A Comparison of Iranian Consumer Health Websites with Similar Websites in Selected Countries Based On E-Health Code of Ethics Standards

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Abstract—**The aim of this study is to compare Iranian consumer health websites with similar websites in America, Canada and Australia, based on e-Health Code of Ethics criteria, to determine the extent of strengths and weaknesses of Iranian consumer health websites. We used Google as a popular search engine to find Iranian consumer health websites and similar websites in selected countries. Some Persian subject directories and website of the Ministry of Health and Medical education of Iran were also searched. Ninety websites were evaluated and compared using e-Health Code of Ethics criteria. No websites in Iran met all the criteria, but majority of websites in selected countries met most of the criteria and in some cases met all. Four criteria were found to be rare among Iranian websites, including privacy, informed consent, professionalism in online health care, and responsible partnering. Findings of current study can be used to improve the quality of consumer health websites of Iran and other developing countries based on current standards to best serve users.**

Keywords— *Health Information, Patient Education, Quality Control, Codes of Ethics, Iran, United States, Canada, Australia*

I. INTRODUCTION

The Internet has become one of the most important resources of health promotion and improvement by providing vast amounts of medical and health information (Nicholas, et al., 2003). It had changed how individuals receive health information and health care (Rippen and Risk, 2000). Studies suggest that health issues are among the most frequently searched topics on the net (Esmaeilzadeh, 2011; Powell and Clarke, 2002). People regularly use the Internet to retrieve health information to manage their own health and those who are under their care. Therefore, an increasing number of organizations, Societies, and specialists have attempted to provide consumers with health information via the Internet. Quick and easy access to information on the Internet facilitates health information consumers' more involvement in medical care decision-making (Potts and Wyatt, 2002) which significantly enhances the quality of health care (Risk and Dzenowagis, 2000). Fox and Rainie (2000) estimated that at least 60 million Americans searched the internet to find the health information they required, and among those who used the Internet, more than 70% announced that the information they retrieved affected the decision-making process in a treatment. However, with the

proliferation of health information on the Internet, a common concern has been expressed over the accuracy and completeness of health-related information on the net (Risk and Petersen, 2002; Eysenbach et al., 2002). Several investigations of condition-specific websites revealed deficiencies in the quality of health-related information on the web (Beredjiklian et al., 2000; Kunst et al., 2002; Soot et al., 1999).

Variety of people go to the Internet to access health information, including patients, health care professionals, researchers, producers and providers of health products and services. Therefore it is needed to make the Internet a safe environment for meeting health care needs. Rippen and Risk (2000) emphasized that since health information, products, and services have the potential both to improve health and to harm, health information providers on the Internet must be reliable, provide high quality information, safeguard users' confidentiality, and adhere to standards of best practices for online commerce and online professional services in health care.

Due to the increasing growth of consumer health websites, and thus consumers' broad access to health information, implementing quality control standards for health information on the net has been considered by some national and international professional organizations including the Internet Health Care Coalition, HON Code, American Medical Association, Hi-Ethics, MedCertain, European Council, and the Internet Healthcare Coalition (Risk and Dzenowagis, 2001; Rippen and Risk, 2000; Eysenbach et al., 2000). The goal of the e-Health Code of Ethics (Appendix I) is to ensure that people all over the world can confidently and with full understanding of known risks realize the potential of the Internet in managing their own health and the health of those in their care (Rippen and Risk, 2000).

In evaluating a website, particularly a health website, special attention should be paid to the features that contribute to its quality. This study aims to compare Iranian consumer health websites with similar websites in America, Canada and Australia, based on e-Health Code of Ethics, to determine the extent of strengths and weaknesses of Iranian consumer health websites.

