
The use of websites for disseminating health information in developing countries: an experience from Sri Lanka

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Abstract: This study was designed to investigate the use of websites as a health education medium in Sri Lanka. Approximately 87.2% of the websites contained less than 100 webpages. The quality score was higher in the websites owned by local nonbusiness organisations compared to the websites owned by business organisations. Only 8.1% of the websites provided health education content for the general public as their main content. The total number of websites has not increased compared to the increase in internet usage in Sri Lanka during the last few years. The internet is an underutilised health education tool despite the growth of internet usage in Sri Lanka.

Keywords: health education; health information; internet; websites; disseminating health information; electronic healthcare.

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1 Introduction

The internet is a relatively new and fast-growing medium for disseminating health information. It has been found that over 100 million people use the internet for healthcare information worldwide. On any given day, more people go online for medical advice than actually visiting health professionals (Fox, 2002) and this health information-seeking behaviour can be seen during the last few years (Fox, 2006). Most studies on internet usage for health information dissemination were carried out in developed countries, whereas only very few studies were carried out in developing countries. The keywords 'internet' and 'UK' generated over 2000 results, whereas the keyword 'internet' in Sri Lanka, Nepal and Bangladesh generated only 6, 17 and 5 results in PubMed, respectively. From those six results in Sri Lanka, only one study is related to a Sri Lankan health website (Dissanayake and Jayasekara, 1999). Internet usage has grown dramatically in developed countries as well as in developing countries during the last seven years (Internet World Stats, 2008).

The internet is a less regulated communication mode compared to most traditional media like books, newspapers and television. One of the main disadvantages of web-based information is the lack of regulation. Although there are several guidelines from different organisations such as Health on the Net Foundation Code of Conduct (HON Code), the American Medical Association, the Internet HealthCare Coalition, Hi-Ethics and MedCertain on "better health website" (Boyer and Geissbuhler, 2005; Charatan, 2000; Boyer *et al.*, 1998; Collste, 2002; Bedell *et al.*, 2004), these are not followed by a majority of health websites (Boyer and Geissbuhler, 2005; Di Giacomo and Maceratini, 2002). Therefore, the quality of the information provided by websites was questioned in several early studies (Peterlin *et al.*, 2007; Jain and Barbieri, 2005; Khazaal *et al.*, 2007). The situation could be worse in relation to the websites targeting developing countries, since the regulations on digital products are not properly implemented in most developing countries.

There is no accurate information on current internet usage in Sri Lanka. According to the provisional data of the Telecommunications Regulatory Commission of Sri Lanka (TRCS), there were over 150 000 e-mail and internet subscribers in Sri Lanka in 2007, with an increase in the usage during the last few years (85 500 in 2003, 93 444 in 2004, 115 000 in 2005, 130 000 in 2006 and 150 000 in 2007) (Lanka, 2008). However, data from other sources reveal that there are over 700 700 internet users in Sri Lanka (Internet World Stats, 2008). Internet penetration in Sri Lanka is 3.7%, which is a low value compared to other developing countries in Asia such as China (15.8%), India (5.2%) and the Philippines (15.4%) (Internet World Stats, 2008).

The retrieval of health information is the third most popular activity online in certain other countries (Akerkar and Bichile, 2004). It is not unreasonable to assume that the same is true for Sri Lanka. The literacy rate is higher in Sri Lanka compared to other low-income countries (World, 2008). Therefore, the use of the internet in Sri Lanka as a health education tool is more likely if the adequate infrastructure is provided. Even though there are millions of health-related websites on the internet, websites targeting Sri Lanka would mainly attract Sri Lankan users since these websites mainly carry contents that are specifically relevant to Sri Lanka. The aim of this study is to investigate the usage of websites as a health educational medium in Sri Lanka.

2 Methods

A collection of webpages can be considered a website. We used our own working definition for a 'health website related to Sri Lanka'. All web pages under a certain domain name which is devoted to Sri Lankan health or more than three closely linked web pages collectively devoted to Sri Lankan health under one or more domain names were considered as a health website related to Sri Lanka.

