



Assessment of Online Health Information for Arabic Sites



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Abstract

Purpose: The trustworthiness of Arabic health content on the net is not yet assessed, therefore King Saud Bin Abdulaziz University for Health Science (KSAU-HS) in collaboration with Health on the Net Foundation (HON) & Geneva University, have conducted this study in the Kingdom of Saudi Arabia.

Introduction: With the development of information technology and communications, there has been an evolution in the “information age” which is mirrored in the exponential growth in the number of web sites. Yet, it is unclear whether the confidence that we can give this information is based on universal reliability criteria. A crucial concern is that patients apply the information they have read on the Internet to their own lives directly, while there is an extreme variability of the quality of health information on the Internet, which ranges from beneficial to harmful [5][7]. Health on the Net Foundation (HON), one of the leading organizations in the deployment of useful and reliable online health information, has been interested in extending its activities to other languages such as Arabic. In collaboration with KSAU-HS and Geneva University, a study has been conducted in the Kingdom of Saudi Arabia to assess the trustworthiness of Arabic health websites.

Objectives: this study aims to explore and describe Arabic health content on the Internet for health professionals as well as patients in Arab countries, evaluates and assesses Arabic health websites according to HON code of conduct, identify the specific needs for capacity building, and understand the Arab health professionals' usage of online health information.

Methodology: An exploratory and descriptive research was conducted to assess and describe the Arabic health content on the internet; these were, an inventory of health information sources in Arabic, identification of the typology, assessment (evaluation according to the principles of the HONcode certification), and a survey was conducted to identify confidence criteria specific to online medical content and to evaluate the specific needs for capacity building.

It was established by the team to carry out the inventory for Arabic health sites with a period of one month and a target sample size of 120 health sites. Websites were identified through Google and Yahoo search engines in addition to using health directory websites.

Results & Analysis: The result of sites retrieved was 218 accessible health related sites. A sample of 120 Health Websites was randomly selected from that list. 2 Arabic websites were already added by HON team to the HON platform and were included with the sample sites list to be reassessed, giving a total of 122 sample sites. The typology was identified for the resulting 122 sites to understand the mechanisms of production; and then they were evaluated according to the principles of the HONcode to record their alignment to the trustworthiness criteria (the HONcode).

It was found that almost half of the sites originated from Saudi Arabia 46%, Egypt 15% and the least were Sudan and Oman 1%.

47.15% of these sites were presented by Associations, 23.57% were Governmental, and the least presented by Arabic health websites were Research Centers 1.62%.

A total of 965 questionnaires were manually and electronically distributed to health professionals. Out of which 236 were returned. 40.7% of the respondents were physicians, and the rest were from 8 different health specialties. Almost 70.2% were Saudis, and the rest were from 11 different countries. More than three quarters of the participants (79%) did not use the Arabian health websites. Almost all participants did not know about HONcode certification 82.2%.

Conclusion: Comparing the results of the assessment of the 122 sample of Arabic health websites according to HONcode 8 principles to the results of assessments in the world (French-Africa & Europe), the results stress the weakness points in health websites in Arab countries, in respecting Advertisement, Complementarity, and Confidentiality policies.

There is a critical indication in the survey results that Arabic health professionals do not trust Arabic health websites as source of health information, which needs a

serious promotion of the quality of the Arabic health websites, in order to improve their trustworthiness.

Chapter 1 Introduction

With the development of information technology and communications, there has been an evolution in the “information age” which is mirrored in the exponential growth in the number of web sites, online accessible databases, and expanding services and publications available on the Internet [5][7]. Along with the information revolution on the internet, the number of health websites have rapidly increased [6][11] to be one of the important fields on the internet. This vast growth has made patients more involved in caring for their health and is changing the nature of the patient–clinician relationship [20]. Hence, Medical information on the Internet has become a major factor in improving health and health care.

However, despite the availability of extensive amounts of online medical information, access to this information is not always uniform. New tools have been developed to facilitate in the production, publication, and the access of such information. This then results in the difficulty of differentiating the reliable information from the unreliable one.

Furthermore, it is unclear whether the confidence that we can give this information is based on universal reliability criteria. It seems important to take into account the diversity of social, economic and cultural contexts in which such information is used. In fact, it is likely that local adaptations will be necessary to take into account this diversity underlying the use of such information.

Health websites range from personal accounts of illnesses and patients' discussion groups to peer reviewed journal articles and clinical decision support tools [29]. Like any field on the internet it is accompanied by lack of regulation [8]; some information is wrong, while other information is confusing or could take advantage of vulnerable people by promoting or selling useless products or worse, harmful advice [5][9][25].

Patients are requiring information in relation to their illness or disease, the general public have information needs relating to healthy living, nutrition, health promotion and disease prevention [29]. A crucial concern is that they apply directly the information they have read on the Internet to their own lives, while there is an extreme variability of the quality of health information on the Internet, which ranges from beneficial to harmful [7][21], and this health misinformation can mislead patients with life-threatening conditions. People with inadequate capabilities in critical thinking may also be victimized by biased or incomplete information from those with a financial interest in the information they provide [7][17].

Such risks are present in most media, but on the internet this problem reaches a new dimension. In the mid-1990, the quality of health information on the internet became a subject of interest to health care professionals, information specialists, and consumers of health care [7][11]. Therefore National Governments and medical societies have also recognized their responsibility to help users to identify "good quality" information sources [24], through the development of a number of evaluation tools and criteria that have been designed to direct consumers to good source of information .

Evaluation tools usually are generic to be applied to websites providing a wide range of health information for different conditions, to judge the quality of health information [7][11][12]. Defining a single quality standard for such disparate collection of resources is challenging [29]. Some of these rating instruments took a form of logos resembling "awards" or "seals of approval" and appeared prominently on the Health websites on which they were bestowed [11].

A list of Some of the organizations that validate health information on the net in the world is addressed below [11]:

- Government of Australia
- US department of health & human services
- National Health Services
- Health Summit Working Group

- Health on the Net Foundation
- Internet Health Coalition
- DISCERN on the internet
- Hi-Ethics Principles
- American Accreditation HealthCare
- TRUSTe
- Council of better business bureaus

One of the leading organizations mentioned above in promoting the deployment of useful and reliable online health information is Health on the Net Foundation (HON), a non for profit organization. It has introduced in 1996 the first Code of Conduct for online medical and health information. HON is especially active in developed countries including English, French, Spanish, Italian, Portuguese and German speaking, with more than 6,500 certified medical web sites in 78 countries. The HON Foundation was interested in extending its activities to other languages such as Arabic [5][15].

The trustworthiness of Arabic health content is not yet assessed, therefore King Saud Bin Abdulaziz University for Health Science (KSAU-HS) in collaboration with Health on the Net Foundation (HON) and Geneva University, have conducted this study in the Kingdom of Saudi Arabia to:

- 1- Explore and describe Arabic health content on the internet for health professionals and for patients in Arab countries.
- 2- Evaluate and assess Arabic health websites according to HONcode of conduct, to identify the specific needs for capacity building.
- 3- Understand the Arab health professionals' usage of online health information.

Chapter 2 Literature Review

It is estimated that there are over 36 million internet users in the world. The average age of users is 35, and 15.5% are female [28].

2.1 Background on Usage of the Internet in Arab Countries

Najeeb Al-Shorbaji [1], has discussed the internet usage in the countries of the Middle East. Despite the late entry of information and communication technology (ICT) in health in the Middle East, there have been many impressive developments both as public health applications and in medical care. A recent study covering the 6 Levant countries, Egypt, Iraq, Jordan, Lebanon, Palestine and Syria; the North African countries of Algeria, Libyan Arab Jamahiriya, Morocco, Tunisia and Sudan; along with Yemen revealed that these 12 countries collectively had a lower personal computer penetration rate than the global average. The 6 Gulf Cooperation Council (GCC) states, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, however, registered a higher number of PCs sold compared to the global norm [33].

Internet penetration rates in the Middle East vary, ranging from a minimum of 0.1% in Iraq to 38.4% in the United Arab Emirates. According to the Internet World Stats, none of the Middle East countries is among the top 38 countries that have a penetration over 50%, as of November 2007 [29].

The same classification shows that 3 Middle East countries (Bahrain, Kuwait and the United Arab Emirates) are among the 65 “average Internet penetration countries”, with a penetration of 15.2%–49.9%. The 158 “low Internet penetration countries” include all other Middle East countries. In fact 9 Middle East countries have a penetration of less than 10% [33].

In the 22 Arab countries, all but 4 (Djibouti, Iraq, Libyan Arab Jamahiriya and Somalia) have established websites. These websites vary in quality; most of them are not built to function as e-health tools for health professionals and the public: they provide information on the ministry’s structure, activities, departments, etc. but do not provide healthcare services or health and medical advice [1].

Health on the Internet is weak in the Middle East: in early 2006, a total of only 258 medical and health-related websites were found through an Internet search. Currently there are 335 sites available, an increase of 38%. Of these, 51 were in Pakistan, 42 in Egypt, 56 in the Islamic Republic of Iran, 29 in Lebanon and 32 each in Bahrain, Jordan, Palestine and Saudi Arabia. The other 29 sites were distributed among the other countries. Health websites in the Middle East were maintained mainly by ministries of health, medical education institutions, research centers and hospitals in the private sector.

Internet connections and web presence at health care institutions in the Middle East are still suffering from the digital divide. A number of countries have also recognized the need and took major steps to establish postgraduate programs in health informatics, which holds the promise of producing a generation of health informatics professionals in the Middle East. A few examples are presented here.

Saudi Arabia: health informatics MSc program

The College of Public Health and Health Informatics was established in 2006 as part of the King Saud bin Abdulaziz University for Health Sciences (KSAU-HS). The college offers graduate studies in health informatics, health systems and quality management, public health, and epidemiology and medical statistics.

Oman: postgraduate diploma in medical librarianship

The Regional Office recommended in one of its missions to Oman the establishment of a medical librarianship training program in collaboration with the Department of Library and Information Science at Sultan Qaboos University.

2.2 Examples of Associations that are Active in the Middle East

Syrian Arab Republic

The Syrian Medical Informatics Association was founded as one of the scientific associations of the Syrian Medical Association (Syndicate) [38]. It aims to improve the status and the profession of medical informatics to become part of medical practice.

Lebanon

The Lebanese Medical Informatics Association is a non-profit, nongovernmental organization based on the voluntary work of health professionals and computer scientists with a special interest in medical informatics. The purpose of the association is to promote the use of the telecommunications and information technology in medicine or, perhaps more accurately, in the health sector [22].

Saudi Arabia

The Saudi Association for Health Information (SAHI) was established to work under the direct supervision of King Saud Bin Abdulaziz University for Health Sciences to practice public activities, develop theoretical and applicable knowledge, and provide scientific and applicable studies and consultation, private and public. It aims to act as an umbrella for practitioners in healthcare to better utilize the applications of health informatics in therapeutics, research and e-learning [32][34].

Arab Region

The Arab Telemedicine Society was founded under the umbrella of the Arab Medical Union in October 1999 after the recommendations of the First International Telemedicine Symposium for the Arab World, Africa and Europe held in Tunis in 1998. Founding members were representatives of 6 Arab countries (Algeria, Egypt, Jordan, Kuwait, Morocco and Tunisia).

Eastern Mediterranean Region

The Middle East Association of Healthcare Informatics (MEAHI) is a geographic chapter of the International Medical Informatics Association. The association is to be established in response to the need for education and awareness of medical/health informatics as a key to continuous quality improvement in the health industry in this Region [37].

2.3 E-health Challenges in the Middle East

The diversity and variation in the socioeconomic and cultural situation among countries of the Middle East has resulted in the variation and multiplicity of constraints in e-health implementation [11][23] . The constraints range from

lack of awareness of potential e-health benefits; shortage, and sometimes total lack, of funding by the government and other healthcare providers; privacy concerns and lack of legal framework; weakness of information infrastructure; complex systems coupled with lack of skilled personnel; and lack of data standards that permit exchange of health data in local languages [33].

2.4 Types of Arabic Health Websites Available on the Net

Below are some types of health websites found online [5][6][13]:

- Personal Blogs: are usually written by one person about his or her experiences and thoughts.
- Medical Companies (Commercial) sites: can be informative about a particular company or product.
- Governmental sites: such as ministries of health.
- Specialized Health Websites: information for certain diseases or health topic.
- Public Health websites: information in all aspects of health.
- Educational websites: such as universities, colleges and specialized educational websites.
- Medical Journals.
- Medical Associations.

Zina King [13] has described the Arabic health websites she identified through Ayna.com and Ouon.com directories, and it was found that those websites are diverse in their quality of health information. Most Arabic websites aim to educate patients with diseases and treatments in a simple way. However, people who are looking for more precise information may be surprised with no sufficient or no information at all. It was found that health websites specialized in medicine are originally from Saudi Arabia, Egypt and Syria. Specialized health websites and Health Association websites are mainly in English.

2.5 Obstacles Faced by Arab Internet Users in Searching for Health on the Net

Feras Jarjees [19], has addressed some of the obstacles that Arab internet users may face when searching for health information, such as:

- 1- Language barrier diversity

- 2- The extensive availability of health information on the net would be confusing
- 3- Quality of Arabic health website is not reliable
- 4- Absence of classification of Arabic health websites according to international criteria.
- 5- Absence of governing health websites in Arab countries.

2.6 Previous Studies on the Usage & Satisfaction of Health Information Online

One survey showed that 67% of physicians report having patients discussing Internet information with them [10]. In several cases, the fact that patients put forward Internet information has put a strain on that relationship [9]. Indeed, physicians express many doubts about the credibility of such information and patients sometimes become irritated by their attitude [20].

In HON survey May-July 2000 for Healthcare professionals' experience of the medical information on the net, with a total 1129 responses from different countries, they found the following [16]:

Do you use the medical Internet?		I have been on the Internet for	
Yes	93.84 %	Less than 6 months	13.75 %
	daily 43.83 %	6-12 months	14.16 %
	at least once a week 38.38 %	1-3 years	31.31 %
	at least once a month 11.19 %	More than 3 years	40.75 %
	less than once a month 6.58 %		
No	6.15 %		

Physicians are accessing clinical information on the Internet to find latest research on specific topics (46.1%), new information in a disease (44.4%), information related to a specific patient problem (43.7%), drug dose information (40.4%), new therapy or product information (38.1%), and patient information materials (59%) [3]

In HON's third survey (2007) on the usage of the Internet for medical and health Internet purposes, they found that 93% of the 1863 persons who answered their survey found the medical/health information on the Net to be useful, 83% found it in their primary language and 68% said that it was easy to

find. With 53% of the total participants believing that there is a need to enhance the medical/health information on the net [15].