II. LITERATURE REVIEW

Not many studies have been done using e-Health Code of Ethics to investigate and compare the websites quality of one developing with the developed countries we investigated in current study. A rather previous study by Risoldi Cochrane et al. (2012) compared the readability of consumer health information found on U.S. government-funded websites versus that found on commercially funded websites. The study revealed that commercially funded websites were significantly more difficult to read as measured by Flesch Reading Ease. Yet, there was no significant difference according to SMOG Formula (12.8 vs. 13.2, p = .150). The overall readability of Internet health information intended for consumers was poor. Adams (2010) conducted an inter-disciplinary literature review to explore renewed concerns about the reliability of online health information presented on web 2.0. Findings suggested that Specific points of renewed concern include: disclosure of authorship and information quality, anonymity and privacy, and the ability of individuals to apply information to their personal situation. She concluded that Interactive and collaborative web applications offer new opportunities for reaching patients and other health care consumers by facilitating lay information creation, sharing and retrieval. However, researchers must be careful and critical when incorporating applications or practices from other fields in health care. Kaicker et al. (2010) investigated the quality of pain websites, and explained variability in quality and readability between pain websites were assessed using the DISCERN instrument as a quality index. A total of 161 websites were assessed. It was found that the overall quality of pain websites is moderate, with some shortcomings. websites that scored high using the DISCERN questionnaire contained health related seals of approval and provided commercial solutions for pain related conditions while those with low readability levels offered interactive multimedia options and have been endorsed by health seals. In one study by Davallius (2009), 70 Swedish websites on heart attack were evaluated using European Union (EU) quality control criteria. No websites met all the criteria, but websites found on the first search pages of search engines, met the criteria in the best way. Those websites were primarily aimed at health information to the general public provided by government authorities, county councils, universities and companies. Morahan-Martin (2004) performed a cross-cultural review to find out how health information on the internet is retrieved, evaluated and used. Findings suggested that most online health information consumers search information on specific health conditions. They typically use general search engines to find online health information and enter short phrases. Both their search and evaluation skills are limited. They avoid sites with overt commercialism, but often do not pay attention to indicators of credibility. There are cross-cultural differences in the types of sites used as well as how online information is used. Wilson (2004) described a classification of five types of approaches for rating the quality of English language websites. She argued that no organization or label has the capacity to identify objectively what is good or bad information. Quality remains an inherently subjective assessment, which depends on the type of information needed, the type of information searched for, and the

particular qualities and prejudices of the consumer. In Iran, regarding the importance of access to health information, designing and launching such web sites have also been seriously considered. But, these web sites are still in infancy and need improvement (Fathifar et al., 2007).

As our literature review indicated, to date, no survey on the strengths and weaknesses of Iranian consumer health websites has been reported with the method we used in the study. To help narrow this gap, this study compared consumer health websites of Iran and three other countries.

III. RESEARCH QUESTIONS

To drive the investigation the following hypotheses will be tested:

1. What are the differences and causes of differences among Iranian consumer health   websites and those of selected countries regarding e-Health Code of Ethics criteria, and what should be changed to improve Iranian health websites?

2. What are the differences among selected countries' consumer health websites regarding e-Health Code of Ethics criteria?

IV. METHODOLOGY

We used Google in the study to find relevant websites, as this is held to be the most used search engine (Eysenbach and Kohler, 2002). In November and December 2011 one search was performed using the search term "Consumer health-related Websites". We limited the search to Iran, America, Australia and Canada by using the Boolean operator 'AND'. In this study the first 50 hits links to Websites were selected. In the case of Iranian websites in addition to Google, websites of "Ministry of Health and Medical Education of Iran", "Linkestan" and "Hot Links" were also searched using the search terms "medicine", "treatment", "diseases", and "drugs information". Duplicated websites and websites that merely provided information on sales of health products were excluded from the study. To make sure that the sample of the Iranian websites were proportional to their size in the population, proportionate stratified random sampling method was used. The required sample size for Iranian websites was found to be 45 (Appendix II) using the sample size for estimating proportion formula ($n=(Z_{(\alpha/2)}^2 \; p \; q)/d^2$) while p=q=0.5, z=1.96 and d=0.15. And 45 websites (Appendix III) for selected countries (America 15, Australia 15 and Canada 15) were chosen using table of random numbers. Then, totally 90 websites were investigated in current study. To retrieve websites for scrutiny and evaluation, all selected websites were downloaded using Offline Explorer 5.9.To conduct current study we used the e-Health Code of Ethics. It has been developed by the Internet Healthcare Coalition with the cooperation of the World Health Organization/Pan-American Health Organization (WHO/PAHO) in 2000 (Rippen and Risk, 2000). The e-Health Code of Ethics, prepared by a panel of about 50 experts from all over the world, consists of eight guiding principles (criteria) which are assessed in some 50 items. The criteria are: candor (3 items); honesty (3 items); quality (12 items); informed consent (8 items); privacy (5 items); professionalism in online health care (12 items); responsible partnering (3 items); and accountability (4 items).