Google¹ and Yahoo² were used to search for websites, as these are the two currently leading search engines (Burns, 2008). The keywords used in both search engines were 'Sri Lanka health', 'Sri Lanka medicine', 'Sri Lanka drug' and 'Sri Lanka treatment'. We did not use the two native languages, Sinhala and Tamil, since the search engines did not allow us to use those two languages at the time of data collection. All the websites fulfilling the working definition were included in the study. Sponsored listings were excluded. All the listed websites and websites linked up to the second level were browsed and the websites which fulfilled the working definition were included in the study. The selection of websites was done from 5 February 2007 to 20 February 2007. Data collection from the websites was done from 1 March 2007 to 30 April 2007. Quantitative and qualitative data were collected from the websites by two medical professionals who assessed each website independently. They have independently assigned a score (see Section 2.1) for each website. If there was a discrepancy between the two scores, they assessed the website again and came to an agreed value for that website.

2.1 Quantitative data

Certain aspects of the websites which might directly contribute to the quality of its content and educational aspect were assessed as quantitative data. The size, ownership, profit/nonprofit nature and language used were assessed. The content was assessed under three categories: the major content: secondary leading content and tertiary leading content. As there were several duplicated Sri Lankan health websites, we examined whether there are two or more websites with the same or similar content. The period of existence of the website was assessed using the search function in www.archive.org (Ryan and Smith, 2003). The ages of the international domain names were investigated by searching the domain name registrant data. Both methods were used to assess the age of the website and an average was taken if both were available.

2.2 Qualitative data

Several aspects were assessed to detect the quality of a website. A 'quality score' was developed using objective and subjective assessments.

2.2.1 Objective assessment

An instrument based on the HON Code was used to assess the quality of Sri Lankan health websites (Boyer and Geissbuhler, 2005; Boyer *et al.*, 1998). Whether the website contained the following information was assessed whenever relevant:

- names of the authors
- qualifications of the authors
- a disclaimer that the information provided in the website will not replace the doctor-patient relationship
- citation of the sources of published health information
- accessibility of the editor/webmaster by e-mail or other means
- advertising is clearly distinguished from editorial/main content
- financial disclosure by showing the funding sources
- information to back up the claims relating to benefits and performance
- privacy policy about the confidentiality of personal data
- HON Code logo in the site (the logo can only be placed on a website which is accredited by the HON Foundation (Boyer and Geissbuhler, 2005; Boyer *et al.*, 1998)).

2.2.2 Subjective assessment

The general quality of the website as perceived by two medical doctors (two authors) was assessed separately with three aspects:

- 1 accuracy of the content
- 2 scope
- 3 design.

Accuracy and scope were assessed by considering mainly the medical aspect of the website. When assessing the design of the website, the navigation structure, the presence of a sitemap, simplicity, readability and clearness were considered. Each aspect was given a value from 1 to 5 (1 being the lowest and 5 being the highest) after the assessment.

2.2.3 Up-to-date information

The indicated date of the website's last update was recorded if it was available and the time span from the last update to February 2007 was calculated.

3 Data analysis

3.1 Quality score

The quality score was calculated using the information gathered from the objective and subjective assessments stated above. Each component of the objective assessment was given marks from 0–20, as described below:

Positive – 20 marks

Partly positive – 15 marks

Not relevant – 10 marks

Negative – 0 marks.

For example, when evaluating a website for the eighth criteria (Information to back up the claims relating to benefits and performance), the website should provide references or other information to back up each claim. The possible point allocations are as follows:

References or other information are available for all claims – 20

References or other information are available for only some claims – 15

No claims are included in the website – 10

No references or other information are available for any claim – 0.

The points were allocated to all ten criteria used in the objective assessment according to the example above.

On the scheme of subjective assessment, the accuracy of the content, scope and design of each website was graded from 1 to 5 (maximum of 15 for the three aspects). To increase the relative weight of the subjective assessment in relation to the objective assessment, the value was multiplied by two. As an example, one website received a grade of 3 for the accuracy of content, a grade of 2 for scope and a grade of 2 for design. That website received $(3 + 2 + 2 = 7$ and $7 \times 2)$ a score of 14 for the subjective assessment. The score for the objective and subjective assessments were added to obtain the quality score. The point allocation system and quality score were designed by the authors.

