Typology and credibility of Internet health websites originating from Gulf Cooperation Council countries

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أنماط ومصداقية مواقع الإنترنت الصحية التي منشؤها بلدان مجلس التعاون الخليجي

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الخلاصة: إن جودة المعلومات المتوافرة على مواقع صحية في دول مجلس التعاون الخليجي لم تقيَّم بصورة شاملة. وقد قام الباحثون من تشرين الثاني/ نوفمبر إلى كانون الأول/ ديسمبر من عام 2012 بالوقوف على جميع المواقع الوظيفية ذات الصلة بالصحة (ع = 925) والتي منشؤها بلدان مجلس التعاون الخليجي. وتم تسجيل البيانات المتعلقة بالمؤلف واللغة والتاريخ ومحتوى المعلومات ونمط الموقع. وتم وضع قائمة مرجعية جديدة لمواقع الإنترنت استناداً إلى معايير المصداقية والموثوقية الخاصة بمنظمة تقييم الإنترنت (مؤسسة الصحة على الإنترنت). فكانت 5 مواقع (0.5٪) فقط مستوفية لجميع فئات القائمة المرجعية. وكانت جميع المواقع باللغة الإنجليزية أو العربية، ما عدا موقع واحد. و10.1٪ فقط من المواقع سجلت سياسةَ خصوصيةٍ، و2.7٪ ذكرت مؤلف المعلومات، و51.0٪ كشفت عن ملكية الموقع، و80.6٪ قدمت تفاصيل الاتصال، و58.5٪ حددت تاريخ المعلومات. و1.7٪ فقط منها ذكرت سياسة إعلاناتها، و23.5٪ كشفت عن رُعاتها. وخلص الباحثون إلى أنه يجب على أصحاب المواقع الصحية في بلدان مجلس التعاون الخليجي أن يفكروا في العمل مع مؤسسة الصحة على شبكة الإنترنت أو المنظمات المماثلة لتلبية معايير المصداقية المعترف بها دولياً.

ABSTRACT The quality of information available on health websites in the Gulf Cooperation Council (GCC) countries has not been comprehensively assessed. From November to December 2012 we retrieved all functional health-related websites (*n* = 925) originating in GCC countries. Data on authorship, language, date, information content and type of site were recorded. A novel website checklist was developed based on the credibility and trust criteria of the Internet assessment organization Health On the Net Foundation (HON). Only 5 sites (0.5%) fulfilled all checklist categories. All websites except one were in English or Arabic languages. Only 10.1% of websites posted a privacy policy, 2.7% stated the authorship of information, 51.0% disclosed website ownership, 80.6% provided contact details and 58.5% dated information. Only 1.7% reported their advertising policy and 23.5% revealed sponsorships. GCC health website owners should consider working with the HON or similar organizations to meet internationally recognized credibility criteria.

Typologie et crédibilité des sites Web de santé créés dans des pays du Conseil de Coopération du Golfe

RÉSUMÉ La qualité des informations disponibles sur les sites Web de santé des pays du Conseil de Coopération du Golfe n'a pas été évaluée de manière exhaustive. De novembre à décembre 2012, nous avons répertorié tous les sites Web actifs consacrées aux questions de santé (*n* = 925) créés dans des pays du Conseil de Coopération du Golfe. Les données sur les auteurs, la langue, la date et les informations disponibles ainsi que sur le type de site Web ont été enregistrées. Une nouvelle liste de contrôle des sites Web innovante a été élaborée à partir des critères de crédibilité et de confiance de la fondation *Health On the Net* (HON) - la Santé sur Internet, organisme d'évaluation des sites Web. Seuls cinq sites (0,5 %) avaient des résultats satisfaisants pour toutes les catégories de la liste de contrôle. Tous les sites Web, sauf un, étaient en langue anglaise ou langue arabe. Seuls 10,1 % des sites avaient publié une politique de confidentialité ; 2,7 % citaient les auteurs des informations ; 51,0 % révélaient l'identité du propriétaire du site ; 80,6 % fournissaient des coordonnées et 58,5 % avaient daté les informations publiées. Seuls 1,7 % précisait leur politique en matière de publicité et 23,5 % indiquaient les parrainages. Les propriétaires des sites dédiés à la santé dans des pays du Conseil de Coopération du Golfe devraient envisager de collaborer avec la fondation HON ou des organisations similaires pour satisfaire aux critères de crédibilité internationalement reconnus.