In this study each item was assessed in terms of its presence (yes=1) or lack of presence (no=0). The summated score of items in each criterion was then ranked in three categories: no=0, somewhat= [1,n/2] and yes=[n/2+1,n], where 'n' equals the number of each criterion's corresponding items. To confirm the reliability of the instrument the Guttman split-half coefficient was calculated to be .892 which indicated the internal consistency of the instrument. Data analysis was performed using Excel and SPSS 16.0. In analyzing and interpreting the data, different statistical measures like Frequency, Percentage, Mean, Standard deviation, Chi-square Test, and ANOVA were utilized. Tables, charts and figures were used to make the presentation clear and simple.

V. FINDINGS

Totally 200 hits were returned from Google search engine, and 27 hits from 'Link', 213 hits from 'Ministry of Health and Medical Education' and 70 from 'Hot Links', from which 45 websites were selected from Iran and 45 from selected countries, 15 for each, after applying inclusion/exclusion criteria and omitting duplicated cases. results indicates that approximately half of (43.8%) websites contained information on health issues, where Canadian websites were first in rank (60%) followed by Iran (42%), America (40%), and Australia (40%). The next common topic is medicine (20.2%), where American websites (33.3%) ranked first. The least common topic was observed to be drug information with 3.4% websites. Table 1 reveals that about half of Iranian websites (44.4%) are run by private sector, followed by websites that are official and supported by government (31.1%). Whilst, more than half (53.3%) of Australian and majority of (86.7%) Canadian websites are professional and official ones, respectively.

Table I. Type-wise distribution of Websites					
Type	Country				Total
	Iran	America	Australia	Canada	
.gov	14 (31.1)	7 (46.7)	3 (20.0)	13 (86.7)	37 (41.1)
.Com	20 (44.4)	4 (26.7)	4 (26.7)	2 (13.3)	30 (33.3)
.Org	11 (24.4)	4 (26.7)	8 (53.3)	0	23 (25.6)
Total	45 (100.0)	15 (100.0)	15 (100.0)	15 (100.0)	90 (100.0)

The eight criteria of e-Health Code of Ethics were applied to 90 consumer health-related websites. Table 2 shows the frequency distribution of health websites according to the score of the e-Health Code of Ethics guiding principles evaluation. This table indicates that none of the Iranian websites met all of the e-Health Code of Ethics criteria. It is shown that all websites in America, Australia, and Canada fulfilled all the items under principle of 'Candor', whereas, only 71.7% Iranian websites clearly indicated their owner, purpose, and sponsor. The calculated Chi-square detected a

significant difference (p = .019<.05) among health websites regarding this criterion. The 'Quality' criterion was met by all websites of selected countries (100%), and 88.9% of Iranian websites displayed the items under this criteria including 'evaluate information rigorously' (38.7%), 'provide information that is consistent with the best available evidence' (44.4%), 'the care or advice given by a qualified practitioner' (44.4%), 'whether information is based on scientific studies, expert consensus, or professional/personal opinion'(44.4%), that 'some issues are controversial' (8.9%), 'the language is easy to read, and appropriate for intended users' (88.9%), 'accommodates special needs users may have' (46.7%), and 'the site editorial board and policies' (24.4%).There was no significant difference (p= .151> .05) among health-related websites in this regard.

As indicated in table 2, less than half (46.7%) of Iranian websites clearly specified to be 'truthful in all content used to promote the sale of health products or services' (53.3%), or 'in any claims about the efficacy, performance, or benefits of products or services' (46.7%). However, the majority of American (73.3%), Australian (86.7%), and Canadian (60%) websites fulfilled the items of 'Honesty'. A statistically significant difference (p= .031<.05) was detected among Websites regarding this criterion. Four criteria were found to be rare among Iranian websites, including 'privacy' (8.9%), 'informed consent' (8.9%), 'Responsible Partnering' (15.6%), and 'Professionalism in Online Health Care' (17.8%), while, all websites in America (100%) and Australia (100%) displayed the items of professionalism in online health care, and all Australian (100%) websites provided all the items of informed consent. Further, majority of American (80%) and Canadian (60%) websites met all the items of privacy, while nearly one-fifth (40%) of Canadian websites indicated to take reasonable steps to prevent unauthorized access to personal data; to make it easy for users to review and update personal data; to trace how personal data is used; told how the site stores users' personal data and for how long; assured that when personal data is de-identified, it cannot be linked back. Significant differences (p= .000<.05) have been observed among websites, regarding the fulfillment of the above mentioned criteria (Table 2).