An Empirical Study of Consumer Satisfaction with Online Health Information Retrieval by Bliemel, *et al.* [4] has examined the area of Online Consumer Health Information Retrieval (HIR) as: “a field of study that pertains to consumers’ use of the Internet to locate and evaluate health related information, for the purposes of self education and collection of facts to enable informed decision making.” A research model exploring the antecedents of consumer satisfaction with online HIR is developed by using the constructs quality, trust beliefs and satisfaction. This model for consumer satisfaction with online HIR is quantitatively validated using structural equation modeling techniques. The findings of this research provided evidence that content quality, technical adequacy, and trust beliefs explain a large proportion of the variance in satisfaction with online HIR for consumers.

2.7 Previous Assessments of the Quality of Online Health Information

Whether one views the Internet as a great opportunity for health care or a potential minefield, its impact is undeniable and it is here to stay [10]. Multiple studies have been conducted to assess the quality of health information on the net. These studies vary in their methods and factors of assessment and in the nature of the sites they access.

Of 344 osteoarthritis websites assessed by Maloney S. *et al.*, 103 (29.9%) cited evidence to support the information presented, of which 69 (20.1%) drew on evidence from systematic reviews and randomized controlled trials. The majority of websites (37.5%) recommended a multidisciplinary approach to the treatment of osteoarthritis [23].

In Sandra Harrison, *et al.* [14] assessment of the online contents and interactivity provided by 80 health support group (HSG) websites representing a range of chronic diseases, they found that in regard to **information and advice**, 97.5% of these sites have provided ‘information about the specific condition(s)’, 88.1% provided ‘Advice about treatment’, 77.5% of the sites displayed ‘news

items', and 93.75% provided non-medical information. As for the sites **Interactivity**, ranging from simplest interactive components as 'contacting the organization', which in the majority of cases was performed by sending an email directly from the website (91.3% of sites) to more complex interactive elements (e.g. completing an 'online self- evaluation questionnaire', 18.8%). For **Online Support**, 52.5% provided a discussion forum. Of these, 78.6% had controlled access, either by restricting the forum to members of the HSG, or by asking subscribers to register. Similarly, 85.7% of sites offering electronic newsletters and 50% of sites with chat groups restricted these to registered members. In regards to **Information currency** in HSG sites, 36.3% of the sites provided the date of the last update.

In a study conducted to assess the quality of information on cervical cancer treatment on 46 sites, carried out by Tara J Selman, *et al.* [31], they have assessed sites using two factors, credibility and currency; of the Criteria for Assessing the Quality of Health Information on the Internet. The assessment of credibility was made by examining the source, with trusted authorities presumed to provide higher quality sites; the currency, with currency being the data of the posting the document and any updates; the relevance, assessing if actual content of the site answers the search question posed; the stated use of an editorial process.

67% of the sites were reported to be current. For credibility, an editorial process was evident in 45% of websites, 30% with information posted being referenced, and 61% with a disclaimer present. The most frequently occurring credibility point present in the websites was a mechanism for feedback present in 89% of the sites [31].

In HON measurement of the trustworthiness of online medical information in French-Speaking Africa on 2007 [15], it was found that there is lack of locally published online medical information. A significant gap was seen between the quantity of online information available and the requirements of health professionals. Scientific information seemed to be the most sought after by health professionals at 82%, while only 25% of sites in French-Speaking Africa

provided scientific articles online. The information on medical practice, such as therapeutic experiences and diagnosis were also searched (60% and 56%).

An evaluation performed by Park H., *et al.* [27] of the quality of asthma-related information on the Korean Internet as an educational material for patients using the Health On the Net Code of Conduct (HON code) principles showed that 23 web sites out of 76 websites contained unreliable information and only one site satisfied the criteria of justifiability.

Nahas R., *et al.* [26] have developed a checklist for assessing sites, based on checklists recommended by other researchers, which contained six items: author, author credentials, references, relevant links, date modified, and the statement “not a substitute for professional care.” They found that only three of the 19 sites they have assessed (15.8%) met four of the six criteria in the technical appraisal checklist.

In an evaluation of English and Spanish Health Information on the Internet, Gretchen K, *et al.* [30] found that out of 26 English and Spanish sites, most sites provided at least minimal coverage of 75% of the condition-related topics. With some sites providing very little information with up to 70% of condition-related topics completely uncovered. They also reported that only four of the English-language websites (oncolink.com, cancer.net.nih.gov, webmd.com and nimh.nih.gov) and none of the Spanish-language websites provided more than minimal coverage for at least 80% of the condition-related topics. In regard to the author information and date, it was reported that about 65% of all English-language materials contained an author and a date, and most of the materials were published within 1-3 years. By contrast, 14% of all Spanish-language materials contained an author and a date, and just half of those materials were published within 1-3 years.

Eysenbach G., *et al.* [7] in an effort to establish a methodological framework for the evaluation of health information on the web by comparing the methodologies, results, and conclusions of published and unpublished empirical studies that evaluated the quality of websites and reported quantities results, found 24 of the most frequently used technical quality criteria (see Table 1).

Quality Criterion	No. of Studies	Total No. of websites evaluated
Disclosure of authorship	19	1636
Disclosure of ownership	5	196
Sources clear	4	110
Disclosure of sponsorship	7	738
Disclosure of advertising	3	119
Statement of purpose	4	230
Date of creation disclosed	5	284
Date of last update disclosed	7	801
Date of creation or update disclosed	12	1366
Authors' credentials disclosed	9	1030
Credentials of physician disclosed	3	81
References provided	30	2135
Balanced evidence	3	182
Feedback mechanism provided	4	157
Fax number provided	5	1322
E-mail address provided	8	1642
General disclaimers provided	6	390

Table 1: Overview of quality criteria used by 3 or more studies.

Chapter 3 Methodology

This is considered an exploratory study of the situation of health websites available in Arabic countries. Different methods were used in conducting this study to assess and describe the Arabic health content on the Internet. The study was conducted in three folds explained bellow:

3.1 Inventory of Health Information Sources in Arabic

3.1.1 Sites Inventory

In order to better understand the current situation of the health on the web available in Arabic countries, an inventory of the existing sources of online health information was conducted.

It was established by the team to carry out the inventory for Arabic health sites in a period of one month and a target sample size of 120 health websites. The tasks of inventory included:

- Identifying and selecting the main websites available, where websites were identified by Google and Yahoo search engines (some of the terminologies used in the search engines are shown in Table 26 in Appendix A) in addition to the use of sites that provide directories of health and other websites (Table 25 in Appendix A).
- The result of websites retrieved was 218 accessible health related sites. Six of these 218 sites were excluded since they already had the HONcode certification, resulting in 212 health websites that were not yet assessed by HONcode. A sample of 120 Health Websites was randomly selected from that list in addition to 2 more sites that were already included in HON platform and required reassessment.
- The selected 120 sample sites were added into the HON platform, resulting in a total sample size of 122 health websites available on the platform.

3.1.2 Identification of the typology

Selected sites were analyzed and elements were identified to determine and understand the mechanisms of production process such as the language,

the country, who owns the site, the sponsorship, features like dynamic or static, the audience, the type of the content (general diabetic information, news, scientific and research articles, day to day living), literacy level etc.

The following was carried-out:

- Classifying the sites according to the typology on HON platform.
- Typology statistics were generated by HON platform.
- Analyzing the results of this classification.

3.2 Assessment (Evaluation according to the principles of the HONcode certification)

3.2.1 Initial status of assessed websites

Then the 122 selected websites were evaluated according to the HONcode certification tool. Evaluation was done on HON platform that consist of 8 principles as follows [36]:

HC1. Authority

Any medical or health advice provided and hosted on the site will only be given by medically trained and qualified professionals unless a clear statement is made that a piece of advice offered is from a non-medically qualified individual or organization.

HC2. Complementarity

The information provided on the site is designed to support, not replace, the relationship that exists between a patient/site visitor and his/her existing physician.

A brief description of the website's mission, purpose and intended audience is necessary.

Another brief description of the organization behind the website, its mission and its purpose is also necessary.

HC3. Confidentiality

Confidentiality of data relating to individual patients and visitors to a medical/health website, including their identity, is respected by this website.

HC4. Attribution

Where appropriate, information contained on the site will be supported by clear references to source data and, where possible, have specific HTML links to that data.

HC5. Justifiability

Any claims relating to the benefits/performance of a specific treatment, commercial product or service will be supported by appropriate, balanced evidence in the manner outlined above in Principle 4.

HC6. Transparency of authorship

The designers of this website will seek to provide information in the clearest possible manner and provide contact addresses for visitors that seek further information or support. The Webmaster will display his/her e-mail address clearly throughout the website.

HC7. Transparency of sponsorship

Support for this website will be clearly identified, including the identities of commercial and non-commercial organizations that have contributed funding, services or material for the site.

HC8. Honesty in advertising & editorial policy

If advertising is a source of funding it will be clearly stated. A brief description of the advertising policy adopted by the website owners will be displayed on the site. Advertising and other promotional material will be presented to viewers in a manner and context that facilitates differentiation between it and the original material created by the institution operating the site.

Then the level of adherence was assessed for those websites to describe the situation of online health information in Arab countries.

3.3 The Survey

A Survey was conducted to identify confidence criteria specific to online medical content and to evaluate the specific needs for capacity building. A

structured questionnaire was developed and intended for Arabic speaking health professionals (see Appendix B for a copy of the questionnaire).

3.3.1 Participants:

The survey was addressed to Arab health professionals, and 425 questionnaires were distributed personally (paper based), with 195 (45.9%) returned. 540 electronic version questionnaire, which is linked to HON platform, was sent through e-mail, and 41 (7.6%) responded. Convenient and accidental sampling techniques were implanted in distributing the paper based questionnaire in the following places:

- Post Graduate Center in King Abdulaziz Medical City (KAMC) in Riyadh, KSA.
- Arab Regional Conference in Riyadh, KSA.
- International Conference in Dubai, United Arab Emirates (UAE).
- King Faisal Specialist Hospital.
- Military Hospital in Riyadh, KSA.
- Human Resources Department in KAMC, Riyadh, KSA.
- Medical Departments in KAMC, Riyadh, KSA.

Electronic version questionnaire was also posted in those forums:

- Facebook (www.facebook.com)
- Nursing4all (www.nursing4all.com)
- Nursing castle (www.nursingcastle.com)

3.3.2 Questionnaire:

The study questionnaire consisted of 4 parts with a total of 20 questions. Part one included some questions about the demographic information including position of the respondents, age, gender, place of work and nationality. Part two consisted of 8 questions about the usage of internet to search for health information. Part three is one question with 19 statements on how health professionals perceive the reliability of medical information on websites, it allows respondents to grade the statements on a nine-point scale: +4=very important, 0=none, -4=not important. Part four is of 5 questions, to assess the respondents' knowledge of HONcode certification. This questionnaire was developed by HON, and additions to Part one of the

questionnaire were advised by KSAU-HS master students to identify the characteristics of respondents.

Chapter 4 Analysis & Results

4.1 Inventory of Health Information Sources in Arabic

4.1.1 Country of origin

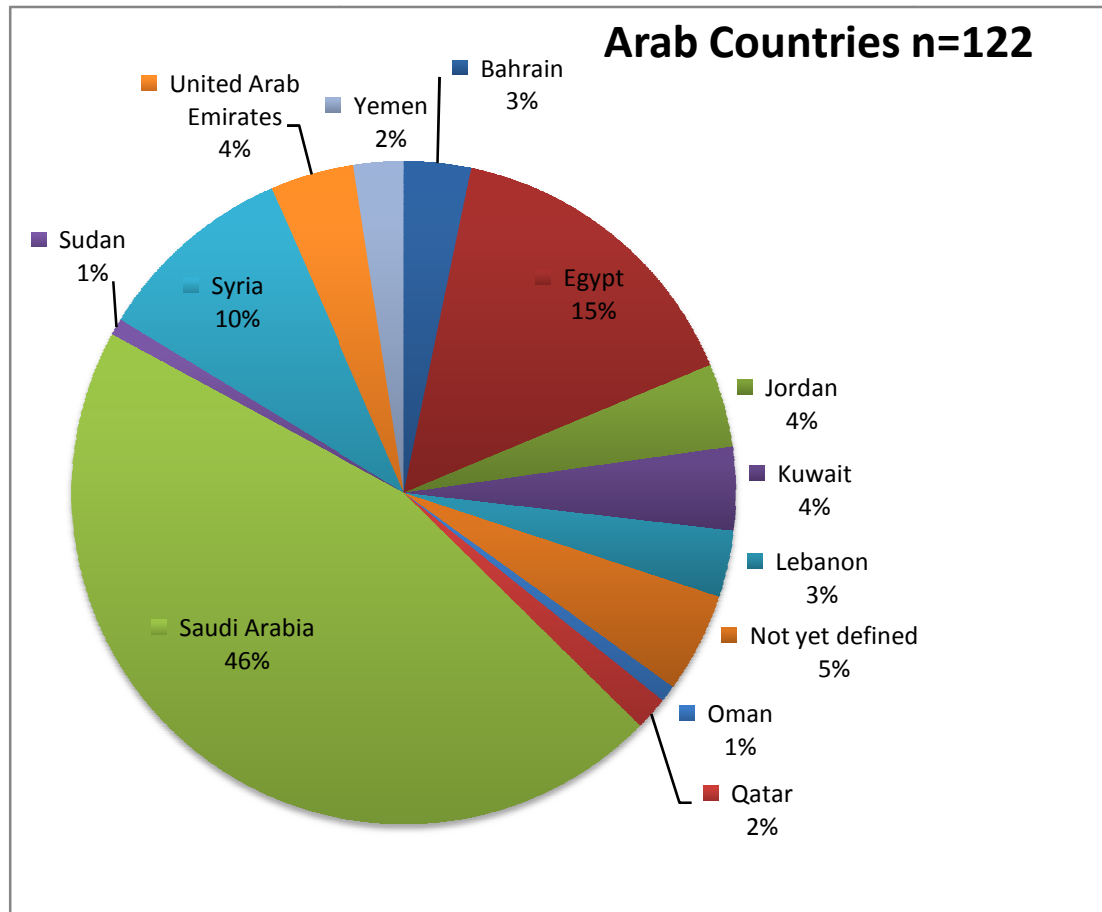


Figure 1: Arabic websites assessed, grouped by country

4.2 Typology

A - Type of site	# sites	%
A1 - Governmental site (national)	29	23.57 %
A1_1 - Academic site	5	4.06 %
A1_1_1 - University, institute	3	2.43 %
A1_1_2 - Organization (academic) of health professionals	1	0.81 %
A1_2 - Presentation of a health ministry	11	8.94 %
A1_3 - Presentation of a hospital	9	7.31 %
A2 - Site of a private hospital or clinic	4	3.25 %
A3 - Web site of a medical practice	7	5.69 %
A4 - Presentation of a research centre	2	1.62 %
A5 - Presentation of an association	58	47.15 %
A5_1 - To fight against disease	24	19.51 %
A5_2 - To help patients and their families	26	21.13 %
A5_3 - Organization of health professionals	31	25.2 %
A6 - Portal, database	15	12.19 %
A7 - Private individual	21	17.07 %
A7_1 - Private individual - Health professional	16	13 %
A7_2 - Private individual - Non-health professional	3	2.43 %
A8 - Presentation of services	1	0.81 %