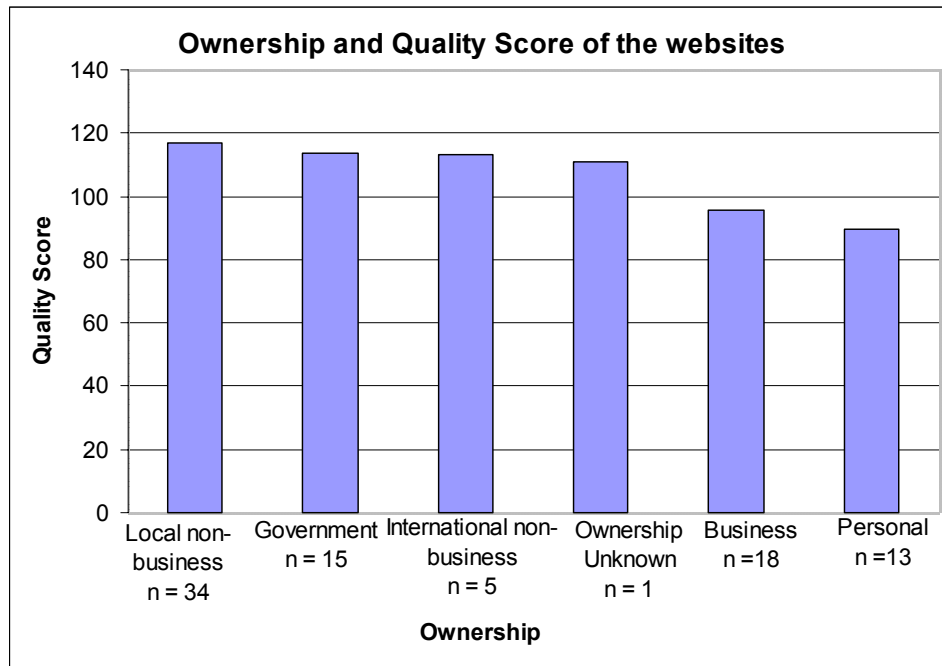
4 Results

A total of 98 websites conformed to our working definition. Data were collected from 86 websites which were online during the period of data collection. The remainder were either continuously offline, the domain name was directed to another website or the Universal Resource Location (URL) was replaced with another website when we tried to collect data from them.

Eight websites contained 3 to 5 pages, 36 websites contained 6 to 20 pages, 39 websites contained 21 to 100 pages and only 3 websites contained more than 100 pages. None of them contained more than 300 pages. The mean quality scores of the websites with 3–5 pages, 6–20 pages, 21–100 pages and >100 pages were 126.8 ± 9.7 , 116.3 ± 22.7 , 116.9 ± 20.0 and 115.3 ± 5.7 , respectively. Local nonbusiness organisations were the single major owners of Sri Lankan health websites (Figure 1). There were 20 websites selling products or services, while 53 websites were nonprofit websites (Table 1). Only 8.1% and 24.4% of the websites provided health education information for the general public as the main content or secondary main content, respectively (Table 2).

A total of 80 websites (93%) were published only in English. Only three websites published information in Sinhalese, Tamil and English and one website contained data in Sinhalese and English. Two websites were published in English as well as in another European language.

Figure 1 The distribution of the ownership and mean quality score of each category (see online version for colours)



Notes: The mean quality scores of local nonbusiness organisation-owned websites and government/multinational organisation-owned websites were significantly higher over that of individual/personal websites and business organisation-owned websites ($p < 0.005$, one-way ANOVA followed by Bonferroni *post hoc* test).

Table 1 The quality score of the websites and their profit/nonprofit nature (n = 86)

<i>Profit/Nonprofit nature</i>	<i>Number of sites</i>	<i>Quality score</i>
Nonprofit	53 (61.6%)	123.3* (SD 13.9)
Selling product/service	20 (23.2%)	102.9 (SD 27.5)
Advertisement but no sales	13 (15.1%)	116.7 (SD 18.6)

Notes: The number of profit and nonprofit websites and their mean quality score are shown. The mean quality score was significantly higher in nonprofit websites over websites selling products or services (* $p < 0.005$, one-way ANOVA followed by Bonferroni *post hoc* test).

Table 2 The content in Sri Lankan health websites (n = 86)

<i>Content type</i>	<i>Major content</i>	<i>Secondary leading content</i>	<i>Tertiary leading content</i>
Information for health professionals	26 (30.2%)	7 (8.1%)	3 (3.5%)
General information about an organisation	26 (30.2%)	22 (25.6%)	8 (9.3%)
Western medical treatment – product and service	7 (8.1%)	0	0 %
Health education content for public	7 (8.1%)	21 (24.4%)	5 (5.8%)
Health infrastructure development	7 (8.1%)	5 (5.8%)	2 (2.3%)
Ayurveda service	9 (10.5%)	0%	0%
Ayurveda product	1 (1.2%)	1 (1.2%)	0%
General information about Ayurveda	3 (3.5%)	1 (1.2%)	0%
Alternative medicine (other than Ayurveda)	0	0	2 (2.3%)
Not applicable	0	29 (33.7%)	66 (76.7%)

Notes: Different types of content, the number of websites in category and the percentage of websites for each content type are shown as major content, secondary leading and tertiary leading content. When there is no other content other than the major content or secondary leading content, it is indicated as 'not applicable'.

