Journal of Cancer Education (2019) 34:810–818
https://doi.org/10.1007/s13187-018-1378-9

Evaluation Breast Cancer Information on The Internet in Arabic

Lamya Alnaim[1]

Published online: 20 June 2018

Abstract
Nowadays, medical information regarding various diseases and disorders is available online. The Internet has become the first choice for the patient when it comes to gathering detailed information about a disease or problem. Therefore, in view of this frequent occurrence, the information that is provided online needs to be accurate; providing comprehensive facts, transparency, and quality. A study was carried out to determine the accuracy of information related to breast cancer on various websites. Websites which share information online about breast cancer, in the Arabic language, were selected. The quality of the websites was to be evaluated; however, there is no standard method for evaluating the quality of health websites. Hence, a rating form was developed for this study, to determine the completeness and transparency of a specific number of websites using three popular search engines. A 16-item questionnaire was prepared and validated to determine the quality of individual websites in addition to using the DISCERN instrument for assessing consumer health information. Most of the websites (approximately 47%) were deemed to be commercial in nature. Thirty-three percent were developed by non-profit organizations. They disseminated information concerning the risk factors (93%), screening, mammography (93%), surgical treatment (93%), chemotherapy (89%), radiotherapy (93%), and complementary medicine (0%) surrounding the treatment of breast cancer. About 67% of the websites were estimated to give completely correct information. Incidentally, only five websites had a healthcare professional or expert as the author, while nine of them had no author. Although numerous breast cancer-related websites exist, most do a poor job in providing Arabic-speaking women with comprehensive information about breast cancer surgery. Providing easily-accessible, high-quality online information has the potential to significantly improve patients' experiences.

Keywords Breast cancer · DISCERN instrument · Reliability · Coverage

Introduction

Health information on the Internet refers to all communication related to one's health conducted on the Internet [1]. Health websites provide an assortment of different information, ranging from personal interpretations of illnesses and patients' discussion groups to peer-reviewed journal articles and clinical decision support tools. Like most of the Internet, it is highly unregulated; information could be either wrong or misleading. Concurrently, certain website information was deemed to be confusing for the reader, or it could lead to vulnerable patients being taken advantage of via the promoting or selling of useless products or harmful advices [2, 3]. Inaccurate or misleading information could lead to ignoring side effects or delay in seeking professional help for health problems, or it may lead to the use of unproven treatments in place of standard therapies [4].

Around 49.2% of the world's population is using the Internet, while in the Middle East, this percentage rises to 57.4% [5]. In the USA, 72% of Internet users said they had searched online for health information within the past year [6]. Patients are increasingly searching for information pertaining to their illnesses or treatment programs and are participating in online communities more frequently. They are buying products and services for health and well-being more recurrently, too. This might be due to an increase in the "health awareness" of the patient, the availability of information, and the amount of time the patient has with his/her healthcare professional. Finally, this might also be due to the sensitive nature of the patient's concern. The use of the Internet as a source of information has risen steadily and has reached around 50% of cancer patients [7].

Cancer is a leading cause of death worldwide among women in both high-income countries and middle-income countries

✉ Lamya Alnaim
lalnaim@ksu.edu.sa

[1] Clinical Pharmacy Department, College of Pharmacy, King Saud University, P.O. Box 4143, Riyadh 11149, Saudi Arabia

[8]. Among females, cancer is the second leading cause of death worldwide, accounting for 14% of all deaths [8]. Cancer has become one of the most common diseases in the population of Saudi Arabia [9]. Breast cancer treatment usually involves breast-conserving surgery or mastectomy with removal of some of the axillary lymph nodes for disease staging. Radiation therapy, chemotherapy, hormone therapy, and/or targeted biologic therapy may also be used depending on the cancer stage and biologic characteristics and type of surgery [8].

A literature review by Mills et al. in 1999 outlined the functions of patient information in cancer care [10]. These include over their healthcare situation, reducing anxiety, and promoting self-care. Moreover, health information can help women cope with their illness and inform decision-making regarding their treatment and self-care [11].