In 13 (15.6%) of Iranian websites '**Accountability**' items were displayed including 'how the users can contact the owner of the sites or services' (68.9%), and 'review complaints from users in a timely manner' (60%). No websites described their policies for self- monitoring, while, all American (100%), and majority of Australian (93.3%), and Canadian (80%) websites met these items and only a few of them (10; 4.5%) described their policies of self-monitoring. The difference among Websites has been observed to be significant (p= .000<.05).

A one-way ANOVA was used to compare the websites' mean values on e-Health Code of Ethics among four countries. The mean values on e-Health Code of Ethics differed significantly across the four countries, $F_{(3, 86)} = 49.12, p < .0001$. As it is observed from table 3, the lowest mean value belonged to Iranian websites (mean= 23.42 ± 11.88), whereas Australian websites had the highest mean value (mean=56.27 ± 5.26).

Table II. The Comparison of e-Health Code of Ethics in Iranian websites and Selected Countries												
e-Health Code of Ethics	Iran			America			Australia			Canada			X^2	P
	No	Some what	Yes	No	Some what	Yes	No	Some what	Yes	No	Some what	Yes		
Candor (C)	5 (11.1)	8 (17.8)	32 (71.7)	0	0	15 (100)	0	0	15 (100)	0	0	15 (100)	15.19	.019
Honesty (H)	24 (53.3)	0	21 (46.7)	4 (26.7)	0	11 (73.3)	2 (13.3)	0	13 (86.7)	6 (40)	0	9 (60)	8.89	.031
Quality (Q)	5 (11.1)	0	40 (88.9)	0	0	15 (100)	0	0	15 (100)	0	0	15 (100)	5.29	.151
Informed Consent (IC)	21 (46.7)	20 (44.4)	4 (8.9)	0	2 (13.3)	13 (86.7)	0	0	15 (100)	2 (13.3)	2 (13.3)	11 (73.3)	57.33	.000
Privacy (P)	8 (17.8)	33 (73.3)	4 (8.9)	1 (6.7)	2 (13.3)	12 (80)	0	6 (40)	9 (60)	3 (20)	6 (40)	6 (40)	33.26	.000
Professionalism in Online Health Care (PO)	8 (17.8)	29 (64.4)	8 (17.8)	0	0	15 (100)	0	0	15 (100)	1 (6.7)	3 (20)	11 (73.3)	51.67	.000
Responsible Partnering (RP)	10 (22.2)	28 (62.2)	7 (15.6)	0	1 (6.7)	14 (93.3)	0	4 (26.7)	11 (73.3)	0	4 (26.7)	11 (73.3)	41.12	.000
Accountability (A)	6 (13.3)	26 (57.8)	13 (28.9)	0	0	15 (100)	0	1 (6.7)	14 (93.3)	0	3 (20)	12 (80)	38.10	.000

Table III. Comparison of mean value of websites regarding e-Health Code of Ethics criteria				
Country	N	Mean	F	P
Iran	45	23.42 ± 11.88	49.12	P<0.0001
America	15	54.13 ± 12.22		
Australia	15	56.27 ± 5.26		
Canada	15	45.27 ± 13.50		
Total	90	37.66 ± 18.51		

Boneferreni post-hoc comparison of the mean values of four countries indicated that the significant difference was due to the mean value of Iranian websites rather than the mean values of websites of other countries (Table 4).

Tble IV. Boneferreni post-hoc comparisons of the mean values for e-Health Code of Ethics criteria				
Country	Iran	America	Australia	Canada
Iran		*	*	*
America	*			
Australia	*			
Canada	*			
Note *= p< 0.0001				

To compare the mean values obtained for items of e-Health Code of Ethics criteria, a Polygon diagram was drawn (Fig. 1). As it can be seen from the diagram the mean value of the selected countries, except for Canada which is at a lower level, are similar. But, the mean value for items of e-Health Code of Ethics criteria for Iranian websites is significantly lower than those of other countries.