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Introduction

e-health is an umbrella term for health information delivered over electronic networks. It includes information and data for health-care professionals as well as public health information, which is also known as Internet health or web health (the focus of this study). Internet health information is growing at a fast pace in the 6 Gulf Cooperation Council (GCC) countries—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE). In 2006, Al Shorbaji recorded only 258 medical and health-related sites in the 22 countries of the World Health Organization Eastern Mediterranean Region (EMR), which includes the Gulf countries: he later located 335 sites in 2008, an increase of 29.8% (*1*). For this study in 2012, which is the first comprehensive overview of Internet health information in the GCC, more than 1200 websites were initially identified. The increase can be attributed to several factors: governments' development of information and communications technology in general, including e-learning, e-health and e-governance, as part of Gulf economic diversification strategies (knowledge economies); progress in medical education, biomedical research and health informatics programmes and associations in the region; growing health consumerism by the public due to rising levels of educational attainment; and increasing use of the Internet in the region in general (e.g. by 2008–09 Qatar and the UAE were categorized by the International Telecommunication Union as Internet "highly penetrated countries") (*2*).

Known barriers to e-health development in the Arabic-speaking world include the lack of culturally sensitive Arabic language information, the use of online information for self-diagnosis, and access problems such as technological illiteracy and the high cost of Internet services (*3*). These concerns possibly explain Al-Ghamdi's findings

in a 2011 survey of Riyadh outpatients that only 5.7% of respondents always trusted health-related information from the Internet and only 51.4% sometimes trusted the information (*4*). Similarly, in a survey of 450 Saudi women in 2009, the Internet was listed as 5th in importance out of 6 health information awareness resources (*5*).

The quality of information available on health websites in the GCC has not been comprehensively assessed, despite some uses of e-health that are specific to Gulf populations. Due to a shortage of female physicians in the EMR and women's reluctance to submit to examination by male physicians (*6*), Arab women may be accessing the Internet instead for health information. Furthermore, patients from Gulf populations present with unique burdens of disease (e.g. consanguineous genetic disorders, diabetes and chronic obstructive pulmonary disease). Internet health information provides relevant resources for these particular diseases and geographically specific concerns (*7*). The purpose of this study was to determine the kind and general quality of publically accessible Internet health information on health websites originating in the GCC and with content aimed at a GCC audience. A novel website credibility checklist was developed for the study by the authors based on the credibility and trust criteria of the Internet assessment organization Health On the Net Foundation (HON).

Methods

Literature search

Pilot searches indicated that the Google search engine (http://www.google.com.qa/) retrieved the largest number of websites. Data were collected over the period November to December 2012 by using the following Google keyword searches in Arabic and English: GCC country name + health

(الصحة), medicine (الطب), disease (المرض), hospital (المستشفى) and clinic (العيادة). The first 800 results were examined. After 500–600 results, the search engine generally returned irrelevant data. All health and medical links on retrieved sites were followed and recorded, and the authors therefore believe that the search was exhaustive.

Inclusion criteria included websites wholly devoted to health and medicine with a server originating in the GCC and content aimed at a GCC audience. Examples included: portals, hospitals, clinics, spas, diseases, self-help sites, support groups, organizations, associations, societies, universities, research centres, journals, conferences, commercial sites selling products and individual doctor's sites. Blogs were not recorded unless the site was wholly health-related. Health news articles on non-health-related sites were also excluded as well as international employment sites advertising Gulf health positions.

Tools

The websites were categorized by type of website using a scheme adapted from Huziah et al.'s 2009 study of Arabic language health sites prepared for the HON (*8*). Huziah's study retrieved 218 Arabic sites from the Arabic-speaking countries and analysed a random sample of 120 of them. In addition, we also made use of critical information literacy factors drawn primarily from the Information Literacy Competency Standards for Higher Education of the Association of College and Research Libraries (ACRL). These factors are necessary for an Internet health website user to successfully carry out an information literacy task, e.g. to "evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias" (*9*).