Breast cancer is the most common cancer in females in Saudi Arabia, accounting for 27.4% of all newly diagnosed female cancers in the year 2010. Breast cancer incidence rates in Arab women have increased during the last 24 years, but women are still being diagnosed with BC at more advanced stages of the disease [12, 13]. The information requirements of women with breast cancer are diverse. Moreover, these women have changing information needs as they progress along their treatment journey depending on the course of their disease, which means they would need different types of information at different times [11]. Women also have access to multiple sources of information pertaining to the treatment of cancer, including their treating physicians, pharmacist, other healthcare providers, family and friends, and other information sources such as the Internet [14]. The continuing growth of the Internet has transformed patient access to health information. However, there is still variability in the quality of health information available online [15]. The reasons why women use the internet for information are many, and include the following:

(1) not having enough time with their healthcare provider, (2) the sensitive nature of the inquiry, (3) mistrust in their healthcare provider or healthcare system, and (4) a lack of trust regarding the diagnosis and treatment options available to them, as the information provided may be inconsistent, contradictory, and delivered in a haphazard way [16].

For patients to make use of information on the Internet, it needs to be properly processed and organized to their specific needs when seeking online cancer information [17]. Information on the Internet is unregulated, and therefore, patients may be able to access poor quality information on which they base their decisions on [18]. However, information has improved in terms of quality over time, and the quality of the information becomes more dependent on the search and appraisal skills of the patients.

The five main tools in which the quality of health websites are assessed have been defined as follows: (1) codes of conduct, (2) quality labels, (3) user guides, (4) filters, and (5) third-party certification [19]. Codes of conduct refer to certain criteria that are applied during the development of websites to help ensure quality. Quality labels are badges which are displayed by websites to show their commitment to abide by a code of conduct. The site may be checked by the label provider, and users may report misuse of the label. Filters are a gateway approach to organizing access to the Internet—that is, resources are selected for their quality and relevance to an audience. Finally, user guides are tools that may be published by organizations to assist users in judging the quality of a website. With all these available tools, there is still no consensus on which the best method for is ensuring quality for consumers, Website's health information [19].

Health Information in The Arab World

The Arab world is made up of 19 countries, all of which list Arabic as their official language. This entity has a combined population of 420 million people. Incidentally, there are not so many websites available for the dissemination of reliable health-related information. [20]. A large part of the population in the Arab world is fluent in the Arabic language only. This means that they only have access to websites that are written in Arabic to obtain information regarding health-related issues. The (2009) study by Al-Huziah et al. reports that Arabic online health-related information was weak. The information provided in the websites that were evaluated is too simplistic, and there is a lack of specific information in such websites that specialize in information related to medical specialty. Most of these websites originate from countries like Saudi Arabia, Egypt, and Syria with the information mainly provided to the consumer in the English language [2]. Despite this fact, however, the number of websites continues to grow rapidly. At the time that this study was being conducted, the assessment of various different websites (based on their country of origin) revealed that Egyptian health websites are considered to be the best in terms of standards of authoritativeness and transparency [2].

King Abdullah Bin Abdul-Aziz Arabic Health Encyclopedia (KAAHE) is a new initiative that specializes in providing online health information for health consumers and healthcare professionals. Its goal is to provide trustworthy health information for the Saudi Arabian public and the Arab world in both Arabic and English. The KAAHE website is certified by Health on the Net Foundation (HON), and the website identifies the certifications, affiliations, editorial policy and procedures, privacy policy, and terms of use. It is expected that the Arab world will benefit from health information content that is in Arabic and tailored to their cultural needs. However, much work remains to be done regarding the provision of adequate health information to health consumers in order to cater for their needs [21].

Aim

The aim of the study is to evaluate the quality of the various websites that provide information about breast cancer in the Arabic language.

Methods

Selection of Websites

A search using three different search engines (Bing, Google, and Yahoo) was conducted in May 2017. These search engines were chosen because, at the time of our study, they were the most popular search engines in use. The Arabic words for breast cancer were used as search terms. These search terms were chosen based on the input from a convenience sample of women without a personal history of breast cancer. The search terms were kept purposely short, simple, and broad to reflect the practices of Internet users of all abilities seeking information about breast cancer. The search resulted in more than 218,000 results on Bing; 140,000 results on Yahoo; and 4,730,000 results from Google or universal resource locators (URLs), respectively.

