, the evaluation of secondary criterion of retrieval and restore facilities showed that the studied websites are very undesirable such that only 2.29% of Iranian hospital websites can provide the users with the advanced search and retrieval facilities. Therefore, this issue can make retrieval and restoring of information in Iranian hospital websites very difficult.

The results of the present study on "Search and retrieval" related to "functionality" indicate an average status, which matches with the results of Alibeyk et al. (2011). However, the findings of this study on the other secondary criterion of "functionality", which are very desirable, do not match the results of Dastani and Sattari (2017) and Pashazadeh (2010). Dastani and Sattari explain that the hospital websites of Khoarsan Razavi have an undesirable status with only three websites out of 16 having a desirable status.

In order to evaluate the compatibility with different browsers, the studied websites were examined through the Internet Explorer and Firefox, which indicated that they were compatible with the used browsers. All the studied websites had a certain template and had no problem related to the template. Concerning the absence of link error, the results indicated that the status of blind, broken and invalid links in hospital websites of Iran is desirable with only 9.19% of the studied websites having blind, broken and invalid links.

The results of the current study on the secondary criterion of "lack of defect" related to "reliability" indicate a very desirable status, which is in line with the results of Alibeyk et al. (2011). Pashazadeh (2010) indicates that the status of websites in Iranian hospital libraries is desirable in terms of reliability. The results of this study do not match with the results of Dastani and Sattati (2017).

Iranian hospital websites are very desirable in terms of "efficiency" which includes accessibility and implementation. There are some deficiencies in the secondary criterion of information accessibility. It is almost impossible to access the complete version of 22.98% of the websites, which can be due to the policies of the related organization. The speed of the implementation of 11.49% of the hospital websites is undesirable (over 0.99 seconds).

The results of the present study on "efficiency" are consistent with the results of Alibeyk et al. (2011) and Pashazadeh (2010); however, they do not match with those of Dastani and Sattari (2017).

The results indicated that Milad Specialized Hospital with a score of 0.907 out of 1 is in the first rank of WebQEM and Imam Khomeini Hospital of Tehran, with score of 0.577 out of 1, occupies the last rank.

The results of Olsina et al.'s (1999) study indicate that the Website of Stanford University, with a final score of 79.76, ranks the first and that of Singapore National University, with a final score of 54.46, ranks the last. The difference in the rankings of the main criteria and the mean of scores in Olsina et al.'s study with the present study is due to the differences in the type, the identity and the number of websites in the statistical population.

The results of Militaru's (2011) study confirm that the website of ABP University with a final score of 85.19 is in the first rank and the website of Unibook University with a score of 58.03 is in the last rank. The difference in the scorings gained for the websites in the present study using WebQEM and the scorings of the websites in the study by Militaru (2011) can be due to the difference in the checklist, the weighting of criteria, the type of scoring employed by researchers, and the difference in identity and number of websites in the statistical population.

The literature review of foreign (non-Iranian) studies indicates that the status of Iranian hospital websites evaluated through WebQEM is different from that of universities of Spain and Romania in terms of scoring. In evaluating the university websites of Spain, the website of the National University of Singapore has the lowest score with a final score of 46.54 (Olsina et al., 1999) and in evaluating the university websites of Romania, the website of Unibook University has the lowest score with a final score of 78.16 (Militaru, 2011); However, in the present study, the lowest score of WebQEM belongs to Imam Khomeini Hospital of Tehran with 0.577 out of 1.

The results of two surveys indicate that even the score of the lowest ranked websites was not below 50%, having the least of the features required in WebQEM, which indicates that despite differences in weighting, the type, and the identity of statistical population of the study, the quality of Iranian hospital websites is almost the same as of the quality of university websites of Spain and Romania according to the criteria introduced by WebQEM. This can be due to conformity of the designing of the website with standards.

Recommendations

Based on the findings of the current research, the designers of websites for Iranian governmental hospitals are recommended to consider the following to increase the websites' quality:

1. According to the findings, 77% of Iranian hospital websites are in an undesirable status in terms of the quality of guidance features. Therefore, in order to achieve a desired status, it is recommended that the websites consider the possibility of user guide in the home page and the subpages, which is possible by placing the help option on the webpages. Moreover, it is recommended to consider user guides in hospital websites to enable them to search the website itself. These factors affect the usability criterion for a hospital's website.

2. Concerning the findings of this research, 39% of Iranian hospital websites have an undesirable status in terms of foreign language support. Therefore, it is highly recommended that they introduce at least the English language support on their websites. Moreover, they are recommended to support some other languages such as Arabic and Turkish concerning their geographical situation to make Iranian hospital websites globally accessible.

3. Concerning the research findings in that 20% of Iranian hospital websites are in the average to very undesirable status in terms of online services, the suggestion is that they equip the hospital websites with online services such as news services, FTP services, information about their ranking and services so that the content presented in the hospital website would be presented to the users with a higher quality.

4. Based on the findings of this study, 14% of Iranian hospital websites are in an average status in terms of the absence of link errors. As a result, it is recommended to increase the quality of links in hospital websites and avoid blind, broken and invalid links. Moreover, they should check their websites in this respect through reliable tools to increase the reliability of their websites.

5. Concerning the research findings in that 91% of Iranian hospital websites are in an average status in terms of search and retrieval, it is recommended that the hospitals equip their websites with search engines to improve the search and user guide in the best possible way with the least costs. Moreover, the hospitals whose websites are equipped with simple search facilities are recommended to include advanced and general search possibilities in their websites to help search and retrieval. In addition, it is necessary to take into consideration the possibility of retrieval of search results to avoid unexpected results during searching and enable the users to do their searches in the least possible time and with the least possible cost.