Table 2: Typology – Type of site

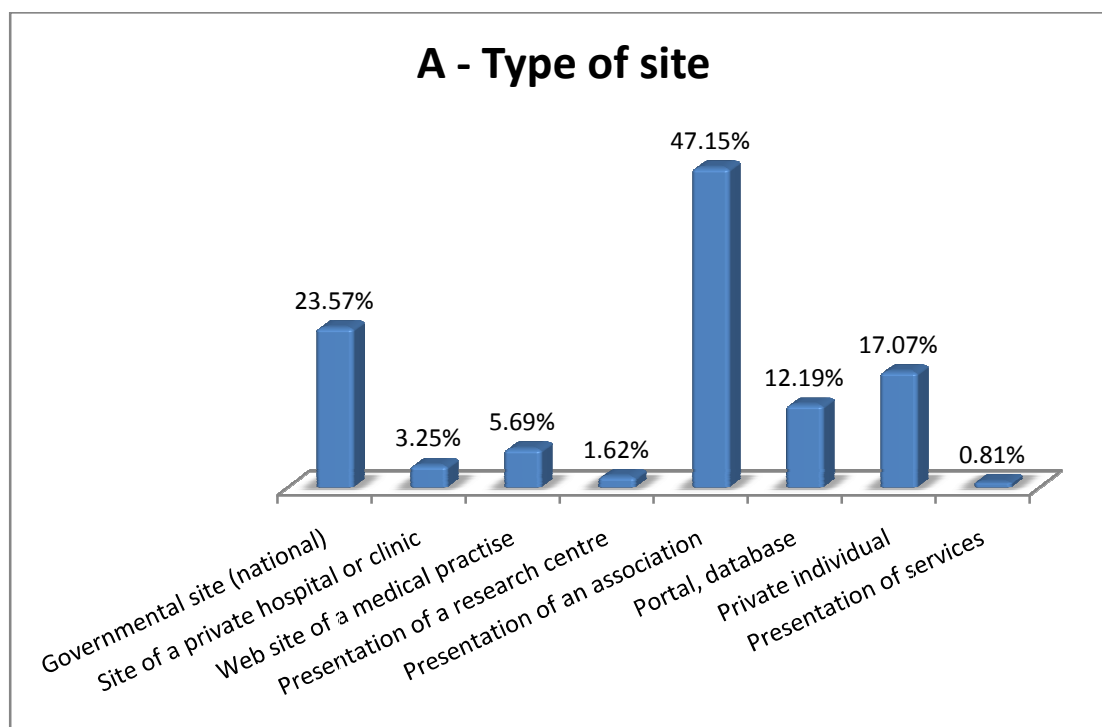


Figure2 : Typology – Type of site

B - Partnerships	# sites	%
B1 - National partners	72	58.53 %
B2 - Gulf Partners	4	3.25 %
B3 - International partners	10	8.13 %
B4 - Arabian Partners	3	2.43 %
B5 - No partnership	46	37.39 %

Table 3: Typology – Partnership

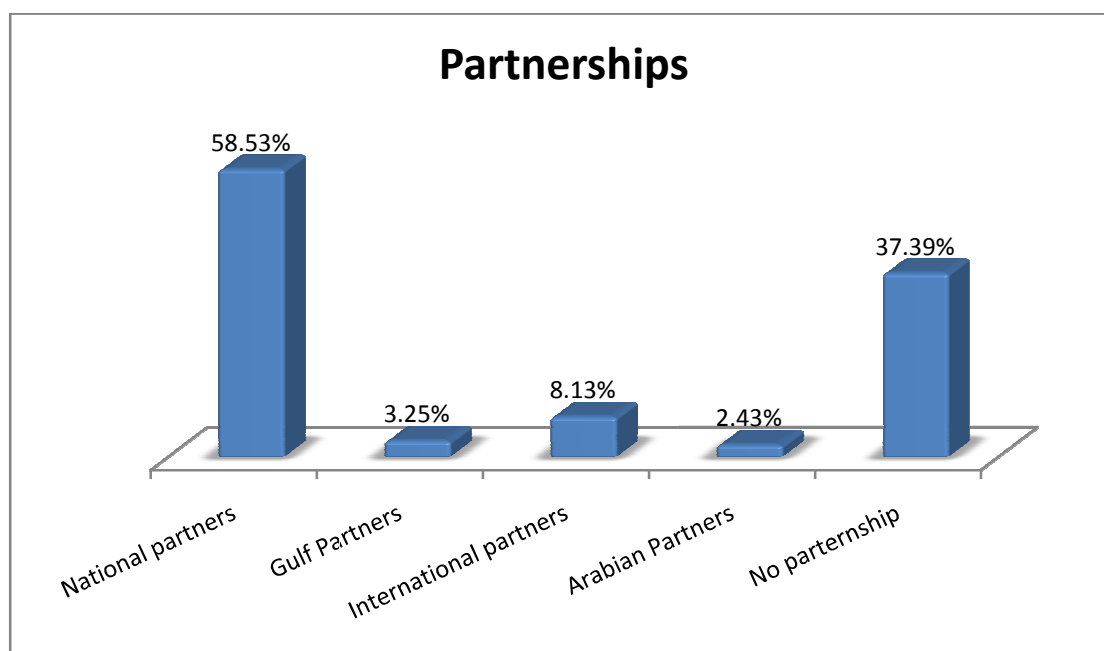


Figure3 : Typology – Partnership

C - Content/Structure of the site	# sites	%
C1 - Information on health/medicine	106	86.17 %
C1_1 - Information on diseases	78	63.41 %
C1_2 - Drugs (pharmacology)	37	30.08 %
C1_3 - Complementary and Alternative medicine	13	10.56 %
C1_4 - Case studies	15	12.19 %
C1_5 - Clinical trials	2	1.62 %
C1_6 - Prevention	57	46.34 %
C1_7 - Statistics (epidemiology)	17	13.82 %
C1_8 - Scientific s articles	46	37.39 %
C2 - On going research in health area	21	17.07 %
C3 - General information on a training	17	13.82 %
C4 - On-line courses	9	7.31 %
C5 - Dictionary/glossary on-line	13	10.56 %
C6 - Forums/blogs	41	33.33 %
C7 - Magazine/Journal	44	35.77 %
C8 - Videos/medical images	20	16.26 %
C9 - Conferences announcement	52	42.27 %
C12 - Conferences organization	16	13 %
C10 - News	78	63.41 %
C11 - Library on-line	23	18.69 %

Table 4: Content/Structure of the site

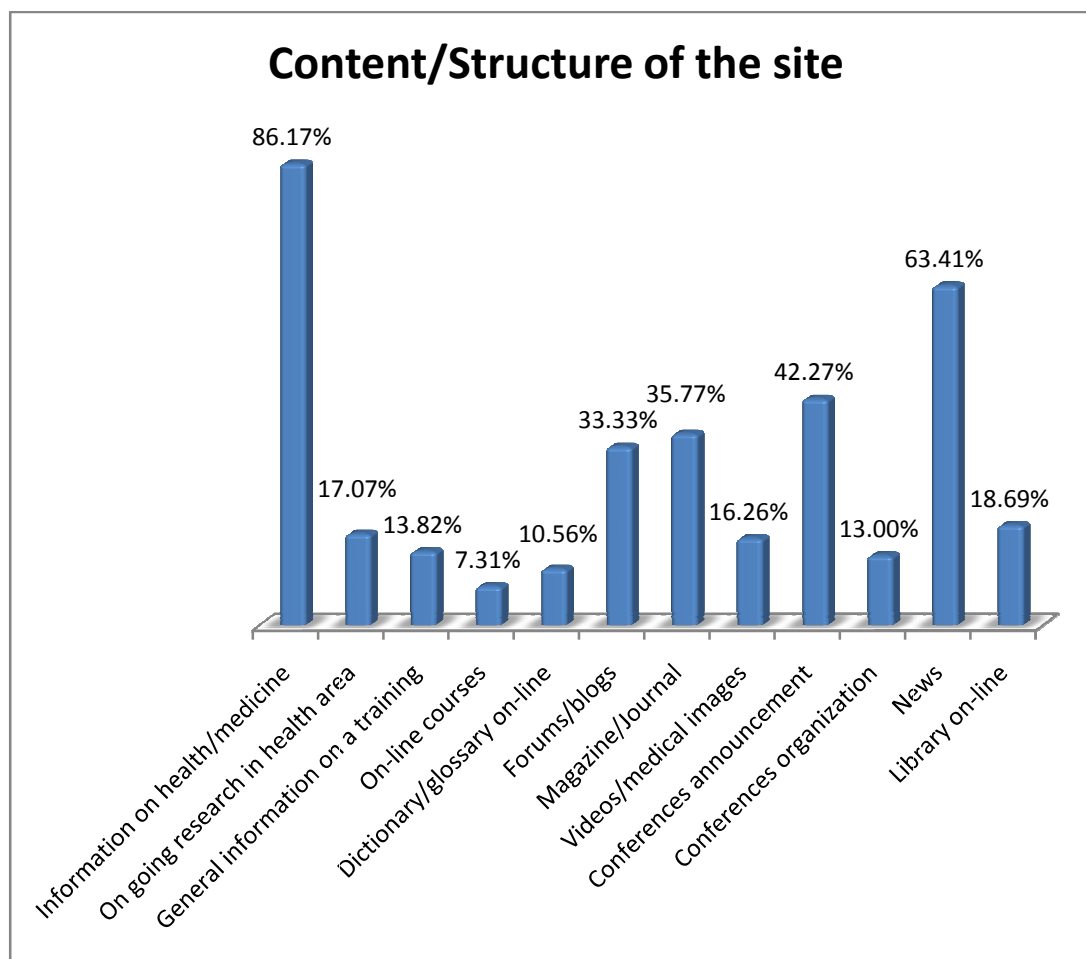


Figure4 : Typology – Content/Structure of the site

D - Authors	# sites	%
D1 - Content: medical information	76	61.78 %
D1_1 - National authors	69	56.09 %
D1_2 - Arabian authors	22	17.88 %
D1_3 - International authors	9	7.31 %
D1_4 - Gulf Author	10	8.13 %
D2 - Content :scientific publication (Research paper)	36	29.26 %
D2_1 - National authors	32	26.01 %
D2_2 - Arabian authors	19	15.44 %
D2_3 - International authors	15	12.19 %
D2_4 - Gulf Author	11	8.94 %
D3 - Content :other	55	44.71 %
D3_1 - National authors	48	39.02 %
D3_2 - Arabian authors	17	13.82 %
D3_3 - International authors	3	2.43 %
D3_4 - Gulf Author	6	4.87 %
D4 - Physician (s)	62	50.4 %
D5 - Health professionals (not physicians) (ex: nurses)	23	18.69 %
D6 - Not health professionals	14	11.38 %
D7 - Information about the author not found	31	25.2 %

Table 5: Authors

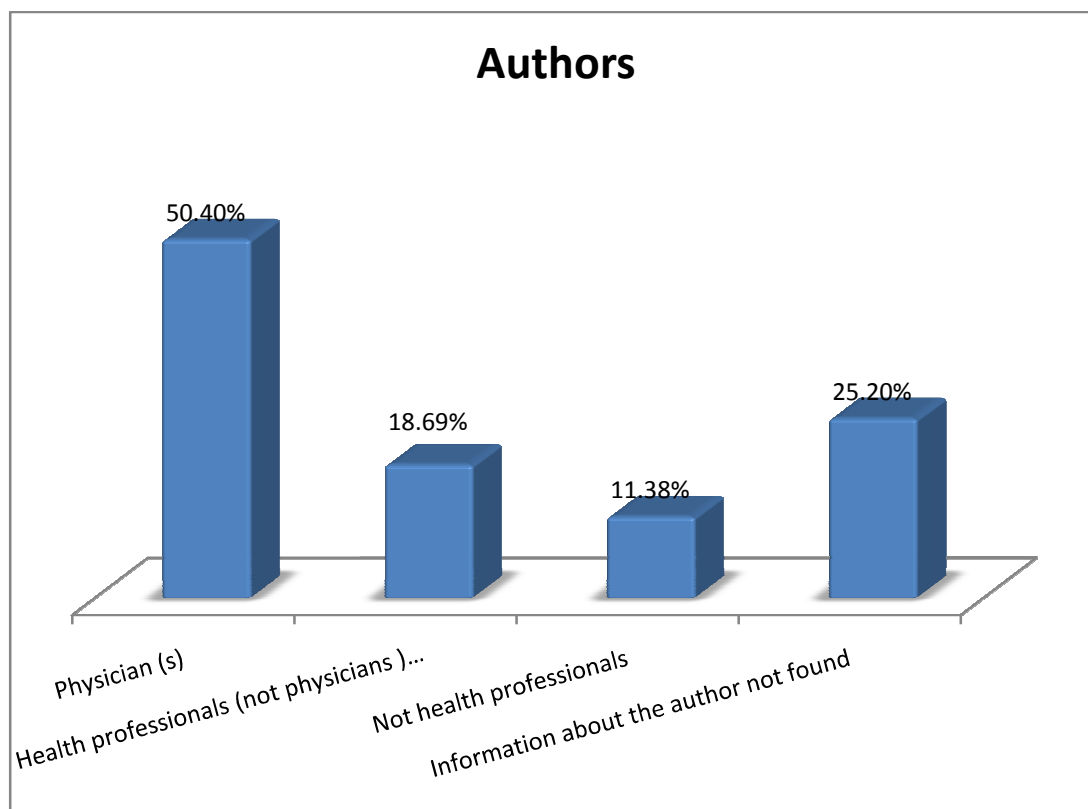


Figure5 : Typology – Authors

E - Access to scientific sources, references and others	# sites	%
E1 - Links to articles on national medical journals	15	12.19 %
E5 - Links to articles on Gulf	4	3.25 %
E6 - Links to articles on Arabian medical journals	5	4.06 %
E2 - Links to articles on international medical journals	14	11.38 %
E2_1 - Access via Pubmed	4	3.25 %
E2_2 - Access via Hinari		0 %
E3 - Online book	6	4.87 %
E4 - Aggregated content (from)	39	31.7 %
E4_1 - National sites	24	19.51 %
E4_2 - Gulf sites	9	7.31 %
E4_5 - Arabian sites	14	11.38 %
E4_3 - International sites	20	16.26 %
E4_4 - Paper sources (books, journal)	14	11.38 %