We reviewed the first three pages of the search results only since marketing data generated in the year 2014 has revealed that most users do not go beyond the first two pages of a search results [22]. All websites that included medical information on breast cancer in the Arabic language were included except for those provided by private individuals. Websites containing links to other websites with medical information as well as those containing only chat rooms or discussion groups were also evaluated. In total, 19 relevant websites were found, all of which were available when the study was conducted in May 2017. Sites were excluded if they were not in Arabic, if they were unrelated to breast cancer or its treatments, and if either payment or registration was required for access. Blogs and posts addressing specific questions only were excluded and so were websites offering potential cures and treatments. Websites that met the inclusionary criteria were then independently reviewed by two research assistants. See Table 1.

Evaluation of the Websites

A rating form including detailed instructions was developed. A clinical pharmacist with experience in medical oncology evaluated all 15 websites. A computer with Internet access, a list of the 15 different website links, as well as any appropriate references were made available to the evaluator. The information references were chosen based on the opinion of a practicing oncologist.

Generally, there is no standard method for evaluating the quality of health websites. Criteria were operationalized by the researcher utilizing elements from three different website evaluation tools. These elements were:

1- Completeness of information [23]
2- Transparency [24, 25]

Completeness, measuring breadth, and the depth of breast cancer information being disseminated were evaluated using items developed by Nilsson-Ihrfelt et al. in 2004 [23]. This quality dimension was assessed through determining: (a) whether information was provided on each of the ten core topics and (b) the level of detail provided for each of them. The ten topics were (1) risk factors, (2) screening and mammography, (3) surgical treatment, (4) chemotherapy, (5) radiotherapy, (6) hormonal treatment, (7) other types of pharmaceutical treatments, (8) breast reconstruction procedures, (9) complementary medicine, and (10) emotional/psychological support [23].

The breadth of information provision was scored out of 10 (one mark for each topic covered). A score was then determined by the level of detail (depth) with 0 being ascribed to "none," 1 "minimal," and 2 "more than minimal." In the case of "none," the topic under scrutiny was not mentioned at all. When coverage was categorized as being "minimal," there was a cursory discussion of the topic. However, a categorization of "more than minimal" required a detailed discussion of the topic [23].

The correctness of information was characterized as "incorrect for the most part," "correct for the most part," and "completely correct." In the case of "mostly not correct," most of the information was regarded as incorrect. For the category of "mostly correct," only slight incorrectness was accepted. For the categorization of "completely correct," the information needed to correspond to scientific knowledge and current best medical practice [23]. The completeness, breadth, and correctness of information were compared with recognized peer-reviewed sources of information. The sources used were obtained from the National Comprehensive Cancer Network (NCCN) guidelines for Breast Cancer [26].

The transparency criteria used are based on the criteria described by Silberg et al. in 1997 [25]. These criteria are as follows: (1) authorship, (2) attribution, (3) disclosure, and (4) currency, and these may be used to assess any source of information. Transparency criteria are used by organizations to award Kitemarks identifying trustworthy sites, [24]. Usability, which measures the ease of navigation around a website, was appraised using items developed by Cline and Haynes in 2001 to assess the design features of a website [27].

DISCERN Instrument

Additionally, the DISCERN instrument was used to access the quality of the websites [28]. This 16-item questionnaire is a validated tool that is used for judging the quality of written consumer health information. The first section (questions 1–8) evaluates the reliability of the information (e.g., "Is it clear what sources of information were used to compile the publication?"). The second section (questions 9–15) considers the