To assess the credibility of the website information (authorship, date, complementarity, etc.), a novel website credibility checklist was developed based on the widely used

credibility principles of the Swiss health website accreditation agency HON. The 8 principles of the HON code of conduct for medical and health web sites (HONcode) (10) were converted into simple yes/no items to create an easy-to-use checklist. The HONcode principles are: Authoritative, Complementarity, Privacy, Attribution, Justifiability, Transparency, Financial Disclosure and Advertising Policy. A website that satisfied credibility principles such as the HONcode would lead an educated person to conclude that the information being presented was produced in a manner generating a high level of trust in its appropriateness, usefulness, accuracy and currency. The authors believe that a minimally credible website would comply with all checklist items, except in cases of non-applicability; for example, a site not making any medical claims would not satisfy the Justifiability category. The Internet Health Website Credibility Checklist is shown in Table 1.

English- and Arabic-speaking researchers collated and examined data related to the structure and credibility of the sites. The following information was collected for each website:

- country; website url; website name; server country of origin; language of website; audience; type of website; website content/structure; areas of site under construction; links to other health information websites;

- authorship of information; qualifications of authors revealed;

- complementary statement (a statement that site information should be used to complement and not replace the advice of a licensed health-care practitioner);

- privacy policy disclosed;

- date of last update;

- claims justified; accreditation seal shown;

- contact details provided; ownership disclosed; sponsorships revealed;

- advertising policy disclosed; and

- notes on anomalies.

In order to eliminate observer bias, the researchers completed 3 independent pilot assessments of a random sample of 25 sites, the objective being to reach consensus in the application of definitions. This study did not collect measures of website usability or accessibility for people with hearing and vision impairments.

Results

Typology of GCC websites: health information & services

The initial total number of websites retrieved was 1243 and then reduced to 925 after applying the exclusion criteria. Saudi Arabia led the GCC countries with 318 sites, followed by the UAE with 270 (Figure 1). However, a calculation of per capita websites (i.e. number of sites per 1000 inhabitants) revealed that Bahrain had the strongest web health presence with 0.71 sites per 1000, followed by UAE (0.51), Kuwait (0.43), Qatar (0.32), Oman (0.23) and Saudi Arabia (0.12).

Table 2 summarizes the type of websites available in the GCC. The majority of websites concerned private hospitals and clinics (26.8%), private medical practices (11.3%) and commercial sites selling health products/services to physicians or hospitals (10.1%). A low

Table 1 Checklist to judge the general quality of health websites originating in Gulf Cooperation Council countries based on Health On the Net (HON) Foundation principles, and number of sites meeting checklist criteria, November–December 2012 (*n* = 925)

HON code of conduct principle	Internet health website credibility checklist (authors)	Checklist (yes/no) explanation	Sites meeting checklist criteria	
			No.	%
1. Authoritative	Authorship	Are identities and qualifications of authors revealed?	25	2.7
2. Complementarity	Complementarity	Is there a statement that information should not replace professional consultation?	112	12.1
3. Privacy	Privacy policy	Is a privacy policy displayed?	93	10.1
4. Attribution	Date	Is the website information dated?	541	58.5
5. Justifiability	Justifiability	Are medical claims/benefits backed by cited, peer-reviewed evidence?	33	7.2
6. Transparency	Contact details	Are email, webform, telephone or surface mail contact details displayed?	746	80.6
7. Financial disclosure	Sponsorships	Are funding sources identified?	217	23.5
8. Advertising policy	Advertising policy	Is an advertising policy displayed?	16	1.7
All		Sites with all features	5	0.5
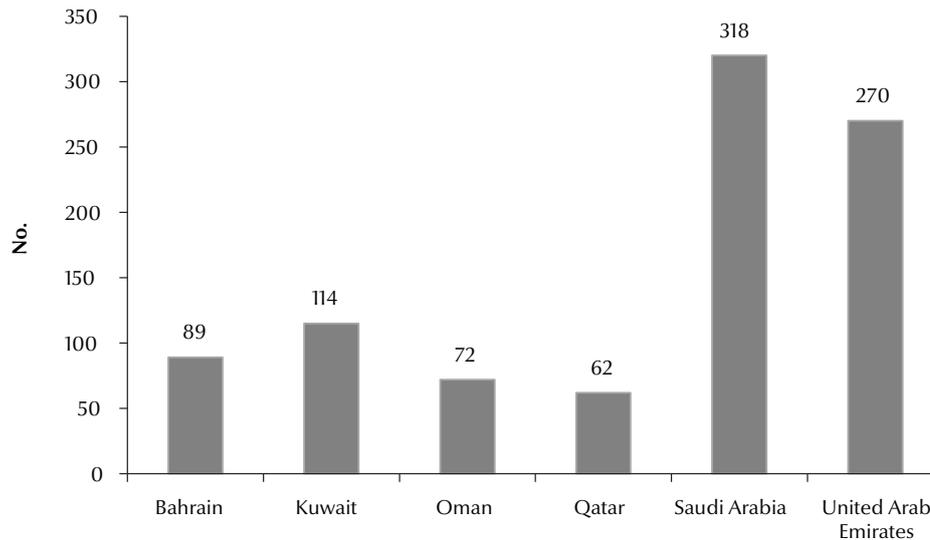
number of academic websites (5.0%) and research centres or institute websites (1.1%) were found.