Table 6: Access to scientific sources, references, and others

Access to scientific sources, references and others

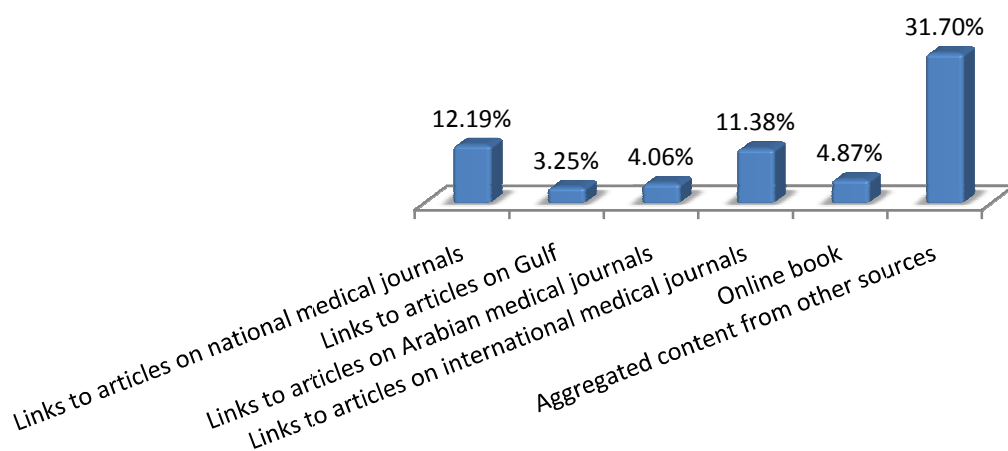


Figure6 : Typology – Access to scientific sources, references, and others

F - Server of the site (localization of the machine)	# sites	%
F1 - Sever localized in the country	90	73.17 %
F2 - Sever localized out of the country	24	19.51 %
F3 - Sever localized in the country but the editor is out of the country		0 %
F4 - Server shared by several organizations		0 %
F5 - Information on the sever was not found	4	3.25 %

Table 7: Server of the site (localization of the machine)

Server of the site

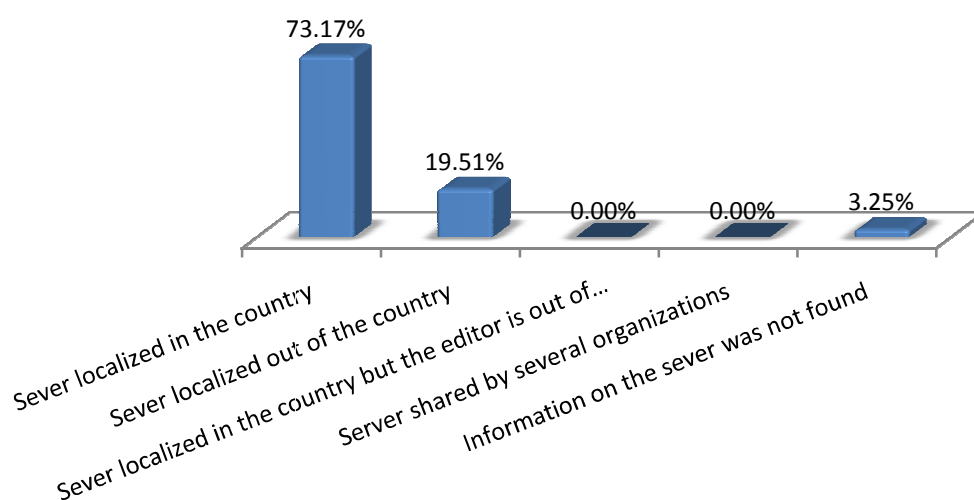


Figure7 : Typology – Server of the site

G - Validity of the access (globally)	# sites	%
G1 - The site is accessible (active)	118	95.93 %
G2 - The site is under construction	14	11.38 %
G2_1 - Whole site under construction		0 %
G2_2 - Part of the site under construction	14	11.38 %
G3 - The site contains more than 2 broken links	12	9.75 %
G4 - The site last update is under or equal to 2003	2	1.62 %
G5 - Last modification of the site is 2004	1	0.81 %
G6 - Last modification of the site is 2005	1	0.81 %
G7 - Last modification of the site is 2006	4	3.25 %
G8 - Last modification of the site is 2007	11	8.94 %
G9 - Last modification of the site is 2008	84	68.29 %
G10 - Last modification not known	15	12.19 %
G11 - Appears inactive	3	2.43 %

Table 8: Validity of the access (globally)

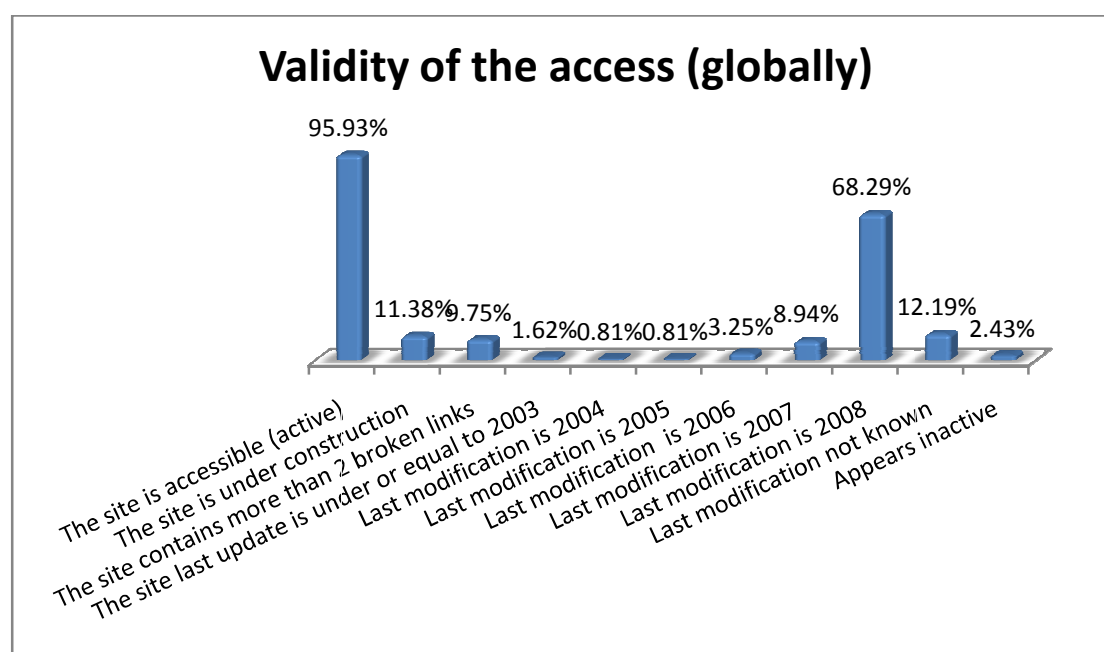


Figure8 : Typology – Validity of the access

H - Languages	# sites	%
H2 - Arabic	97	78.86 %
H3 - English	74	60.16 %
Arabic & English	48	39.34 %

Table 9: Language

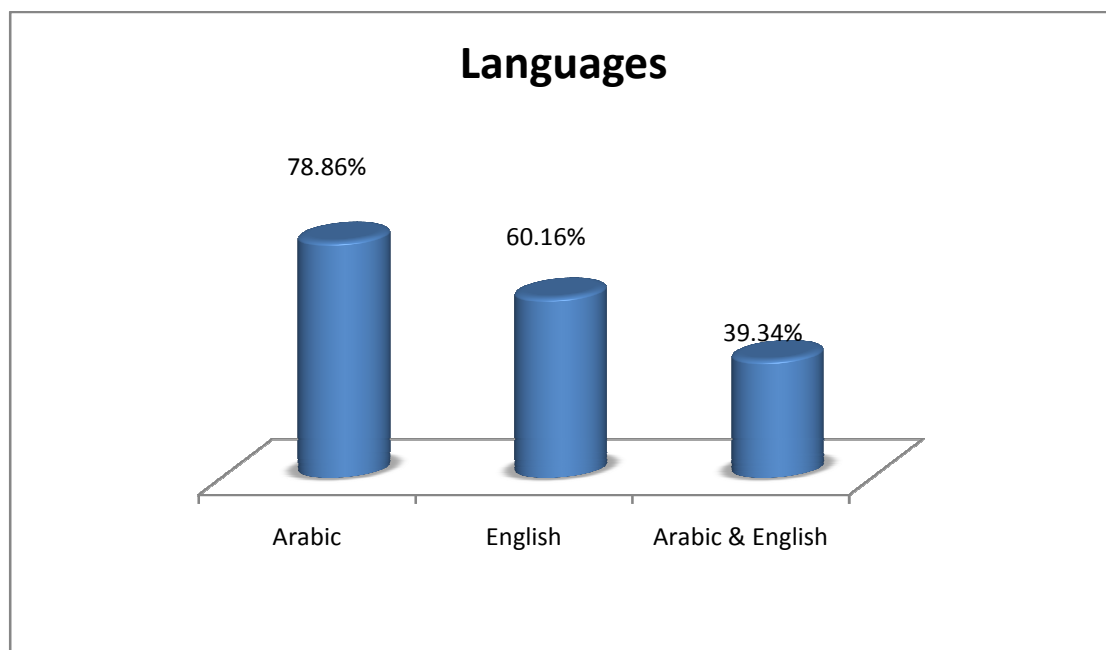


Figure9 : Typology – Language

I - Audience	# sites	%
I1 - General population	95	77.23 %
I2 - Health professionals	85	69.1 %
I3 - Students	36	29.26 %

Table 10: Audience

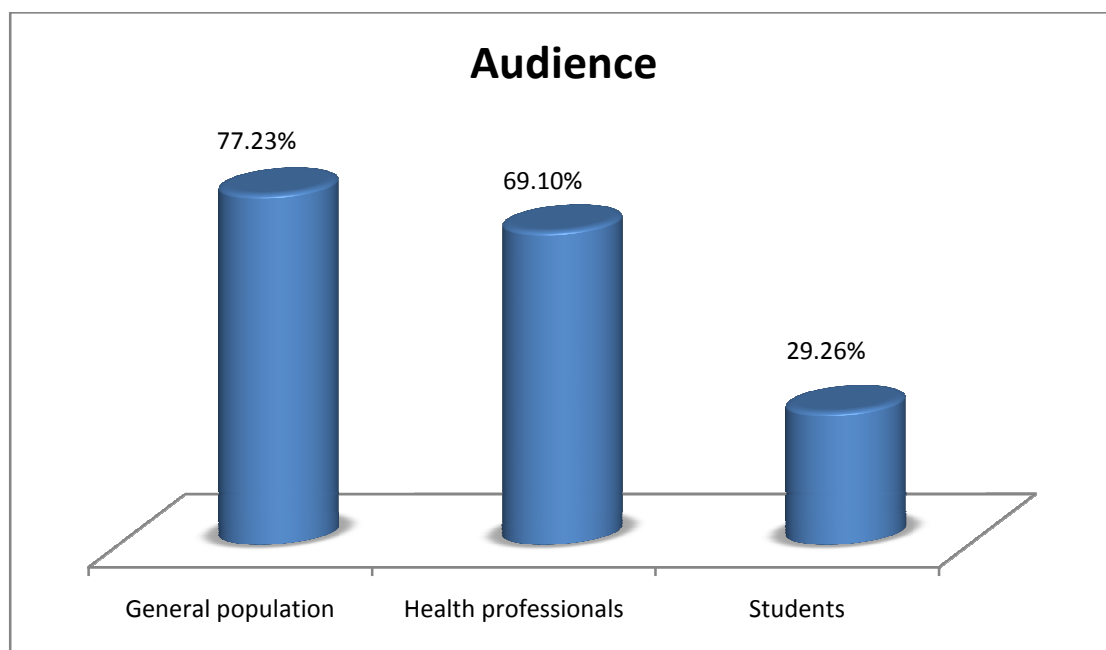


Figure10 : Typology – Audience

Three countries had the highest number of assessed sites. These were Saudi Arabia, Egypt, and Syria with 56, 19, and 12 retrieved sites in the sample respectively.