Figure 1. Comparison of mean value for e-Health Code of Ethics criteria among websites
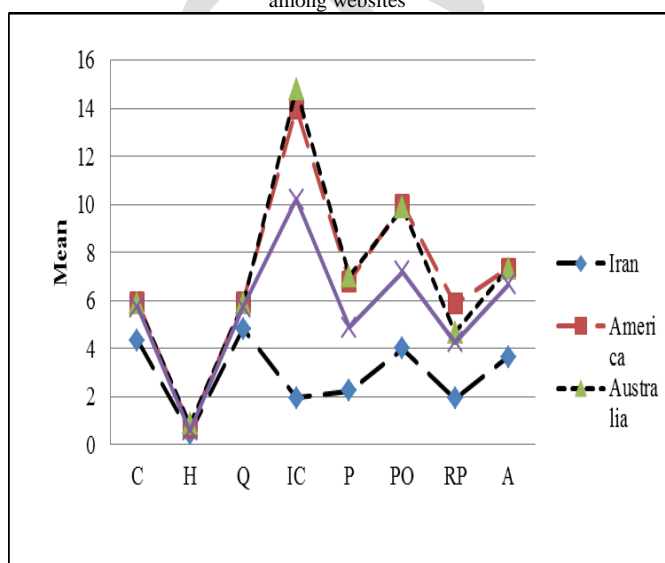
VI. DISCUSSION

This is one of the first studies that investigate consumer health websites in Iran, America, Australia and Canada to know their weaknesses and strengths. Findings can be used to improve the quality of these websites to best serve their health information needs. Results indicated that although websites of America, Canada and Australia fully met the e-Health Code of Ethics criteria, none of the Iranian websites fulfilled all the criteria. Several studies have reported inadequacy of health-related websites in Iran (Fathifar et al., 2007). It is important for the people to be able to decide whether the website is appropriate or not. The indication of the purpose of the website is therefore important. Davallius' study (2009) found that most of the websites displayed their purpose. This is in accordance with the findings of this study which found that majority of Iranian websites and all websites in selected countries indicated their purposes. Four criteria were found to be rare among Iranian websites, including privacy, informed consent, professionalism in online health care, and responsible partnering, while, all websites in America and Australia displayed the items of professionalism in online health care, and all Australian websites provided all the items of informed consent. People who use the Internet for health-related reasons have the right to expect the personal data they provide will be kept confidential and this must be possible for the individual to explore. Further to be able to get up-to-date and reliable information is an important issue for the consumer of health information. People who use the Internet for health-related purposes have the right to be informed that personal data may be gathered and to choose whether they will allow their personal data to be collected and used or shared. A general improvement of the websites in order to meet the privacy, informed consent, professionalism in online services, and responsible partnership is needed. Some Websites in selected countries made specific reference to compliance with quality criteria. However, no Iranian websites indicated to be in compliance with any quality criteria. Development of quality control criteria for Iranian health-related websites should be undertaken to enhance the quality of these websites.

VII. STUDY LIMITATIONS

One limitation of our study is that we performed multiple comparisons. Another limitation is that a single reviewer assessed the websites. To mitigate this, we used objective criteria whenever possible. For example, we used the presence or absence of authorship information rather than author authority. It is important also to acknowledge that the Internet is a constantly changing environment, thus we are only reporting the existing status of websites at the time of evaluation, not necessarily by the time of the publication of this report.

VIII. CONCLUSIONS

Findings of current study suggest that Iranian consumer health websites are of low quality compared to those in selected countries. Hence, Iranian users should be cautious when using Internet as a source of health- related information. Generally, in order to protect users' privacy, Iranian health authorities should give due considerations to the data

protection policy and system for the processing of personal data including processing invisible to users, when designing health-related websites. Furthermore, in order to create a safe and user-friendly Internet environment where health-related information can be obtained, a number of improvements are needed. This is particularly important with regard to the websites' adherence to ethical codes governing their professions as practitioners in face-to-face relationships, protection of the patients' confidentiality, disclosure of the sponsorship, financial incentives, and describing the constraints of online diagnosis and treatment recommendations, which would likely affect the clients' perception of the services offered. Another instance of improvements is the possibilities for the consumers to explore the reliability and actuality of the information. The importance of complying to and displaying quality criteria also needs to be improved by providers, whilst users need to learn how to interpret such information. Developing health-related websites' quality criteria based on their purposes, target audience, and also viewed in a scope of national context is also desirable.

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