Table 1 Selected websites with their website addresses

Organization	Website address
Mawdoo	www.mawdoo3.com
King Abdullah bin Abdul-Aziz	www.kaahe.org/health/ar.com
Webteb	www.webteb.com/cancer/diseases.com
Wikipedia	www.wikipedia.org/wiki.com
Altibbi	www.altibbi.com
Sehha	www.sehha.com/diseases/cancer.com
WHO	www.who.int/topics/cancer/breastcancer.com
National Guard Health Affairs	www.ngha.med.sa/Arabic/HealthAwareness.com
Al Marsal	www.almrsal.com
Thaqafnafsak	www.thaqafnafsak.com
Department of Health	www.haad.ae
Zahra	www.zahra.org.sa
Enabbaladi	www.enabbaladi.net
Feedo	www.feedo.net
King Hussein Cancer Foundation	www.khcc.jo/ar.com

quality of the information on treatment choices (e.g., "Does it describe the benefits of each treatment?"). Five-point Likert scales ranging from 1 (no) to 5 (yes) were used to accompany these items. The final section (question 16) assesses the overall rating of the publication on a 5-point Likert scale ranging from 1 (low quality with serious or extensive shortcomings) to 5 (high quality with minimal shortcomings) [29].

The maximum score for the DISCERN instrument was 80. Each website was categorized as "excellent," "good," "fair" or "poor," or "very poor according to the scale in Table 2. Each rater was provided with the DISCERN instrument, which included hints for rating each item, and the DISCERN handbook, which contains detailed information regarding the scoring of DISCERN items [30].

Results

The characteristics of the 15 different websites that give information about breast cancer are presented in Table 3. Most of the websites that provide information about breast cancer are commercial 47% (7) and are developed by non-profit organizations 33% (5). Thirteen percent (2) had a university or medical affiliation, whereas 6% (1) had a governmental affiliation. The breast cancer websites were also evaluated for their overall rating as being either "low" (serious or extensive shortcomings), "moderate" (potentially important but not serious shortcomings), or "high" (minimal shortcomings). The overall rating of the information about breast cancer on the websites was 73% (11) that had potentially important but not serious shortcomings, whereas 27% (4) showed low ratings that had either serious or extensive shortcomings. Significantly, however, none of the websites had a high rating.

Table 2 DISCERN instrument scoring system

Category	Score
Excellent	68–80
Good	55–67
Fair	42–54
Poor	29–41
Very poor	16–28

Completeness of Information

Both the coverage (which refers to the completeness and depth of the website) and the accuracy (correctness) of the breast cancer information in the surveyed websites are presented in Table 4. Many of the websites covered information about the risk factors (93%), screening and mammography (93%), surgical treatment (93%), chemotherapy (89%), and radiotherapy treatment (93%) available to breast cancer sufferers, whereas

Table 3 Characteristics and overall rating of the websites

Characteristics	Sites % (*n*)
Commercial	47 (7)
University or medical center	13 (2)
Non-profit organization	33 (5)
Government	6 (1)
Overall rating	Sites % (*n*)
Low [serious or extensive shortcomings]	27 (4)
Moderate [potentially important but not serious shortcomings]	73 (11)
High [minimal shortcomings]	0 (0)

Table 4 Completeness, depth, and coverage of all websites related to breast cancer

Topics (%)	Completeness (%)		Depth (%)			Correctness (%)		
	Yes	No	No info	Min info	Max info	Mostly not	Mostly	Completely
Risk factors	93	7	0	60	33	0	27	67
Screening and mammography	93	7	7	73	27	13	20	67
Surgical treatment	87	13	13	67	13	0	33	40
Chemotherapy	93	7	20	67	7	0	40	33
Radiotherapy	93	7	20	73	0	0	40	40
Hormonal treatment	80	20	20	46	7	0	33	33
Other pharmaceutical treatments	40	60	33	13	7	7	13	27
Breast reconstruction	46	67	20	33	7	7	27	27
Complementary medicine	0	100	33	0	0	7	0	0
Emotional/psychological support	27	67	20	7	0	7	0	7

none of the websites covered information about complementary medicine. Only 27% of the websites that were surveyed covered emotional or psychological support.

Maximum information was provided about the risk factors following screening and mammography treatment. Next, information pertaining to surgical treatment was provided. Most of the websites displayed minimal information about chemotherapy and radiation. About 67% of the websites were estimated to give completely correct information concerning the risk factors of breast cancer and screening and mammography. The least correct information was given in relation to complementary medicine related to the treatment of breast cancer. The risk factors pertaining to breast cancer as well as screening and mammography were the two most frequently covered combinations with completely correct information being disseminated on most of the websites that were perused (80%).