A - Type of site	Saudi Arabia		Egypt		Syria	
	# sites	%	# sites	%	# sites	%
A1 - Governmental site (national)	15	26.78%	2	10.52%		0%
A2 - Site of a private hospital or clinic	2	3.57%		0%	2	16.66%
A3 - Web site of a medical practice	2	3.57%	1	5.26%		0%
A4 - Presentation of a research centre	2	3.57%		0%		0%
A5 - Presentation of an association	32	57.14%	8	42.1%	2	16.66%
A6 - Portal, database	2	3.57%	7	36.84%	4	33.33%
A7 - Private individual	9	16.07%	4	21.05%	4	33.33%
A8 - Presentation of services		0%		0%		0%

Table11 : Type of site (Saudi Arabia, Egypt, and Syria)

C - Content/Structure of the site	Saudi Arabia		Egypt		Syria	
	# sites	%	# sites	%	# sites	%
C1 - Information on health/medicine	51	91.07%	16	84.21%	11	91.66%
C1_1 - Information on diseases	34	60.71%	12	63.15%	11	91.66%
C1_2 - Drugs (pharmacology)	18	32.14%	3	15.78%	6	50%
C1_3 - Complementary and Alternative medicine	3	5.35%	3	15.78%	3	25%
C1_4 - Case studies	8	14.28%	1	5.26%	2	16.66%
C1_5 - Clinical trials	1	1.78%	1	5.26%		0%
C1_6 - Prevention	23	41.07%	8	42.10%	9	75%
C1_7 - Statistics (epidemiology)	6	10.71%	2	10.52%		0%
C1_8 - Scientific s articles	22	39.28%	7	36.84%	4	33.33%
C2 - On going research in health area	9	16.07%	2	10.52%	4	33.33%
C3 - General information on a training	9	16.07%	4	21.05%	1	8.33%
C4 - On-line courses	6	10.71%		0%	2	16.66%
C5 - Dictionary/glossary on-line	2	3.57%	4	21.05%	3	25%
C6 - Forums/blogs	22	39.28%	8	42.10%	6	50%
C7 - Magazine/Journal	23	41.07%	5	26.31%	3	25%
C8 - Videos/medical images	8	14.28%	6	31.57%	2	16.66%
C9 - Conferences announcement	31	55.35%	5	26.31%	4	33.33%
C12 - Conferences organization	5	8.92%	3	15.78%		0%
C10 - News	39	69.64%	7	36.84%	10	83.33%
C11 - Library on-line	6	10.71%	4	21.05%	5	41.66%

Table12 : Content/structure of the site (Saudi Arabia, Egypt, and Syria)

D - Authors	Saudi Arabia		Egypt		Syria	
	# sites	%	# sites	%	# sites	%
D4 - Physician (s)	25	44.64%	13	68.42%	10	83.33%
D5 - Health professionals (not physicians) (ex: nurses)	13	23.21%	3	15.78%	2	16.66%
D6 - Not health professionals	7	12.50%	4	21.05%	1	8.33%
D7 - Information about the author not found	16	28.57%	3	15.78%	1	8.33%

Table13 : Authors (Saudi Arabia, Egypt, and Syria)

H - Languages	Saudi Arabia		Egypt		Syria	
	# sites	%	# sites	%	# sites	%
H2 - Arabic	44	78.57%	13	68.42%	12	100%
H3 - English	37	66.07%	10	52.63%	3	25%

Table14 : Languages (Saudi Arabia, Egypt, and Syria)

I - Audience	Saudi Arabia		Egypt		Syria	
	# sites	%	# sites	%	# sites	%
I1 - General population	43	76.78%	13	68.42%	11	91.66%
I2 - Health professionals	42	75%	11	57.89%	9	75%
I3 - Students	21	37.50%	5	26.31%	6	50%

Table15 : Languages (Saudi Arabia, Egypt, and Syria)

4.3 Assessment of the Sites

Principle	All (n=122)		Saudi Arabia (n=56)	Egypt (n=19)	Syria (n=12)
	# sites	%			
HC1 Authoritativeness	73	59.84%	60.72%	68.43%	66.67%
HC2 Complementarity					
HC2 Purpose	57	46.73%	53.58%	63.16%	33.34%
HC2 Mission	97	79.51%	85.72%	89.48%	41.67%
HC2 Audience	67	54.92%	48.22%	78.95%	41.67%
HC3 Confidentiality	39	31.97%	33.93%	42.11%	33.34%
HC4 Attribution					
HC4 References	71	58.20%	62.50%	57.90%	75.00%
HC4 Date	72	59.02%	66.08%	57.90%	50.00%
HC5 Justification of claims	89	72.96%	67.86%	78.95%	100.00%
HC6 Contact details	101	82.79%	83.93%	89.48%	50.00%
HC7 Sources of funding	45	36.89%	35.72%	36.85%	50.00%
HC8 Honesty in advertising	20	16.40%	21.43%	15.79%	16.67%

Table16 : Middle East Assessment Results (n=122)

The results of the assessment ranged between high compliance percentage with HONcode principle and minimal compliance with the principles. The highest **compliance** rate was associated with HONcode principles number HC2 mission and HC6 contact details, where 97 web sites out of 122 (79.51%) provided a clear mission and 101 (82.79%) provided contact details for their sites compared to 25 & 21 sites (20.49% & 17.21%) did not comply with these principles respectively. In contrast the highest rate of **incompliance** was associated with HONcode principle number HC8, honesty in advertising, which was represented by 102 noncompliant web sites (83.60%). Only 5 sites among the 122 sites were compliant with all of the 8 principles (4.1%).

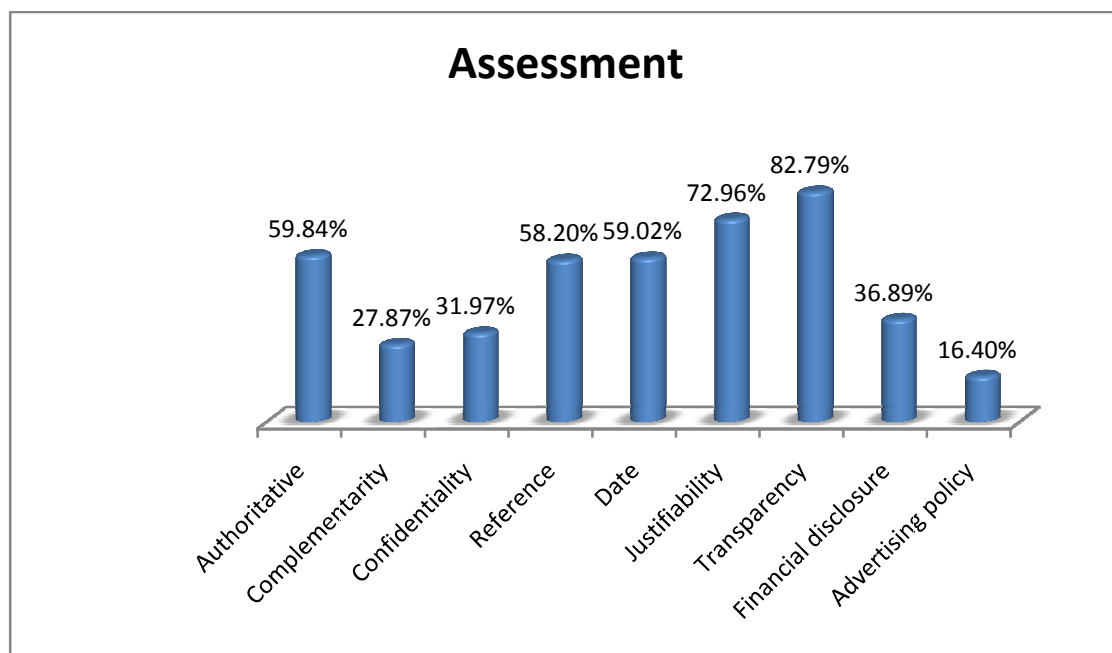


Figure 11: Middle East Assessment Results (n=122)

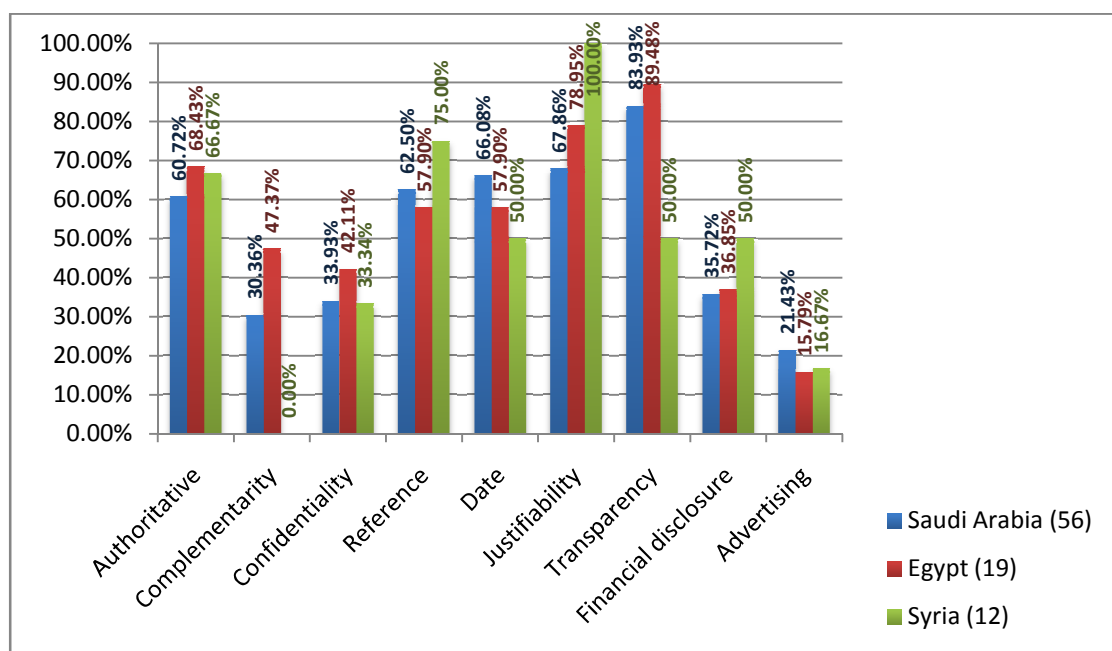


Figure 12 : Comparison Between the 3 countries with highest number of sites assessed

4.4 The Survey

		Frequency	Percent
Valid	Physician	96	40.7 %
	Dentist	24	10.2 %
	Dentist Assistant	1	.4 %
	Physiotherapist	7	3.0 %
	Respiratory Technician	2	.8 %
	Nurse	26	11.0 %
	Nutritionist	7	3.0 %
	Health Administrator	5	2.1 %
	Bioengineer	2	.8 %
	Total	170	72.0 %
Missing		66	28.0 %
Total		236	100.0 %