Figure 2 records the types of information that were found on GCC websites. Information on 421 sites (45.5%) related to health services. Next in prevalence was information on specific diseases (209 sites; 22.6%) and health advertisements for commercial products or services (155 sites; 16.8%). Web health in the Gulf was aimed primarily at the general public (616 sites or 66.6% of information aimed at a general user). The most prevalent technical information specifically targeted towards health professionals was categorized as follows: 131 sites (14.2%) contained information on conferences and meetings announcements and 116 sites (12.5%) listed programmes/training for professionals. Only 6 sites (0.6%) provided links to online courses for professional use, and only 25 sites (2.7%) provided an online database or library.
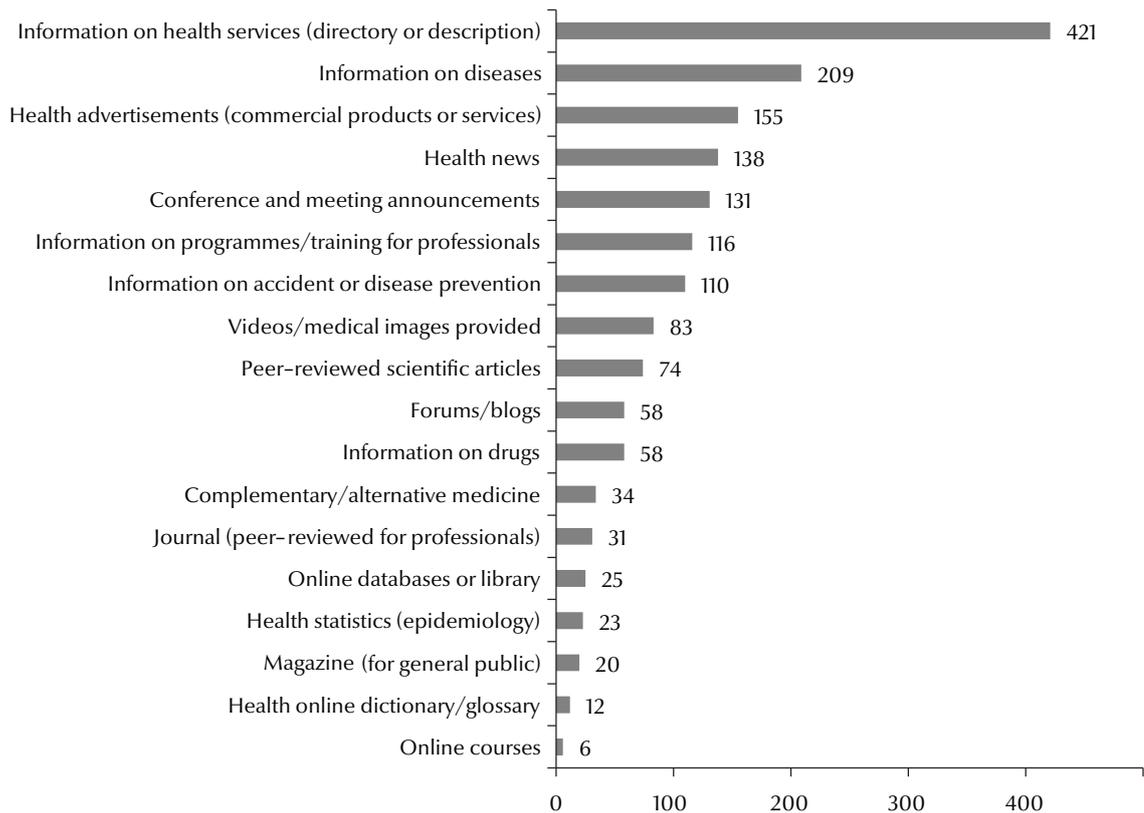
Language of GCC websites

The majority of websites were in English language (551 sites; 59.6%), followed by Arabic and English (241 sites; 26.1%) and Arabic only (132 sites; 14.3%). Only 1 site (0.1%) retrieved in this study was in a language other than Arabic or English.