6. Since 48% of Iranian hospital websites lack a pictorial map of the hospitals, it is recommended that they load the pictorial and 3D map of the hospital on the website to achieve a desirable status and to enable the visitors to visit all wards and sections of the hospital or to find their ways in different wards and sections of the hospital through a printable map. Therefore, it is quite necessary to make essential investments on equipping the websites of the hospital with the pictorial and illustrative maps of the hospital.

7. As another finding, 35% of Iranian hospital websites lack the section "Common questions" on their websites. Therefore, it is recommended to add "Common questions" to the website to achieve a desirable status and to assist users to get feedback from them, since the question of one user might be answered in the "Common questions". Therefore, it is required to include "Common questions" in the homepage and the webpages of websites of the hospitals to increase the quality of guidance and feedback.

8. Concerning the research findings in that 94% of Iranian hospital websites lack the "virtual tour", it is recommended to include it in the websites to achieve a desirable status and increase the users' perception of the hospital, the frequency of visits, and the usability among users.

9. In so far as 95% of Iranian hospital websites lack "Display Resolution Indicator", it is suggested to include it in the websites. Display resolution indicators provide some information about the usability of hospital websites to users to make the quality of the presented information as completely usable as possible.

10. Concerning the research findings in that 22% of Iranian hospital websites are in an undesirable status in terms of data accessibility, it is recommended that they include this feature in the websites of their hospitals and apply the required modifications.

11. As findings of this study show, 35% of Iranian hospital websites lack the "Last update indicator". Therefore it is recommended that they include this feature in the websites of the hospitals and take the required actions.


Conflict of Interest

No conflict of interests has been reported by the authors.

References

- Alibeyk, M., Jamshidi, O.R., Haji-Zeinolabedini, M. and Pashazadeh, F. (2011), "Qualitative Evaluation of Central Library's Web Sites of Medical Universities in Iran with WEBQEM", *Journal Health Administration*, 14(43), 63-76. [In Persian]
- Dastani, M. and Sattari, M. (2017), "Assessing the Quality of Hospitals' Websites in Khorasan Razavi Province", *Depiction of Health*, 8(1), 50-56. [In Persian]
- Diana, M. and Silfianti, W. (2018), "The analysis of quality and services on PT. kereta Api Indonesia website concerning the users by means of web quality evaluation method (WEBQEM)", *International Journal of Computer Science and Software Engineering*, 7(10), 249-254.
- Fakhrzad, M., Fakhrzad, N. and Dehghani, M. (2011), "The role of electronic health records in presenting health information", *Media Journal*, 2(4), 25-33. [In Persian]
- Farhadi, A., Amiri, M.R., Karami, S. and Safipour, A.A. (2015), "Evaluation of schools' websites of Hamadan University of Medical Sciences based on webometrics criteria in 2014", *Pajouhan Sci Journal (PSJ)*, 13(3), 31-39. [In Persian]
- Gharibeh- Niazi, M. and Karballaei-Aghaei, M. (2014), "Comparison of the results of evaluation of website of Iranian state universities in WEB QEM & Web Assessment Index (WAI)", *Academic Librarianship and Information Research*, 48(2), 263-285. [In Persian]
- Ghazi-Saeedi, M., Khara, R. and Hosseiniravandi, M. (2015), "Necessitates of Using Dashboards in Health Information Management", *Health Inf Manage Journal*, 12(2), 255-262. [In Persian]
- Katerattanakul, P. and Siau, K. (2017), "Measuring information quality of web sites: development of an instrument", *Proceedings of the 20th International Conference on Information Systems*.
- Militaru, T.L. (2011), "The evaluation of the websites quality; application for the website of universities", *The 3rd International Conference: Institutional Strategic Quality Management - ISQM*. July 14 – 16, Sibiu, Romania Paper ID: 062-ISQM2011: 236-242.
- Olsina, L. and Rossi, G. (1998), "Web-site quality evaluation method: a case study on museums", *Icse 99-2nd workshop on software engineering over the internet*.at Int'l Conference on Software Engineering. Available at: <http://sern.cpsc.ucalgary.ca/maurer/Icse99ws/Icse99ws.html>, Los Angeles.US.

- Olsina, L., Godoy, D., Lafuente, G.J. and Rossi, G. (1999), "Assessing the quality of academic websites: A CASE Study", *New Review of Hypermedia and Multimedia (NRHM)*, 5, 81-103.
- Ostadzadeh-Mehrabani, B. and Mohammadi-Ostani, M. (2017), "Evaluation of Iranian Sports Federations Websites by using websites quality evaluation tool (WQET)", *Quality Journal of Knowledge and Information Management*, 4(3), 63-76. [In Persian]
- Pashazadeh, F. (2010), "Qualitative assessment of the websites of the central libraries of the medical universities of the country using the WebQEM method", Master's dissertation of Library and Information Science, Management and medical informatics, Iran University of Medical Sciences, Tehran. [In Persian]
- Powell, R. (1998), *Basic research methods for librarians*. Translation by Najla Hariri, Tehran, Asar Nafis.
- Secretariat of the Information and Communication Technology Information and Communication Technology Council (TEKHAF). (2004), "Report of the Tahfab Strategic Plan in the framework of the Fourth Economic, Social, Political, and Cultural Development Plan of the Islamic Republic of Iran", Tehran: Secretariat of the Tahfab Strategic Council. [In Persian]
- Tahamtan, I., Sedghi, S., Talachi, H. and Mohaghegh, N.A. (2012), "qualitative study of the application of PDA and smart phones by the residents and interns of teaching hospitals of Tehran University of Medical Sciences", *Journal Health Administration*, 15(48), 7-12. [In Persian]

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