Table 17: Frequency & Percentage of survey respondents' positions

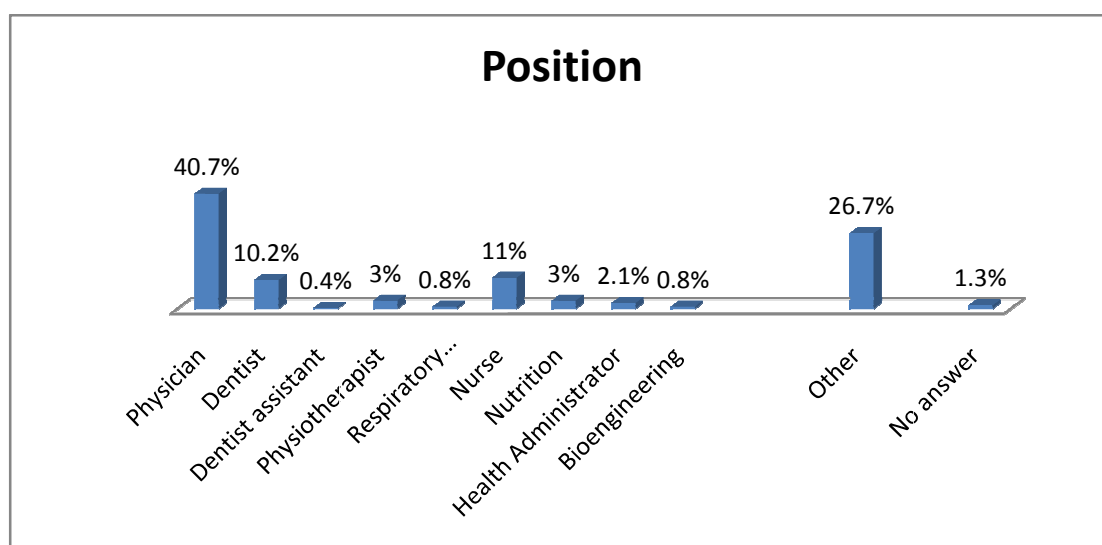


Figure 13: Frequency & Percentage of survey respondents' positions

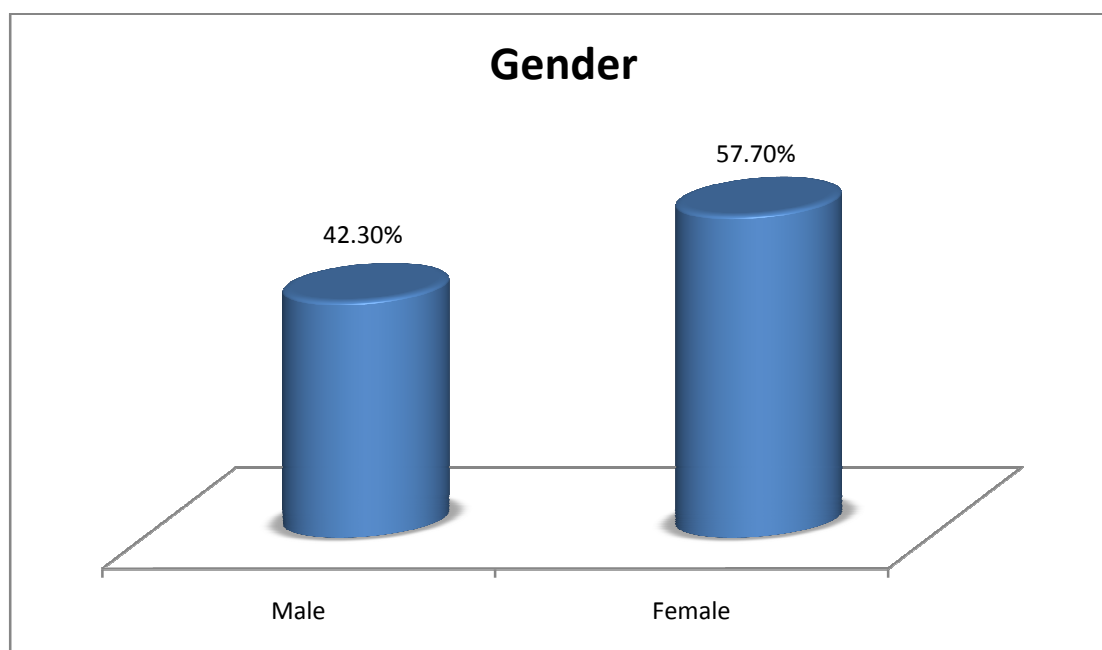


Figure 14: Frequency & Percentage of survey respondents' gender

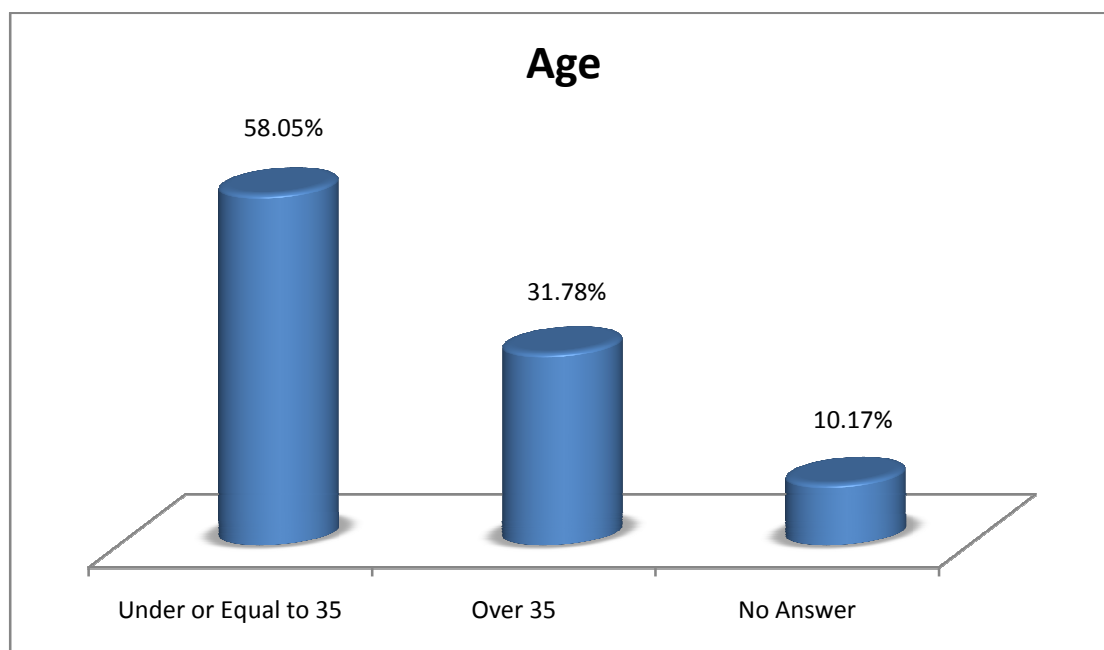


Figure15 : Frequency & Percentage of survey respondents' age

		Frequency	Percent
Valid	KSA	165	69.9 %
	Bahrain	2	.8 %
	UAE	1	.4 %
	Oman	3	1.3 %
	Kuwait	1	.4 %
	Yemen	2	.8 %
	Jordan	12	5.1 %
	Lebanon	2	.8 %
	Syria	6	2.5 %
	Egypt	24	10.2 %
	Sudan	5	2.1 %
	Somal	1	.4 %
	Total	224	94.9 %
Missing		12	5.1 %
Total		236	100.0 %

Table 18: Frequency & Percentage of survey respondents' nationalities

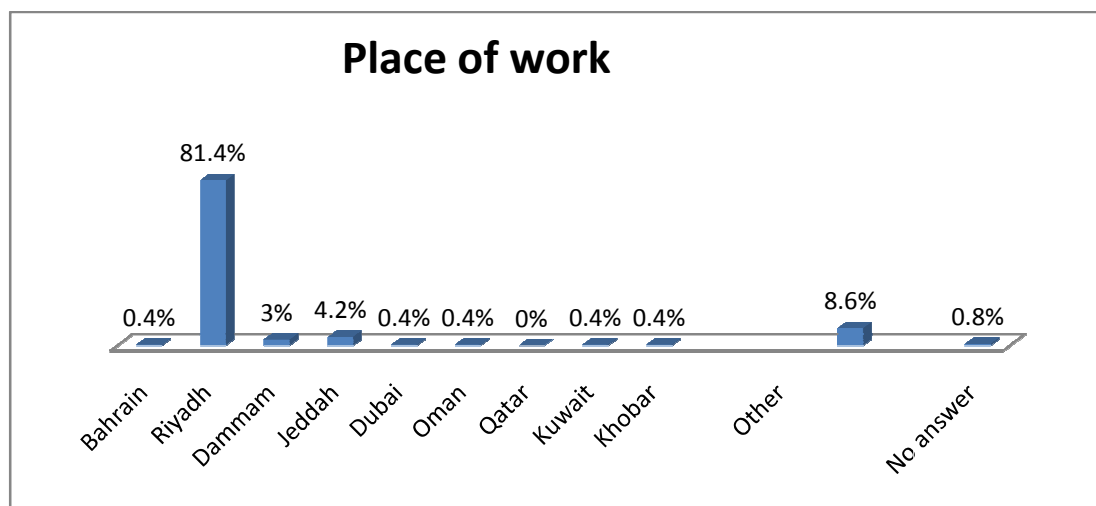


Figure 16: Percentage of survey respondents working place

		Frequency	Percent
Valid	<6 mnt	5	2.1 %
	6-12 mnt	7	3.0 %
	1-3 year	16	6.8 %
	4-6 year	47	19.9 %
	>=7	159	67.4 %
	Total	234	99.2 %
Missing		2	.8 %
Total		236	100.0 %

Table 19: Frequency & Percentage of survey respondents' use of the Internet

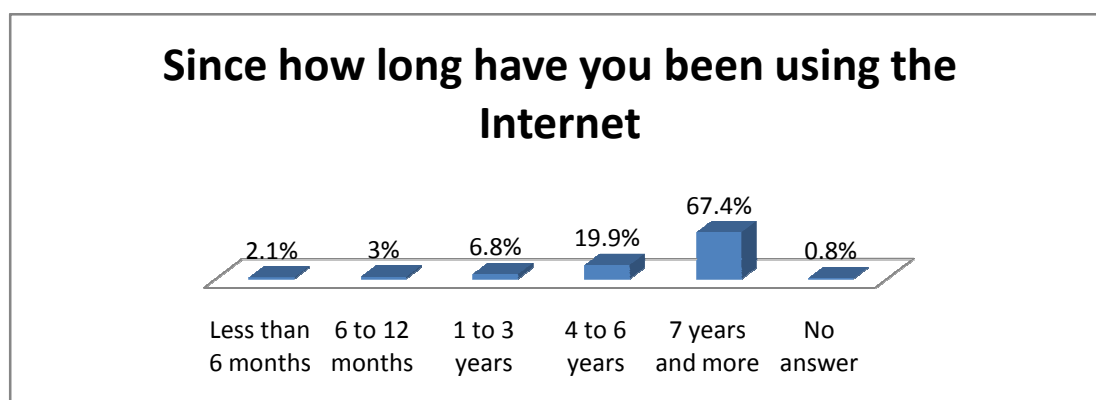


Figure 17: Percentage of survey respondents' use of the Internet

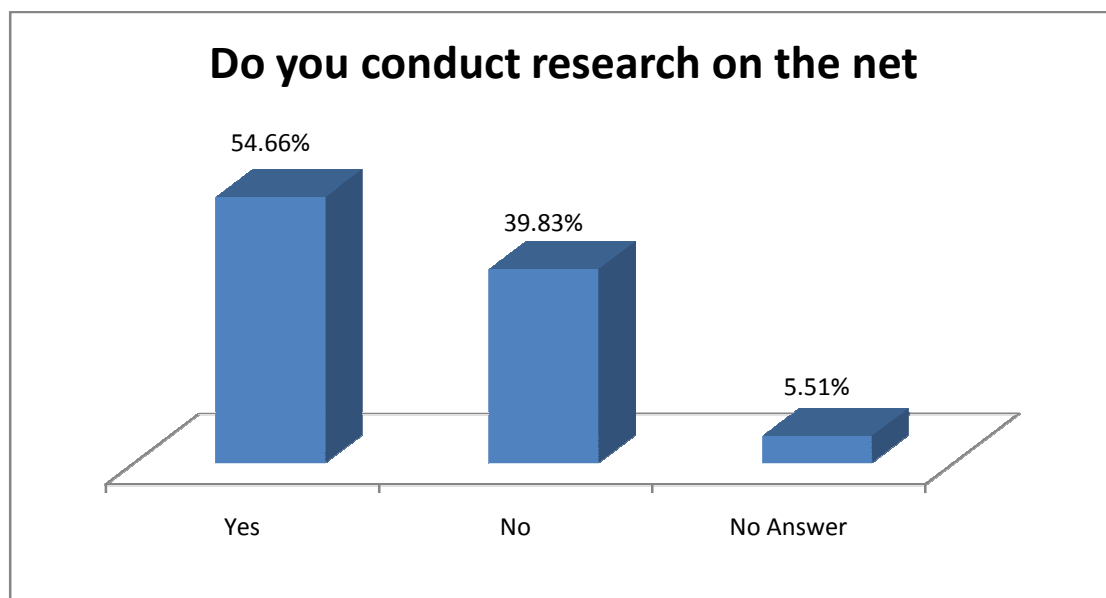


Figure 18: Percentage of respondents' research on the net

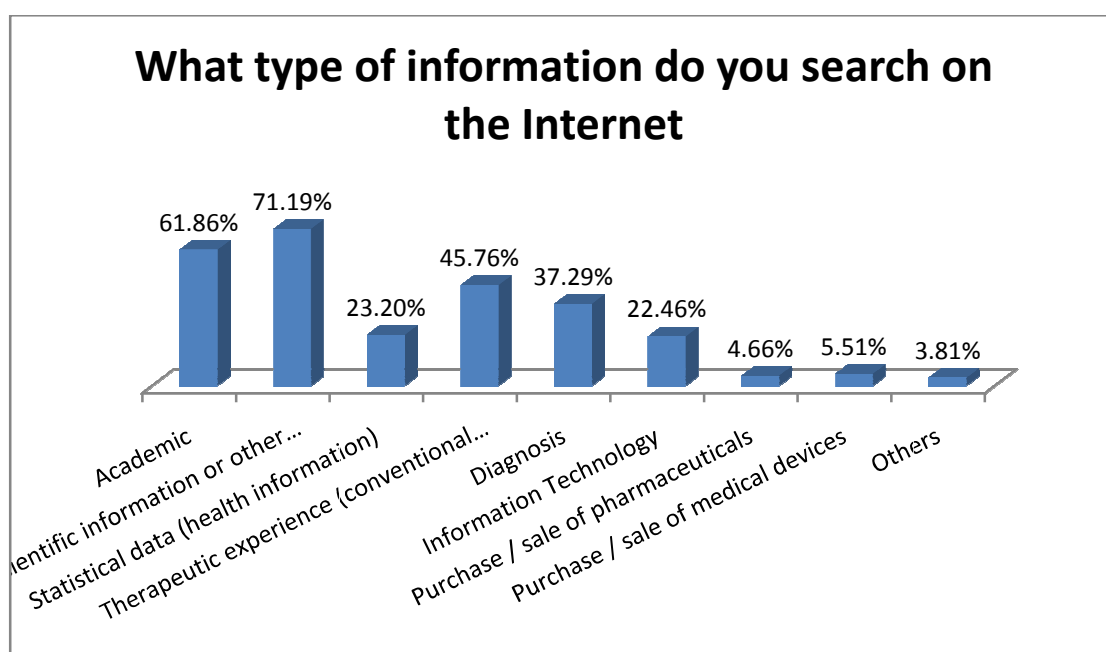


Figure 19: Percentage of what type of information do survey respondents' search on the Internet

How do you discover sites with health information

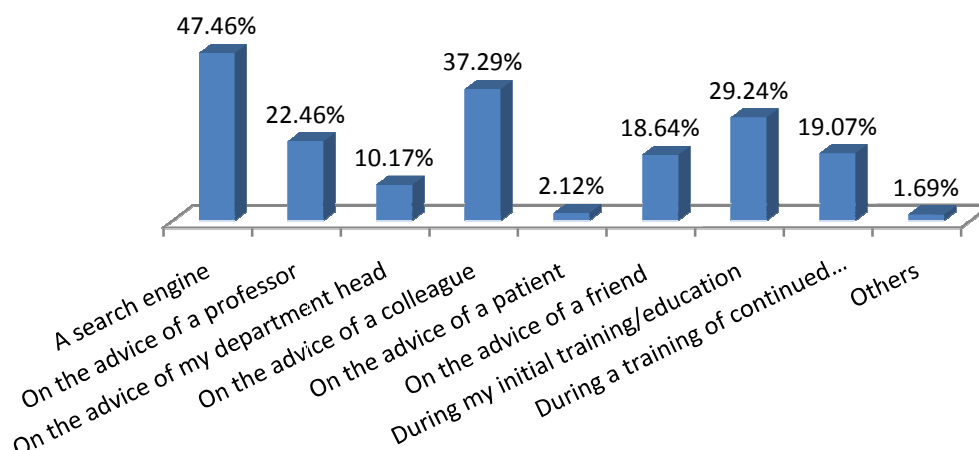


Figure 20: Percentage of survey respondents' discovering health websites

Do you use health websites of Arabian Countries

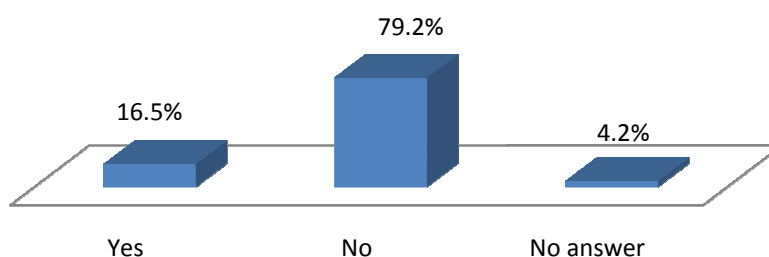


Figure 21: Percentage of survey respondents' use health websites of Arabian countries

		Frequency	Percent
Valid	Yes	39	16.5 %
	No	187	79.2 %
	Total	226	95.8 %
Missing	System	10	4.2 %
Total		236	100.0 %

Table 20: Frequency & Percentage of survey respondents' use of Arabic sites

	N	Minimum	Maximum	Mean	Std. Deviation
Author name	206	-4.00	4.00	2.2343	2.07383
Author qualification	211	-4.00	4.00	2.6361	1.86419
institution name	211	-4.00	4.00	2.8157	1.59041
confidentiality	207	-4.00	4.00	1.7887	2.13351
justification	206	-4.00	4.00	2.3457	1.63431
funding resources	206	-4.00	4.00	1.4676	2.04855
Ad. distinction	208	-4.00	4.00	2.4575	1.58614
Information content	211	-3.00	4.00	3.2752	1.21824
References	208	-4.00	4.00	2.7120	1.70839
Valid N (list wise)	184				