GCC websites meeting HON code of conduct principles

The authors applied the 8 checklist principles to the 925 retrieved websites and the results are tabulated in Table 1. Only 5 sites (0.5%) fulfilled all of the checklist categories, 3 of which displayed the HONcode credibility seal on their homepage.

- Authoritative (authorship): in 25 (2.7%) of the GCC websites the iden-

Table 2 Analysis of types of websites originating from Gulf Cooperation Council countries, November–December 2012 (*n* = 925)

Website type[a]	No.	%
Private hospital or clinic	248	26.8
Private medical practice	104	11.2
Commercial products/service: for physicians	93	10.1
Other health website	86	9.3
Commercial products/service: for public	58	6.3
Government hospital or clinic	52	5.6
Health association: for diseases	47	5.1
Academic website	46	5.0
Conference	39	4.2
Health association: for professionals	36	3.9
Web portal or search engine	29	3.1
Journal or magazine	27	2.9
Health blog	24	2.6
Pharmacy	18	1.9
Health ministry	17	1.8
Health association: general public	13	1.4
Research centre or institute	10	1.1
Employment	1	0.1

[a]Types may overlap.

Figure 2 Types of health information on websites originating from Gulf Cooperation Council countries, November–December 2012 (number of sites containing listed information categories)

tities and qualifications of authors of information were revealed.

- Complementarity: 112 sites (12.1%) provided a complementarity statement. Although many websites built from preformatted templates contained a "disclaimer" or "terms of service" link, these pages were often blank or only listed legal restrictions related to copyright infringement, fraud and abuse.

- Privacy: 93 sites (10.1%) disclosed a privacy policy.

- Attribution (date): 541 (58.5%) sites were dated (Figure 3). However, among those that displayed dates and "last updated" statements, most of the information was very current, with the bulk of updates from 2010 to 2012.

- Justifiability: 33 sites (7.2%) referenced claims of the benefits of a therapy, product or service from the peer-reviewed literature.

- Transparency (ownership and contact details): 746 sites (80.6%) provided contact details and 472 sites (51.0%) disclosed ownership.

- Financial disclosure: 217 sites (23.5%) revealed financial sponsorships.

- Advertising policy: 16 sites (1.7%) published an advertising policy.

Discussion

Despite some highly developed, up-to-date and well-maintained informational sites (such as GCC government health portals), serious deficiencies in GCC Internet health information emerged in this study.

Saudi Arabia produced the greatest number of websites among the GCC countries, although a calculation of per capita websites revealed that Bahrain had the highest number of sites per

1000 inhabitants. A majority of websites in GCC countries were in English language; 26.1% were in both Arabic and English and 14.3% were in Arabic. As the native and official language of all Gulf nations is Arabic, all government health information should be provided in Arabic in plain language (i.e. Modern Standard Arabic). A study of Internet information sought by parents of asthmatic children in Riyadh cited "non-availability of Arabic information and highly technical information" as barriers to Internet use (11). The new King Abdullah Bin Abdulaziz Arabic Health Encyclopedia (http://www.kaahe.org) may partially alleviate the Arabic language health information deficit (12). Only 1 site retrieved in this study was in a language other than Arabic or English, which is surprising due to the widespread use of Hindi, Tamil, Nepali, Urdu and Filipino (Tagalog) among immigrant labourers in
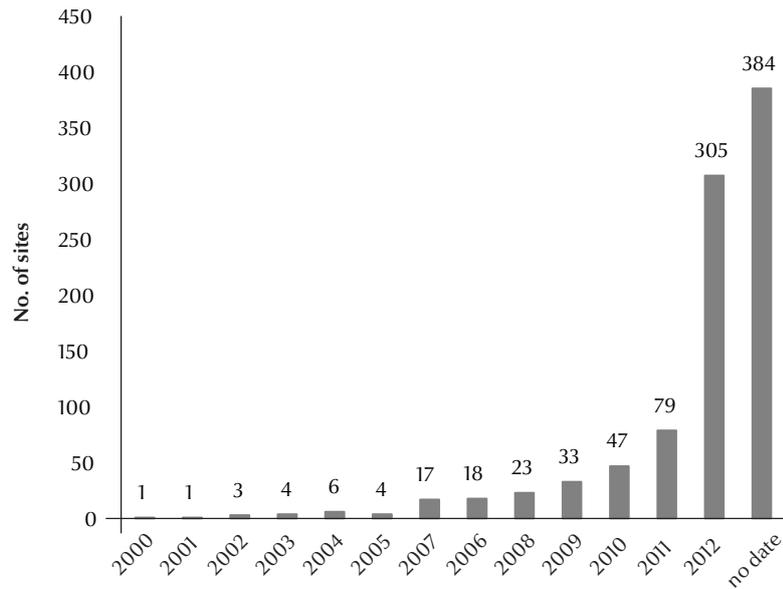
Figure 3 Dates of retrieved websites originating from Gulf Cooperation Council countries, November–December 2012