Transparency of Information

The transparency of the information on the websites related to breast cancer included attributes of authorship, attribution, currency, disclosure, and Kitemarks, which are illustrated in Table 5.

Authorship

The attribute of authorship was assessed to evaluate if the website providing breast cancer information presents the details of the author of the information on the website (name, education, affiliation, year, etc.. By providing the details of the author on the website, the website user may easily access the author's credentials. Table 5 illustrates that nine out of 15 websites provided the author's details, whereas six websites did not provide this information on the website itself. Approximately five websites had a healthcare professional or expert as the author, while nine have no professional or expert author. Only one out of 15 websites provided the author's contact details, while the remaining 14 did not provide such details.

Attribution

The part of attribution discusses whether the source of information provided is genuine, clear, and identifiable. About eight out of 15 websites provided a clear source of information, whereas eight of them did not provide the exact source of information. Approximately five of the websites provided the references that had been cited, while nine of the websites did not. Table 5 highlights the fact that only six websites showed working external links to scientific reference material or studies, while 10 did not provide any external links. When the scores of attributions were aggregated, most of the websites that provided information related to breast cancer showed relatively poorly attribution.

Currency

The attribute of being "relevant and up-to-date" was studied and explored for all the 15 websites to determine whether the information given on the website was factually correct and up-to-date. Table 5 shows that almost half of the websites had revised the up-to-dateness of the information related to breast cancer. Seven out of the 15 websites had the information updated every 4 months. The date of the last update was clearly stated in about 10 of the websites. When all the scores were aggregated for this attribute, half of the websites performed unsatisfactorily in relation to the currency of the information being displayed.

Disclosure: Commercial Interests

The attribute of "Disclosure of commercial interests" of each website was examined to determine whether the websites had an "open or closed access" policy, and the funding for the information provided related to the breast cancer. Approximately

Table 5 Transparency of the websites related to breast cancer

Transparency	Yes for all	Yes for some	No.
Authorship			
Is there a disclosure of authorship?	9	0	6
Is there a disclosure of authors' credentials?	4	1	10
Is the author a healthcare professional/expert?	5	1	9
Are the credentials verifiable?	2	0	13
Are the author's contact details provided?	1	0	14
Attribution			
Is the source of information clear?	6	1	8
Are references given?	5	1	9
Is opinion stated as such?	10	2	3
Are any working external links provided to scientific reference material/studies?	6	0	10
Currency			
Is the date of creation of each page given?	7	0	8
Is the date of the last update clearly stated?	10	0	5
Has the site been updated within the last 4 months?	7	0	7
Disclosure: commercial interests			
If the site is commercial, is the source of funding clearly stated?	4	1	11
Is the site selling a product?	0	0	15
Does the site carry adverts?	5	0	10
Does the site allow pop-ups?	0	0	15
Is the privacy policy easy to find and clear?	9	0	6
Is personal information disclosed to the site sold to other organizations?	1	0	13
Kitemarks			
Does site have health-related Kitemarks/awards?	2	1	8
Are the Kitemarks/awards verifiable?	2	0	8
Are the criteria for winning the award easily accessible?	2	0	8
Does the awarding organization still exist?	2	0	8
Does the awarding body analyze content for accuracy?	2	0	8

four out of 15 websites showed clear information regarding their source of funding, while 11 did not reveal any clear funding source. None of the websites we visited were selling any product on their website. Around five websites displayed adverts, while 10 websites had no adverts. None of the websites allowed any pop-ups during its use. The privacy policy was clear for about nine websites; however, only one website allowed personal information disclosed to the site by the user to be sold to other organizations. When all the scores were aggregated, the organizations were all found to have performed well in the attribute of "Disclosure of commercial interests."

Kitemarks

The Kitemark signifies the attribute of "transparency of information." This symbol indicates whether the websites had been awarded with any health-related awards or not. Only two of the websites had Kitemarks or awards, and these Kitemarks were verifiable. The criteria for obtaining the award was easily accessible on two websites. When all the scores were aggregated, the attribute of Kitemarks showed very poor performance. Only two websites had been awarded with Kitemarks for their health-related information concerning breast cancer. Thus, when all the scores pertaining to the transparency of information were aggregated, it was found that the authorship, attribution, up-to-dateness of information as well as the disclosure of information, and the number of Kitemarks awarded for each website resulted in low scores for each of the websites.