We found information regarding the age of 70 websites out of 86 (Table 3). We could find the addresses of 32 domain name registrants. Out of them, 25 were Sri Lankan addresses and 7 were non-Sri Lankan addresses. Approximately 58 websites could be recognised as of Sri Lankan origin and 28 were either of non-Sri Lankan origin or their identity could not be established. The domain name was considered as of Sri Lankan origin if the website has a .lk domain name or an international domain name with a Sri Lankan registrant address associated with the domain name. The mean quality score was 117.5 ± 17.9 and 117.6 ± 24.7 for 'Sri Lankan origin' and 'non-Sri Lankan origin' websites, respectively. The information on the last update was found only in 28 websites. The mean last update was 41.3 (standard deviation of 29.8) months ago. Two websites were last updated over seven years ago.

Table 3 The quality score of the websites and age of the websites (n = 86)

<i>Age category/Months</i>	<i>Number of sites</i>	<i>Quality score</i>
0 to 20	20 (23.2%)	113.2 (SD 21.2)
21 to 40	13 (15.1%)	117.9 (SD 9.3)
41 to 60	19 (22.0%)	117.2 (SD 22.5)
Over 61	18 (20.9%)	114.5 (SD 25.8)
Not available	16 (18.6%)	126.6 (SD 13.7)

Notes: Different age categories, the number of websites, the percentage of websites for each category and the mean quality score for each category are shown. There is no significant difference in the mean quality score.

The quality score was higher in the websites owned by local nonbusiness organisations compared to the websites owned by business organisations. The quality score was also higher in the websites owned by nonprofit organisations compared to the websites owned by profit organisations. The quality score does not show significant differences depending on the major content, origin, age or size of the website. All websites, except one, allowed access free of charge. There were ten duplicate websites.

5 Discussion

There were over 10 000 health-related websites in 1999 (Bovi, 2003) and it has increased to over 100 000 in 2003 (Ryan and Smith, 2003). The total number of health-related websites on the internet could be even higher than when we collected these data in 2007. A relatively small number of Sri Lankan health websites were online compared to the total number of estimated health websites and country-specific websites for some other countries (Di Giacomo and Maceratini, 2002; Prachusilpa *et al.*, 2006).

Out of 98 websites, data were collected only from 86 websites which were online when we collected data. Twelve websites were either continuously offline or replaced with another website or content after four to eight weeks. This shows that some websites were not stable. McMillan reported that 27.1% of websites disappeared after three years in a random sample of health-related websites (McMillan, 2001). In a study about a group of websites which were claiming herbal remedy, it was reported that 59% of the websites could not be found approximately three years later (Veronin, 2002). In a study about child health websites, Hernández-Borges *et al.* (2005) reported the transitory disappearance of 13% of the websites in five years. Compared to those studies, a 12.2% disappearance within two months in the current study is a higher rate. This higher disappearance rate is probably a sign of poor quality, since it was suggested in a previous study that poor quality sites are more likely to disappear in time than sites of higher quality (Veronin, 2002).

Approximately 83 out of 86 websites contained less than 100 pages. The literature survey did not reveal studies that describe the number of pages in health websites related to other countries or specific themes. When we used the same keywords used in this study with 'UK' and 'USA' instead of 'Sri Lanka', over 90% of the websites in the first 100 results in Google had over 100 Google-indexed pages. This suggests that the popular websites related to those two countries are larger than most Sri Lankan health websites. In addition to the lesser number, the size of the Sri Lankan websites is smaller. Therefore, the contents of the websites were limited, probably indicating the underdeveloped nature of the internet as a mode of dissemination of health information in Sri Lanka.