Table 21: Survey respondents' judgment of the reliability of medical information on the net

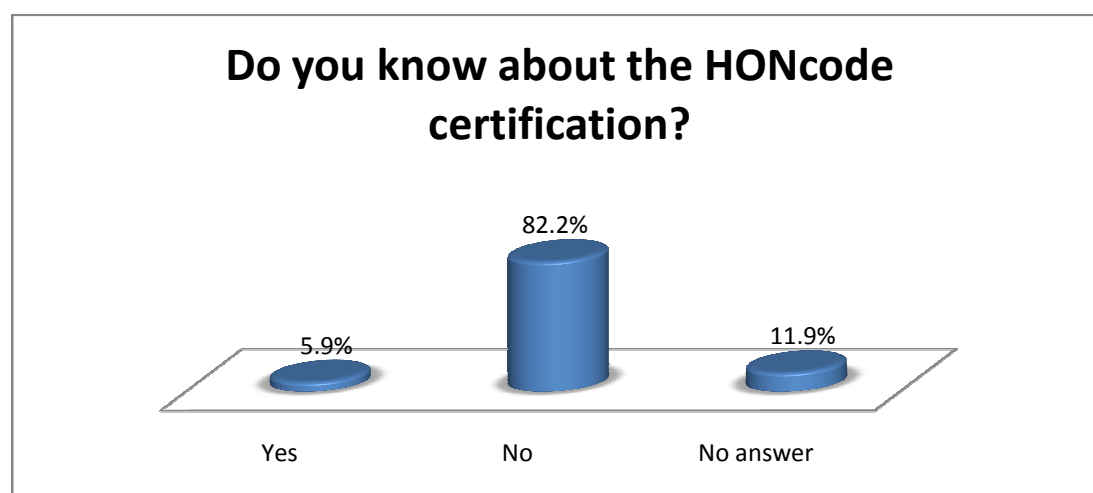


Figure 22: Percentage of survey respondents' knowledge of HONcode certification

		Frequency	Percent
Valid	Yes	14	5.9 %
	No	194	82.2 %
	Total	208	88.1 %
Missing		28	11.9 %
Total		236	100.0 %

Table 22: Frequency & Percentage of survey respondents' knowledge of HON

+4 = very important 0 = none -4 = not important

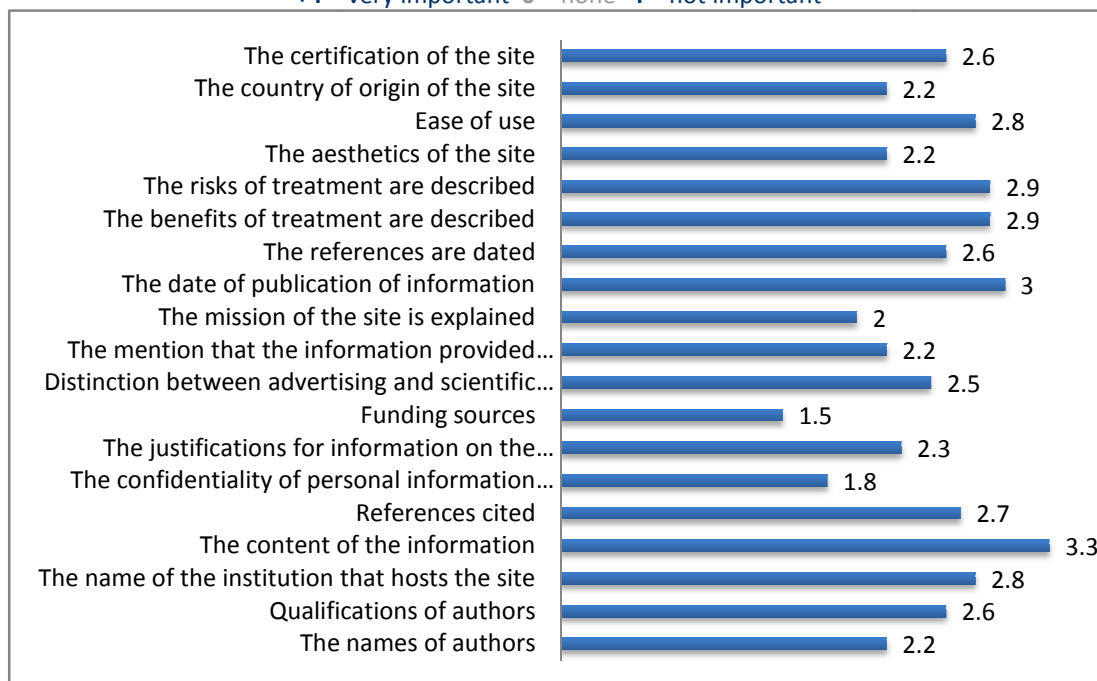


Figure 23: Survey respondents' judgment of the reliability of medical information on the net

	N	Minimum	Maximum	Mean	Std. Deviation
Evidence	140	-2.00	4.00	3.3576	1.27419
Author qualification	139	-4.00	4.00	3.0150	1.37126
Confidentiality	138	-4.00	4.00	2.7470	1.68209
Date	139	-2.00	4.00	3.0436	1.21398
Funds	140	-4.00	4.00	1.9729	1.91379
Complementarily	139	-4.00	4.00	2.4615	1.47883
Policy of ads	138	-4.00	4.00	2.0084	1.89958
Contacts	140	-4.00	4.00	2.5866	1.62556
Accessibility	140	-3.00	4.00	3.0078	1.37410
Valid N (list wise)	132				

Table 23: Survey respondents' evaluation of HONcode certification criteria.

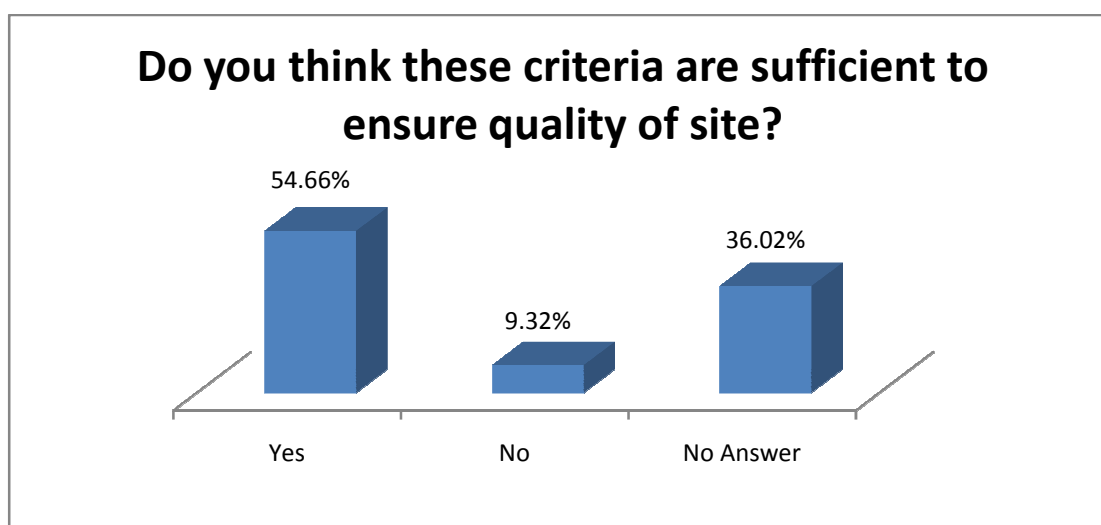


Figure 24: Survey respondents' opinion of criteria sufficiency

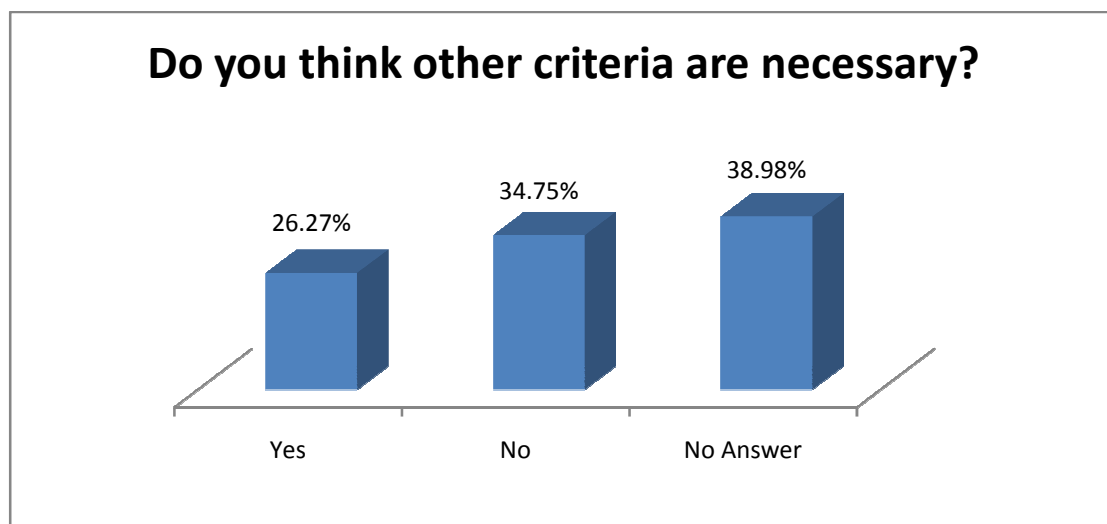


Figure 25: Survey respondents' opinion of necessity of other criteria

Chapter 5 Discussion

5.1 Inventory and Typology

5.1.1 Country of origin

A sample of 122 health websites available in Arab countries was selected through Google and Yahoo engines and went through the identification of their typology to understand the mechanisms of production.

It was found that out of the 122 sites evaluated; almost half of these sites originated from Saudi Arabia (46%), and that could be due to multiple reasons, the search engine used as Google.com.sa might have directed the search to sites originating from Saudi Arabia. In addition, Saudi Arabia is one of the largest countries in the Middle East and the largest in Gulf region with a population of 28,686,633 and one of the leading Middle Eastern countries in the medical field with multiple health care organizations and associations which contribute to the generation of the Arabic medical web content.

Second to Saudi Arabia was Egypt (15%). Egypt has inveterate universities in the Middle East. Many of the health sciences programs in Egypt are taught in Arabic which contributes in founding its graduates with Arabic medically based background.

The least was Oman & Sudan (1%). In Sudan, this may be due to the country's political aspects that might have an effect on their contribution in many fields.

5.1.2 The Typology:

Almost half of the sites (47.15%) were found to be a presentation of associations (most of them are of organizations of health professionals). That supports the assumption that the highest number of surveyed originated from Saudi Arabia due to the relatively big number of associations compared to other countries in the area. The least site type supported was of a presentation of research center (1.62%) due to almost lack of research

centers in the Middle East. A big number of sites had no partnership but most of them were related to national partners.

A big number of the sites (86.17%) contained information on health and medicine and (42.5%) contained conferences announcements and only two of the sites had information about clinical trials.

It was found that most sites contained News (63.41%) but it was noticed that great number of the news provided was not health related.

Most of the authors were physicians (50.40%) but the degree of specialization is not as clear as the specialization in African study, where the highest specialized medical personnel were chief consultants, professors, and researchers. Furthermore, Arabian Authors did not publish their own content.

Most of health websites were found to be in Arabic language (78.86%), and (39.34%) of sites are having both Arabic and English languages. Only (21.31%) websites are found in English only.

Almost all of the sites were active with the majority of servers localized in the producing country. Last modification date of most of the sites was in 2008 with the least number of sites directed to health related students whom, with no access to specialized information databases, need this information the most to help them build a good base in the field of their study.

When looking at the three countries with the highest number of assessed sites (Saudi Arabia, Egypt, and Syria), we found that most of Saudi health websites were for associations (57.14%), the same for Egypt (42.1%) in addition to portals (36.84%), and in Syria the majority was portals and private sites for individuals (both 33.33%) (Table 11). These results are actually supporting Zina King's findings that stated that most sites were from Saudi Arabia, Egypt and Syria.

When looking at the content of the sites in these three countries it was found that all the three countries had high percentages of information on

health and medicine within their sites with Saudi Arabia being slightly the highest among them (91.66%) (Table 12).

Physicians are the maximum number of authors for health websites in all the three countries but number of physicians in Syria was the highest among the three (81.33%) (Table 13). This is a clear indication that physicians are mainly concerned of sharing their knowledge through health websites.

The Support for Arabic and English varied between sites, but Syria had the maximum support of 100% for Arabic language (Table 14).

It is clear that the target of most of the sites in these countries was first, the general population and second, the health professionals. Students had the least importance in sites of all three countries (Table 15).

5.2 Assessment of the Sites

The selected 122 Arabic health websites have been also evaluated according to the principles of the HONcode certification for the identified web sites and recording of their alignment to trustworthiness criteria such as the HONcode.

	Africa ^{**} 2007 [*]	Europe 2006 [*]	Middle East 2009 [*]
Authoritative	93%	81.2%	59.84%
Complementarity	68.6%	86%	27.87%
Confidentiality	4.8%	75.3%	31.97%
Reference	94.3%	91.9%	58.20%
Date	58.1%	79.7%	59.02%
Justifiability	99%	99.7%	72.96%
Transparency	96.2%	99%	82.79%
Financial disclosure	77.2%	77%	36.89%
Advertising policy	82.8%	74.4%	16.40%

Table 24: Comparison of assessment between Middle East, French-Speaking Africa, and Europe

^{*}Percentage of websites per principle respected.

^{**}French-speaking Africa.

When comparing the results of Arab health websites assessment of the 8 principles of HONcode to the French-Speaking Africa, the following was found:

- In regard to Authoritative principle, it was found that only 59.84% of Arabic health websites were compliant with this principle, where in French-Speaking Africa 93% health websites were compliant to this principle.

