

THE QUALITY OF INFLUENZA-RELATED ROMANIAN WEBSITES – ARE THEY ANY BETTER THAN SEVEN YEARS AGO?

Septimiu Daniel POPESCU

Department of Radiology and Imaging,
Emergency County Hospital Tîrgu Mureş, Romania

Alex Otniel POPESCU

University of Medicine and Pharmacy Tîrgu Mureş, Romania

Mihaela DANILA

Cardiovascular and Transplant Emergency Institute Tîrgu Mureş, Romania

Rareş PAROIU

University of Medicine and Pharmacy Tîrgu Mureş, Romania

Septimiu VOIDAZAN

Department of Preventive Medicine and Epidemiology,
University of Medicine and Pharmacy Tîrgu Mureş, Romania

Valentin NADAŞAN¹

Department of Hygiene, University of Medicine and Pharmacy Tîrgu Mureş, Romania

E-mail: valentin.nadasan@umftgm.ro

Abstract

The proportion of people browsing the Internet for health-related purposes keeps growing and the quality of information users find may have a profound impact on the outcome of their medical decisions. The goal of this study was to observe changes in the quality of the Romanian language influenza-related websites for the general public over a period of seven years. The 2011, baseline sample and the 2018, follow-up sample, included 20 websites each, selected from Google's search results pages using "gripa" (influenza, in Romanian) as a search term. Two independent evaluators followed a common set of detailed instructions and rated the websites for credibility, completeness, and accuracy on a numeric scale going from 0 to 10 points. A number of 16 (80%) of the websites in the baseline sample remained accessible in 2018 but most of them had a major decline in their Google ranking (> 100 positions down). The baseline sample had a mean credibility score of 3.9 points (SD 2.2), a mean completeness scores of 5.8 points (SD 2.8), and a mean accuracy score of 7.5 points (SD 1.2). The follow-up sample had a mean credibility score of 4.1 points (SD 2.6), a mean completeness score of 6.4 points (SD 1.8), and a mean accuracy score of 6.0 points (SD 0.9). Timewise comparison tests detected no change in credibility scores ($p>0.05$), and completeness scores ($p>0.05$). Accuracy scores recorded a statistically significant drop ($p<0.0001$), but considering that the mean difference between the 2011 and 2018 accuracy scores was only 1.5 points, the practical implications of this finding should be interpreted with caution. However, observing these low quality scores and no improvement over such a long period of time, should be a reason for concern for public health professionals. In corroboration with the results of other similar studies, the observed lack of improvement in online health-related information quality should prompt the implementation of interventions aiming to improve the quality of sources used by online health-seekers.

Key words: flu, flu vaccine, health education, health-related information quality, consumer health

Introduction

The Internet has become a major source of information for general public. The proportion of people browsing the Internet for health-related purposes keeps growing (Statista.com, 2014; Fox *et al.*, 2013; Andreassen *et al.*, 2007). The quality of health information for users may have a profound impact on the outcome of their medical decisions, especially on those related to influenza or other pandemic health problems (Nadaşan, 2016; Covolo *et al.*, 2013; Gesualdo *et al.*, 2010; Eysenbach *et al.*, 2002). The quality of Romanian websites containing influenza-related information was first assessed in 2011 in a cross-sectional study (Nadaşan *et al.*, 2011). The present research is the continuation of the previous one. The main goal of this study was to observe the changes in the quality of the Romanian language influenza-related websites for the general public over a period of seven years (2011-2018). The study also verified if the sites that are compliant with credibility criteria (HON; DISCERN; eEurope, 2002) have higher quality content and if there were any significant changes regarding the quality of influenza main chapters over time.

Material and Methods

The research was designed as an observational longitudinal study. Both, baseline (2011) and follow-up (2018) samples included the first 20 Google Romanian websites containing influenza information for the general public. Google searches were performed using "gripa" (meaning "influenza" in Romanian language) as search-term in 2011 and 2018, respectively. Data acquisition and evaluation were first performed in 2011, and then, at follow-up, in 2018. Two independent assessors evaluated the credibility (HON; DISCERN; eEurope, 2002) of the websites and the completeness and accuracy of the websites' content (Nadaşan, 2018). Credibility, completeness and accuracy decimal scores were calculated for both samples. Mean completeness and accuracy scores were also calculated separately for each chapter of the topic (Definition, Causes and Epidemiology; Symptoms and Complications; Treatment; Prevention). The procedures and calculation methodology are presented in detail in previously published studies (Nadaşan *et al.*, 2018; Nadaşan *et al.*, 2016).

Descriptive statistics and mean quality scores were calculated for each sample. The agreement between evaluators was assessed using Cohen's kappa test. Kolmogorov-Smirnov test was used to check the normality of the samples; t-test for independent samples and Mann-Whitney test were used as comparison tests. All statistical analyses were performed in SPSS v. 22. The cut-off value for statistical significance was set at $\alpha = 0.05$.

Results

From the whole sample of 2011 evaluated sites, 16 (80%) were accessible and 4 (20%) were inaccessible in 2018. Moreover, only 6 sites from the 2011 sample remained in the first 100 results of google search in 2018 (2 sites in the first 10 google search results), and only three websites were present in both samples (2011 and 2018).

The mean credibility and quality scores of the websites at baseline and follow-up are presented in Table 1. The compliance with credibility criteria is presented in Table 2. Results of comparing influenza chapters completeness and accuracy mean scores are reported in Table 3.