Only 8.1% of the websites in the current study carry its main content to educate the general public. It shows that the internet is not used widely to deliver health information to the general public in Sri Lanka. It can be due to the low internet usage in the country, the language barrier and the availability of thousands of non-Sri Lankan health websites on the web. Demand for web-based health information can be low due to the free healthcare system and the easy access to the health personnel in Sri Lanka compared to some other countries.

There is clear evidence of an increase in the internet usage in Sri Lanka (Lanka, 2008). The approximate launch date of a website can be estimated from the age of the website. Considering the launch dates, it appears that new websites are not being added at

a rate comparable with the growth of internet usage in Sri Lanka. This is additional evidence of the underutilisation of the internet to deliver health information in Sri Lanka. Considering the language used in the websites, 93% of the websites were in English and only three websites (3.6%) provided information in all the three languages used in Sri Lanka: Sinhala, Tamil and English. Although a vast majority of websites were in English, the English literacy rate of the main ethnic groups in Sri Lanka, Sinhalese, Sri Lankan Tamil and Indian Tamil, are 16.2%, 24.1% and 11.0%, respectively (TDoCSS, 2008). Therefore, most of these websites are not aimed at the majority of the Sri Lankans who cannot understand English. This provides further evidence of the underutilisation of the web for disseminating health information in Sri Lanka.

Ten duplicate websites were found in this study. Certain organisations have two or more websites. If one organisation has more than one website, the general public would be misled or confused. The user cannot decide on which website provides relevant and accurate information, reducing the reliability of the information provided by the website. A total of 58 websites were of Sri Lankan origin, which indicated that the majority of the websites were either controlled by a Sri Lankan or somebody from Sri Lanka. This shows that most websites can be controlled or governed by the Sri Lankan legal system if required, as in some other countries (MHRA, 2008).

The quality score is derived from a combination of objective and subjective assessments. There are several important components which are not included in the HON Code-based objective assessment in assessing the quality of a website. We used some of them in the subjective assessment process in the current study. Three subjective criteria used in this study were recognised by the HON Foundation and used in previous studies to assess the quality of a health website (Gattoni and Sicola, 2005; Berland *et al.*, 2001; Hii.org, 2008). The quality of the websites owned by nonbusiness organisations were shown to be higher than those owned by business organisations in the current study as well as in earlier studies (Liu and Liu, 2006; Cheung *et al.*, 2006; Lewiecki *et al.*, 2006; Hanif *et al.*, 2007; Hanif *et al.*, 2006). Regarding the ownership of the website, local nonbusiness organisations owned more websites and most of them were medical professional associations. It is a good sign that a considerable number of Sri Lankan websites belong to nonbusiness organisations over business organisations. Several previous studies also reported that the number of websites belonging to non-profitable organisations were higher compared to the number belonging to business organisations on websites related to scoliosis, postmenopausal osteoporosis treatment, attention deficit hyperactivity disorder and liver transplantation (Hanif *et al.*, 2006; Mathur *et al.*, 2005; Perez-Lopez and Perez Roncero, 2006; Akram *et al.*, 2008). Professional associations have a good control over the content in their websites and tend to have more social responsibility. The main concern of these business organisations is probably the promotion of profitable activities. Their websites are devoted to serving that purpose and pay less attention to the quality.

The quality score of a website does not depend on the age or origin of the website. The popular health website accreditation organisation, the HON Foundation, was found only in one website out of 86 websites. This is a lower rate compared to similar studies. Di Giacomo and Maceratini (2002) examined 2627 Italian health websites and found 46 website with the HON Code, Gunasekera *et al.* (2008) studied 21 websites related to glaucoma and found one website with the HON Code and Bedell *et al.* (2004) studied 47 website related to diabetes and found one website with the HON Code. Another

indicator of the quality of a website is the frequency of content updates. To assess this, the indicated last updated date was recorded. However, we found information on the last update only in 28 websites. Therefore, we did not use this information in calculating the quality score. We found that the mean last update was 41.3 months ago and there were websites which were not updated for seven years. It was clear that a considerable number of websites carried old content. Some of these health websites seemed to be abandoned websites.

6 Conclusion

This study shows that there are few Sri Lankan health websites available on the internet and which are small in size. They are mainly aimed at healthcare professionals, while only few websites provide health educational content for the general public. Generally, the internet is an underutilised health education medium despite the growth of internet usage in Sri Lanka. The improvement of information technology and the related infrastructure in developing countries might help improve the health status of the people using this technology as a health education tool.

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Notes

- 1 www.google.com
- 2 www.yahoo.com