The results relating to the quality of the websites that were evaluated for disseminating breast cancer information is presented in Table 6. To test the quality of the websites, a 16-item questionnaire was used as a validated tool that helped to judge the quality of the breast cancer websites. This validated tool is known as the "DISCERN questionnaire" which has a maximum score of 80. None of the websites that were examined reached the maximum score of 80; hence, none of them was rated as "excellent" (68–80), only one website, namely, Wikipedia, was rated as "good" (56.8). Five of the websites were scored as "fair" (42–54), while six of the websites were

Table 6 Quality of the websites using DISCERN instrument

Website	DISCERN score	DISCERN quality rating
Mawdoo	41.8	Fair
King Abdullah bin Abdul-Aziz	49.8	Fair
Webteb	34.8	Poor
Wikipedia	56.8	Good
Altibbi	33.1	Poor
Sehha	53.1	Fair
WHO	23.6	Very poor
National Guard Health Affairs	37.5	Poor
Al Marsal	30.5	Poor
Thaqafnafsak	43.3	Fair
Department of Health	32.5	Poor
Zahra	23.3	Very poor
Enabbaladi	45.7	Fair
Feedo	38.1	Poor
King Hussein Cancer Foundation	24.1	Very poor

rated as "poor" (29–41). Three websites were scored as being "poor" according to the DISCERN quality rating system. The results pertaining to the overall reliability of the information that was evaluated using a 5-point Likert scale ranging from 1 to 5 were as follows: approximately 11 websites were given a rating of "3" on the scale, and these were "moderate" in terms of the overall rating of the website. However, the remaining four websites were given a rating of "2" on the scale and were deemed to be "low" in terms of the overall rating of the website.

Discussion

The main aim of this study was to evaluate the quality of Arabic language knowledge and information related to breast cancer being made available online on different websites. Three search engines (Bing, Google, and Yahoo) were used to search for the keyword "breast cancer." The three search engines revealed the following results: Bing, 218,000; Yahoo, 140,000; and Google, 4,730,000 results. However, only 15 of the websites showed the information related to breast cancer in Arabic. The previous studies show that there is a large amount of information in relation to breast cancer available on the Internet; searching for "breast cancer" returns over 100 million webpages, incidentally. Moreover, the most commonly searched term "breast cancer symptoms" returns 12.3 million webpages [2, 21].

The completeness, depth, and correctness of all the 15 websites showed varied results on the topics of risk factors, which included screening and mammography, surgical treatment, chemotherapy, radiotherapy, hormonal treatment, other pharmaceutical treatments, breast reconstruction procedures, complementary medicine, and emotional/psychological support. Risk factors of breast cancer and screening and mammography were the two main topics that were completely covered with most of the information given being factually correct (in 80% of the total websites examined). The topic of "complementary medicine for the treatment of breast cancer" was the topic that was least covered (i.e., 0% of the websites alluded to it).

The transparency of the website was calculated using various attributes like authorship, attribution, up-to-dateness, disclosure of information, and the displaying of Kitemarks. When the scores of all the attributes were aggregated, most of the websites that provided information about breast cancer performed relatively poorly for attribution. Compared to the websites of other organizations, breast cancer-specific sites scored relatively lower than the general health organization [14]. This study determines the accuracy of the information provided in websites related to breast cancer and provides accurate information about breast cancer [18].

A study by Meric et al. in 2002 found that the more popular websites when compared with less popular breast cancer sites did not differ either in terms of the quality of information provided or in their levels of inaccuracy [31] The fact that the website is up-to-date does not guarantee that its content is correct but it serves as a monitor the user accessing the website. The quality of the website was determined by assessing the reliability of the website. The tool used was the "DISCERN questionnaire" that uses a 16-item feedback form which led to the conclusion that most of the websites were "poor" followed by "fair" in the case of quality of information being provided [27, 29]. Interestingly, most of the websites did not fulfill the required criterion of providing correct information on breast cancer.