the region. The GCC has the highest percentage of immigrant labour in the world, approaching 50% of the entire workforce overall, while in Qatar and the UAE it comprises 80–90% of the total workforce (*13*). It can be argued that government health information should be provided in the languages commonly spoken in the Gulf.

Approximately 56% of the GCC Internet health information was commercial in nature. This numerical breakdown of websites provides a somewhat distorted view of health-care delivery in the Gulf, since free or subsidized health-care service information was often organized on large, national health portals. The large number of commercial and private hospital sites was a result of the need for these organizations to advertise and attract paying customers. A low number of academic websites (5.0%) and research centres or institute websites (1.1%) is not unexpected as the GCC countries are developing nations that have only relatively recently established biomedical research output. Health information on the publically accessible Internet in the GCC consisted primarily of information about health

services (45.5%) and diseases (22.6%) for lay persons and about development and training opportunities for healthcare professionals (conferences 14.2%, training 12.5%).

HON code of conduct for medical and health web sites

Breckons et al. identified 39 different health website rating instruments in 2008, including the eHealth Code of Ethics, HONcode, the eEurope 2002 initiative and Silberg's 4 simple core standards (*14,15*). Assessment agencies and instruments have avoided judging the scientific accuracy of specific information (which can only be determined by trained medical professionals, and they will not always reach consensus), but instead have focused on identifying and verifying the structural and ethical principles of credible website construction.

We believe that the HONcode-based checklist designed for this study will be useful in rapidly assessing a large set of regional (as in this study) or national websites in conjunction with e-health readiness indices or SWOT analyses. The checklist can in addition

be used on individual websites to quickly assess if a more detailed rubric needs to be invoked, such as the DISCERN instrument, or a full HONcode site visit. Also, the checklist could easily be automated by programming a web crawler (Internet bot) to retrieve the checklist items.

Applying the 8 checklist principles developed from the HON code of conduct for medical and health web sites revealed that only 5 out of 925 sites fulfilled all of the checklist categories, 3 of which displayed the HONcode credibility seal on their homepage.

Authorship of information revealed

The issue of website information authorship is complex. Although 97.3% of the GCC web information surveyed was anonymous (unattributed), not all reliable and safe health information needs to be attributed or produced by credentialed health practitioners. For example, hospital service hours posted on a website are assumed to be accurate if the hospital is a trusted entity to the user and the website is up to date. Best practices suggest that medical information should be

attributed clearly to an expert author on a website. Information on an individual health practitioner's website might be assumed to have been written by the practitioner him/herself; however, that information could have been cut and pasted from other unidentified sources, generated by the web developer or outsourced to unknown writers. Particularly troubling was the amount of unattributed disease/drug information found on GCC websites. Ideally, technical medical information should be written by an accredited medical professional or scientist citing recent peer-reviewed literature, with links to other credible sources for information comparison. However, very little information on the GCC health sites investigated reached this high standard of credibility.