- In regard to Complementarity principle; in terms of site purpose, mission and, to which audience it is addressed, Less than one third (27.87%) of Arab health websites respected this principle which is less than French-Speaking Africa (68.6%), and less than Europe (86%).
- Only (16.40%) of Arabic health websites were respecting the Advertisement principle (advertising policy adopted by the site), which is extremely less than French-Speaking Africa health websites' (82.8%) respect to this principle, and 74.4% health website in Europe. Which means little importance was given to advertisement principle by Arabic health websites.
- One third of Arabic health websites (31.97%) were respecting Confidentiality principle, which is much higher than that of French-Speaking Africa where only (4.8%) of health websites respected this principle. In European health websites (75.3%) were respecting this principle.
- More than one third of Arabic health websites (36.89%) were respecting Financial Disclosure principle, while (77.2%) of French-Speaking Africa's health websites were considering this principle.
- Arabic health websites were mostly respecting the Transparency principle by (82.79%), and Justifiability principle by (72.96%).
- When comparing the results of the assessment of Arabic health websites according to country of origin; and focusing on the biggest Arab countries (Kingdom of Saudi Arabia, Egypt, and Syria), it was found that Egyptian health websites are considered the best in respecting these principles: Authoritative, Complementarity, Transparency, and Confidentiality and the lowest in respecting the Advertisement policy.
- Saudi health websites were found to be the highest in respecting Attribution (in regard to Date only) and Advertisement policy among

Arabic health websites, and the lowest in respecting Source of funding and justifiability principles.

- Syrian Health Websites were found to be the highest in respecting Attribution (references), Justification of claims and Source of funding among Arabic health websites and the lowest in respecting Complementarity, Transparency (contact details), and Attribution (in regard to date) principles.

5.3 The Survey

5.3.1 Participants Demographics

Participants in this survey were 236, and their demographical data were found as follows:

Almost half of participants (40.7%) were Physicians, (11%) Nurses, (10%) Dentists, (0.4%) Dental Assistants, (3%) Physiotherapist as well as (3%) Nutritionist, (2%) Health Administrators and (26.7%) Other health professionals.

(42.3%) of participants were male and (57.7%) were female, so it is clear that the results of the survey will not be affected by the participants' gender in their usage/search for health information online. (31.78%) of participants were more than 35 years old, and (58.05%) of the participants were found to be less than 35 years old.

More than two third of participants were from Saudi Arabia (69.9%), this was due to the fact that the study was conducted in Saudi Arabia, 10.2% from Egypt, 5.1% from Jordan, 2.5% from Syria, 2.1% from Sudan, and 1.3% from Oman. The rest was from different Arabian countries.

5.3.2 Participants usage of net

67.4% of participants have been using the internet for 7 years or more and 19.9% for 4-6 years. Results also showed that more than half of the participants (54.66%) conduct search on the net and 39.83% do not, that might be a result of the variation of the net penetration in Arab countries as Shorbaji indicated in his Eastern Mediterranean Report, where he stated

that Internet penetration rates in the Region vary, ranging from a minimum of 0.1% in Iraq to 38.4% in the United Arab Emirates, however the survey participants were health professionals, so they are expected to be skilful in internet searching tools.

47.46% of participants found health websites through search engines and 37.29% on the advice of colleagues.

61.86% of participants were searching for academic information, 71.19% for scientific information, 45.76% for therapeutic experience, and 37.29% for diagnosis. This indicates that most of health professionals in our sample are medical students and that they use these sites for continuing their education (Half of them are under 35 years old), and it explains why more than three quarters of the participants (79.2%) don't use the Arabian health websites, and only 16.6% use Arabic health website. This result is also supported by the typology results due to the fact that only 1.62% of health websites assessed are representing Health research centers, and only 17.07% are having ongoing research in health area within their content. This clearly means that there is a lack of scientific resources in Arabic health websites for Health professionals.

This indicates that Arabic health websites are not seen as a reliable source of health information for Arab health professionals, or not trustworthy as stated by Shorbaji report that Arabic health websites are weak due to weakness of information infrastructure; complex systems coupled with lack of skilled personnel; and lack of data standards that permit exchange of health data in local languages.

This result also supports Jarees's report, where he indicated that the quality of Arabic health websites not yet being reliable, as one of obstacles of Arab users of the Internet.

When referring to the results of the assessment done for Arabic health websites according to HONcode criteria, we can understand why Arab health professionals do not rely on these websites. Instead they prefer information produced in Western countries and do not regard local material as credible.

5.3.3 Participants judgment on the reliability of medical information online

Content information had the highest importance (Mean=3.28, SD=1.21), which means most of the participants judged the reliability of health information on the net by the information content; therefore it is an important aspect in judgement. Then if the risks of treatment and benefits were described (Means respectively 2.92 & 2.89), which emphasizes the fact that any evaluation tool for health information on the net must have these aspects in judging the reliability of medical information. The least aspect in judging the source of information that participants evaluated was the funding source of the health website (Mean=1.5).

5.3.4 Participants' knowledge of HONcode certification

Almost all participants were not aware of HONcode certification (82.2%), only 5.9% knew about it. Participants also have evaluated that mentioning the evidence (scientific references) is the most important principle in HONcode (Mean=3.36, SD=1.27) and last modification dates (Mean=3, SD=1.21) and accessibility (ease of use) of the health websites were second in importance (Mean=3, SD=1.37).

More than half of the participants (54.66%) said that these criteria are sufficient to ensure quality and 9.32% said it is not sufficient, 34.75% think that these criteria are not necessary, only 26.27% think they are necessary, and 39% did not comment, this result supports the result that Arab health professionals are not aware of health websites criteria necessary for ensuring the quality of health information online. This lack of awareness reflects the situation of e-health in Arab countries, which is explained in Shorbaji's Report, that constraints of e-health in Middle East ranged from lack of awareness of potential e-health benefits; shortage, and sometimes total lack, of funding by the government and other healthcare providers; privacy concerns and lack of legal framework.

Chapter 6 Conclusion

This study has explored the situation of health websites in Arab countries, to identify the typology, weaknesses and strengths of Arabic health websites.

6.1 Typology

Most of the websites were presentation of associations and Arabic health websites were found limited in many aspects, this might be due to:

- Lack of awareness of potential e-health benefits.
- Shortage, and sometimes total lack, of funding by the government and other healthcare providers.
- Privacy concerns.
- Lack of legal framework

6.2 Assessment

The results of the assessment of the sample of 122 Arabic health websites according to HONcode 8 principles have showed that only 5 sites were compliant with all of these 8 principles (4.16%). And when comparing it to the same assessments performed in the world, these results stress:

A) Weakness points in the health websites in Arab countries, in respecting theses principles:

- Advertisement policy.
- Complementarity.
- Confidentiality.

B) Strength points in regards to respecting these principles:

- Transparency.
- Justifiability.
- Authoritativeness.

6.3 Survey

Most of Arabic health professionals are searching for academic and scientific information, therapeutic experience, and diagnosis information.

Arab health professionals are not aware of health websites criteria that are necessary for ensuring the quality of health information online. This lack of awareness reflects on the situation of e-health in Arab countries

There is a critical indication in the survey results that Arabic health professionals do not trust Arabic health websites where 79.2% do not use Arabic health websites as a source of health information, which needs a serious promotion of the quality of the Arabic health websites, in order to improve its trustworthiness.

Chapter 7 Recommendations

The study results calls for immediate action of improving the Arabic health websites trustworthiness through:

- Establishing an Arabic health information online foundation, to govern and accredit the Arabic health websites, and work in collaboration with a popular international health informatics validation foundation, in order to regulate the health on the net in Arab countries and promote the quality of health information content on the net and protect community individuals from misleading health information.
- Health Informatics Associations in Arab countries must collaborate with each other in order to improve the quality of health on the net through promoting the awareness of the importance of quality health websites.
- Initiating a reliable Arabic Health Encyclopedia for Arab community and encourage health professionals in the contribution of creating this encyclopedia to ensure its reliability and quality.
- Encouraging the initiation of reliable health websites, by specifying Awards given to those reliable and extraordinary health websites that have spent efforts to improve their quality in a competitive way. Awards should be through health informatics associations in Arab countries.
- Another project is recommended to certify those assessed health websites.
- Promote the awareness of patient and community when using or applying health on the net by brochures, awareness campaigns, and advertisements sponsored by health informatics associations.
- Inclusion of Health informatics as a basic course in any medical study field, with emphasis on how to judge the reliability of health information on the net, since we are in the information era and the Internet is a rich source of information.

- Encourage research centers to represent their health websites to serve health professionals which will promote for scientific research.

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Appendix A –Inventory Search

Arabic Websites Directories

- <http://www.ratteb.com>
- <http://portal.ahram.org.eg/>
- <http://www.raddadi.com/>
- <http://arabyana.com/>
- <http://dir.sptechs.com/>
- <http://www.the-saudi.net/directory/health-links.htm>
- <http://aarabiah.isoc.ae/directory/tib-asiha>

Table 25: Arabic Websites Directories

طب	موسوعة
صحة/صحته	طبيب
مرض	مستشفى
سرطان	وزارة
أمراض/امراض	مجلة
صيدلة/صيدله	مؤتمر/مؤتمرات
توحد	أسنان
دواء	قلب
وقاية/وقايه	علاج
Hospital	Health
Disease	Arabic
Medical/Medicine	Treatment
Pharmacy	Ministry
Autism	Prevention

Table 26: Keywords used in searching in Arabic

Appendix B - Survey



Health On the Net Foundation

Survey on the use of online medical/health information in Arabic Countries under the project “Trustworthy online medical information: A study of specificities in Arab Countries”

This study is conducted by King Saud bin Abdul Aziz University of Health Science in collaboration with HON Foundation & Geneva University. This survey will be addressed to the Health Professionals in order to understand their usage of online health information in Arabic, and to evaluate the specific needs for capacity building, and to assess the need to certify Arabic health websites according to the internationally de facto Code of Conduct of the Health On the Net Foundation, a not-for-profit, Non-governmental Organisation based in Geneva Switzerland (<http://www.HealthOnNet.org>).

We appreciate your participation with us in this project, which is the first of this type in the Arab world.

Personal information

1 - Position:

- | | | | |
|---|---|--|---|
| <input type="checkbox"/> Physician | <input type="checkbox"/> Dentist | <input type="checkbox"/> Dentist Assistant | <input type="checkbox"/> Physiotherapist |
| <input type="checkbox"/> Respiratory technician | <input type="checkbox"/> Nurse | <input type="checkbox"/> Nutrition | <input type="checkbox"/> Health Administrator |
| <input type="checkbox"/> Bioengineering | <input type="checkbox"/> Other (specify please) | | |

2 - Place of work:

- ☐ Riyadh ☐ Dammam ☐ Jeddah ☐ Dubai ☐ Bahrain ☐ Khobar ☐ Kuwait ☐ Katar ☐ Oman
☐ Other (specify please)

3 - Education:

4 - Sex:

- ☐ Male ☐ Female

5 - Year of birth:

6 - Nationality:

- ☐ KSA ☐ Bahrain ☐ UAE ☐ Oman ☐ Qatar ☐ kuwait ☐ Yemen
☐ Iraq ☐ Lebanon ☐ Jordan ☐ Palestine ☐ Syria ☐ Egypt ☐ Sudan
☐ Somali ☐ Morocco ☐ Mauritania ☐ Djibouti ☐ Comoros ☐ Al Geria ☐ Tunisia
☐ Libya ☐ Eritrea ☐ Other (specify please)

7 - Since how long have you been using the Internet?

- ☐ < 6 months ☐ 6 to 12 months ☐ 1 to 3 years ☐ 4 to 6 years ☐ >= 7 years

8 - Do you conduct research on the Net?

☐ Yes ☐ No

If yes, what type of research and for whom?

9 - In general, what type of information do you search on the Internet?

- ☐ Academic
☐ Scientific information or other reference material
☐ Statistical data (health information)
☐ Therapeutic experience (conventional medical practices, evidence based medicine)
☐ Diagnosis
☐ Information Technology
☐ Purchase / sale of pharmaceuticals
☐ Purchase / sale of medical devices
☐ Others:

10 - What websites do you most frequently access for health information?

http://	http://	http://
---------	---------	---------

None

11 - How did you discover this or these sites?

- ☐ A search engine
☐ On the advice of a professor
☐ On the advice of my department head
☐ On the advice of a colleague
☐ On the advice of a patient
☐ On the advice of a friend
☐ During my initial training/education
☐ During a training of continued education (workshops, training courses, seminar)
☐ Others:

12 - Do you use health websites of Arabian Countries?

☐ Yes ☐ No

If yes, which ones

13 - Do you sometimes ask third parties to search for Health, Scientific, or Medical information on the Net?

☐ Yes ☐ No

If yes, what type of research and by whom?

14 - What types of health sites that do not exist now would you like to find in Arabic countries?

☐ I don't know

15 - How do you judge the reliability of medical information on a site?

+4 = very important 0 = none -4 = not important

	+4	+3	+2	+1	0	-1	-2	-3	-4
The names of authors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Qualifications of authors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The name of the institution that hosts the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
References cited	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The confidentiality of personal information submitted by site visitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The justifications for information on the benefits or disadvantages of products or treatments. The existence of a contact address	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Funding sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distinction between advertising and scientific content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The mention that the information provided on the site aims to complement the doctor-patient relationship and not to replace it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The mission of the site is explained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The date of publication of information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The references are dated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The benefits of treatment are described	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The risks of treatment are described	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The aesthetics of the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ease of use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The country of origin of the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The certification of the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

+4 = very important 0 = none -4 = not important

16 - Do you know about the HONcode certification?

☐ Yes ☐ No

What does the HONcode certification indicate for you?

Is the website your own or access certified by the HONcode?

- ☐ Yes, my website is certified
☐ No, my website is not certified
☐ Yes, any of the sites are certified
☐ No, websites I access are not certified

17 - How did you get to know about the HONcode certification?

- ☐ Another certified site
☐ By a colleague or a patient
☐ During a search
☐ Through conferences
☐ Other

18 - The HON offers the following criteria, what is the importance of these principles?

	+4 = very important	0 = none	-4 = not import						
	+	+	+	+	0	-	-	-	-
	4	3	2	1		1	2	3	4
1. Mention of evidence (scientific references)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Mention of qualifications of the author	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Mention of confidentiality (personal data)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Mention of the original date and dates of last modification of the information provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mention of the origin of funds of the site (funding sources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Mention of the political advertising and editorial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Mention of the complementarity (preserving the doctor-patient relationship)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The ability to contact the person responsible for the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Accessibility (ease of site navigation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	+4 = very important	0 = none	-4 = not import						
	+	+	+	+	0	-	-	-	-
	4	3	2	1		1	2	3	4

19 - Do you think these criteria are sufficient to ensure quality of?

☐ Yes ☐ No

20 - Do you think other criteria are necessary?

☐ Yes ☐ No

Why? What other criteria would you suggest?

Thank you for having answered to this questionnaire.