All the studies that were done before as well as this current study state that most of the websites do not provide complete and correct information about breast cancer to the user [14]. The main benefit of the Internet today is that it provides people with an effortless way to update the information unlike the outdated print media. Many websites now incorporate Web 2.0 technologies, thereby making content more dynamic. For example, users have access to social networking sites, discussion forums, live chat, and blogs, all of which can convey information and are updated frequently, often by the users themselves [14].

At the same time, however, there seems to be a drawback to this type of social media outlet, as anyone can create and maintain such websites without them having any expert knowledge about breast cancer [4]. The quality and the accurateness of the information related to breast cancer has to be improved and maintained. It should also be updated by an expert and/or a professional healthcare author, so that the doctor can recommend these updated websites to the patients for them to gain more information about breast cancer. Results are in line with Shon and Musen's findings in 1999, as they found that certain health websites performed best for disclosure of information and worst for authorship [27, 32]. We suggest that physicians, website users, and authors should provide quality information related to breast cancer on the Internet. All the information that is provided in online websites needs to be evaluated by both physicians and oncologists alike, where the completeness, transparency, and coverage of topics are concerned. The limitation of this study was that it was restricted to the examination of websites related to breast cancer in the Arabic language only.

The King Abdullah Bin Abdul-Aziz Arabic Health Encyclopedia (KAAHE) is a positive first step in providing online health information for health consumers and healthcare professionals in the Arabic Language [21].

Healthcare professionals need to participate more in the development of KAAHE or other similar initiatives to provide trustworthy health information for the Arab-speaking population. Following such action, the Arab population will benefit from reliable health information content that is accessible in their own language and tailored to their cultural needs. New websites with comprehensive and accurate health information regarding breast cancer need to become available to counteract the negative impact of uncontrolled and unregulated health information on the Internet that may lead patients to make wrong decisions regarding their illness.

Such websites need to be certified and make their certifications, affiliations, editorial policy and procedures, privacy policy, and terms of use visible. Major educational and health institutions in the region can support such initiatives, and this would serve to perform a vital role in the community.

Patients affected by cancer want and need a diverse variety of accurate, easy-to-find, and understandable information, in addition to how cancer may impact on their lives and on those close to them. Patients differ in the amount, detail they want, how and when they would like to obtain that information, and also on their ability to identify quality information and understand it sufficiently to base treatment decisions on it [33]. Information provided to cancer patients has been shown to relieve anxiety and help them make informed treatment decisions [34].

Patients have better healthcare outcomes when they are more informed about their disease, more involved with their treatment choices, and more invested in their healthcare [33].

When well-informed, a patient is more likely to have improved treatment compliance and better outcomes [35].

Providing high-quality, accurate, reliable, and relevant information on dependable websites is an attainable way of providing the patient with needed information and, thus, achieving the benefits of informed patients in terms of outcomes.

Future research needs to address the barriers that hinder the development of trustworthy health websites in Arabic from being developed. Moreover, individual healthcare practitioners should play a greater role in educating patients in selecting appropriate sources of information on the Internet to answer their health queries and to help them make informed decisions regarding their health. Additional efforts need to be spent in understanding the effect of providing accurate and reliable information in patients' own language would have a great impact on patient's health outcome.

Conclusion

The various organizations that provide information related to breast cancer on their websites in the Arabic language need to improve in terms of completeness, transparency, and coverage. There are a very limited number of websites that have reliable information available in the Arabic language about breast cancer, and most of these websites do not present complete or accurate information. The websites are not updated or referenced even though there is an ever-increasing number of patients who use the Internet to get information about breast cancer. Having complete, accurate, and trustworthy health information in their native language is the right of every patient. It will also help patients to make decisions about their treatment if they are able to access accurate information on the Internet. Many aspects of the issues discussed in this paper need to be studied further to understand barriers and facilitators to providing high-quality reliable information about breast cancer in the Arabic language and how this information affects patient's outcomes.

Acknowledgements The project was fully supported financially by the Vice Deanship of Research Chairs, King Saud University Riyadh, Saudi Arabia.

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