Complementarity statement

Few websites (12.1%) provided a statement indicating that site information should be used to complement and not replace the advice of a licensed healthcare practitioner. When professional medical services are unaffordable or unavailable (as in rural areas), patients may resort to self-diagnosis and self-treatment with over-the-counter medications, prescriptions borrowed from friends or family members, or home remedies based on internet health information. Obviously this can result in great harm to the patient, and ethically health websites should warn readers that they should visit a trained and licensed health-care practitioner if they exhibit any signs or symptoms of serious disease.

Privacy policy disclosed

The GCC health websites examined scored very low on privacy protection, with only 10.1% disclosing a privacy policy. All GCC governments can maintain Internet censorship by routing Internet traffic through government servers to block and filter undesirable websites and possibly maintain surveillance on citizens and expatriates. Anyone gaining

unauthorized access to government communication servers, as well as data-centre employees themselves, would have access to all unencrypted Internet traffic in the country, possibly leading to potential abuse or data theft. An individual anonymously posting health information, such as their health status, to a bulletin board, chat room or blog should have the reasonable expectation that all official parties with access to that data will keep the information confidential and private.

Date of last update

A very high percentage of GCC websites (41.5%) were undated. Timeliness of medical and health information is obviously extremely important due to the rapid developments in modern medical knowledge. While out-of-date service hours for clinics, pharmacies or hospitals might only be an inconvenience, out-of-date information on diseases and treatments, e.g. withdrawn drugs, can be dangerous and misleading for both the public and health practitioners.

Justifiability of claims

We adopted strict criteria for claims of the benefits of a therapy, product or service by requiring claims to be referenced by the kinds of standard evidence accepted by health professionals (peer-reviewed articles, reports and clinical trials). Only 7.2% of sites met our criteria. Justifiability is one of the most complex aspects of Internet health since users trust the credibility of information for a variety of reasons: trust in an individual practitioner, trust in an organization or sometimes such superficial factors as graphic presentation (web design "looks professional").

Ownership and funding disclosed

Approximately half of the GCC websites (51.0%) disclosed ownership, although only 23.5% revealed any financial sponsorship, and 80.6% provided contact details, thus exhibiting a high level of transparency. Clearly displaying financial sponsorships, site ownership and providing contact details helps

the user to assess any potential fraud or bias of the information displayed on the website. Consumers should be informed as to where the information they are viewing originates, and why it has been made available on the Internet (e.g. altruistically for public education or to sell commercial products). Although many consumers assume that an entity described on a site, e.g. a specific dental or surgical practice is the sponsor, owner or originator of the information, this is not always the case, especially with the rise of third-party sponsored adverts, portals, web directories and aggregators. For greater clarity and establishment of trust, websites should clearly declare who is producing and sponsoring the information.

Advertising policy disclosed

Very few sites in our study (1.7%) published an advertising policy that might reveal conflicts of interest and misleading information. Users at all times should be able to clearly distinguish on the site between peer-reviewed and referenced medical (evidence-based) material provided by the site and advertising information provided for commercial purposes.

Limitations of the study

It was difficult to verify conclusively that all GCC health websites were retrieved, as even a thorough search of a country's complete list of registered site URLs might not reveal all health-related sites without an actual site visit due to such factors as missing or poorly constructed website meta-tags or use of the "noindex" value. Thus searches using common key words with the most frequently used search engine (Google) and following links was adopted as a retrieval strategy since it duplicates actual users' experiences. The low number of non-English and non-Arabic language sites retrieved may have been an artefact of using Arabic/English keyword searches, although we believe that the numbers of these sites in the GCC is quite low. A replication of the study by

another group might result in slightly different typology and checklist percentages due to some subjective bias in the application of categorical definitions selected by the authors; however, the results should be broadly similar.

Conclusions and Recommendations

The study showed that privacy and security policies on websites originating in the GCC need to be implemented and clearly articulated in plain language. Websites should be available in the languages commonly used by people living in the Gulf region, such as Urdu, Tagalog, Nepali, Hindi and Malayalam, and not only in Arabic and English. Technical medical information needs to be dated and cited, and the authorship and credentials of the authors disclosed. Sponsorships, contact details, site ownerships and advertising policies should be disclosed for full transparency. GCC health website owners should consider working with the HON or similar organizations to meet internationally recognized credibility criteria.

More research needs to be done concerning actual online health consumer and health professional behaviour, as well as usability and accessibility studies of GCC websites. Language and cultural issues should be the focus of cross-sectional surveys of attitudes.

Competing interests: None declared.

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