Table 1. Comparison of mean credibility, completeness and accuracy scores of the two samples

Scores	2011 sample (mean ± SD)	2018 sample (mean ± SD)	p value
Credibility	3.9 ± 2.2	4.1 ± 2.6	0.819
Completeness	5.8 ± 2.8	6.4 ± 1.8	0.6072
Accuracy	7.5 ± 1.2	6.0 ± 0.9	< 0.001

Table 2. Compliance to credibility criteria – comparison between the 2011 and 2018 samples

Credibility criteria	Compliance 2011 (%)	Compliance 2018 (%)	Change (%)
Quality procedure statement	30	44	+14
Displaying date of last update	15	20	+5
Displaying publication date	25	32	+7
Referencing sources	0	36	+36
Authorship disclosure	5	40	+35
Providing contact mechanism	90	44	-46
Confidentiality statement	65	36	-29
Disclosure of commercial interest	20	16	-4
Disclosure of funding	20	0	-20
Consultation disclaimer	50	20	-30
Mission statement	65	28	-37
Owner name and address	85	76	-9

Table 3. Quality scores of influenza chapters – comparison between 2011 and 2018 samples

Chapters	Completeness scores			Accuracy scores		
	2011 sample (Mean ± SD)	2018 sample (Mean ± SD)	p value	2011 sample (Mean ± SD)	2018 sample (Mean ± SD)	p value
Definition, Causes and Epidemiology	5.7 ± 3.5	7.1 ± 2.3	0.26	4.5 ± 3.5	4.3 ± 1.9	0.87
Symptoms and complications	6.0 ± 3.4	6.2 ± 2.3	0.79	4.8 ± 3.2	3.9 ± 1.8	0.27
Treatment	5.3 ± 3.0	6.0 ± 2.3	0.42	3.9 ± 2.3	5.9 ± 1.2	<0.01
Prevention	6.1 ± 3.4	6.1 ± 2.1	0.67	5.0 ± 3.4	5.8 ± 1.0	0.79

Discussions

Regarding the evolution of the influenza-related information on Romanian Internet in time, even if 80% were still accessible after 7 years, only two of these were found in the first ten Google results and only three sites are present in both samples (2011 and 2018). The matter of concern is not the almost total modification of Google results in time, but the

credibility and quality of the present influenza-related information on the Romanian cyberspace.

Regarding the credibility of the evaluated websites there was no statistical significance between the scores of the two samples. Looking at each credibility criteria, websites from 2018 were found to be more compliant to some particular criteria than those from 2011; the best improvement was found in referencing the sources (36% improvement) and Authorship disclosure (35% improvement). In practical terms, regarding the credibility of the websites, nowadays users search influenza-related information on sites with the same credibility like 7 years ago. Because websites improved some credibility criteria over time, we can say that today the average users can follow the references and authors of the online Romanian information, which can widen a little bit their horizon regarding influenza. As far as the credibility of the sites, similar results were obtained in a 5-year longitudinal study about breast cancer-related information on the Romanian websites (Nadaşan *et al.*, 2018).

Comparing the mean completeness scores of the two samples we found no statistical difference. Statistical significance was found when comparing the accuracy scores of the two samples. The influenza-related information on the Romanian websites declined significantly in terms of accuracy over a period of 7 years.

We also found no statistical significance comparing the mean quality scores on influenza chapters information, except the chapter about treatment ($p < 0.01$). With respect to treatment, patients who read about influenza on Romanian websites, seem to be better informed about the vaccines and other adjuvant therapies in 2018 compared to 2011. The practical implication of this isolated improvement should be interpreted with caution since the overall accuracy score has worsened significantly over the same period of time. However, the overall low quality scores coupled with the lack of improvement over such a long period of time should be a matter of concern for the public health professionals.

We searched the Internet for other published researches about online influenza information for users. The published studies used a different methodology than our study and therefore a rigorous comparison is not possible. Nevertheless, one research showed better results than our study, with the conclusion that the majority of the investigated sites gave sufficient information (Covolo *et al.*, 2013) while two other studies presented similar results and concluded that relevant information is not easy to find, nor safe on the majority of the websites (Pehora *et al.*, 2015, Gesualdo *et al.*, 2010). Another Dutch study about the present influenza vaccination information on websites concluded that news media reports tend to be more objective and non-judgmental while social media is more critical with the necessity of flu shot (Lehmann, 2013).

In corroboration with the results of these studies and others on different topics (Nadaşan *et al.*, 2016; Bastos *et al.*, 2014; Nadaşan *et al.*, 2011; Santana *et al.*, 2011; Kunst *et al.*, 2002; Griffiths *et al.*, 2000), the observed lack of improvement in online health-related information quality should prompt the implementation of interventions aiming to improve the quality of sources used by online health-seekers.

Strengths and limitations

To the best of our knowledge this is the first study that evaluated the evolution of influenza-related information for common users on Romanian websites over a 7-year period. The results may help Romanian language health care professionals and users be aware of the lack of quality of online influenza information and the changes appearing on health Internet.

The limitations of the study correspond with those of the ongoing change of the Internet. The replication of the study may lead to different result, because of the continuous modification in Google ranks and websites information. A real limitation of the study is the subjective nature of the evaluators. We tried to minimize the biases using two individual evaluators (medical doctors or medical students) for each website. Another issue that may look like a deficiency of the study is the small number of included sites (20 for each sample), but since most of the Internet users access only the first page of Google results (first 10 results), the large margin of safety we took transformed it in a strength (Granka *et al.*, 2018). As a limitation may also be considered the use of Google as the only search engine in our study, but taking into account that up to 97% of Romanians use Google as their search engine, this decision does not weaken the methodology of this research (Statcounter, 2018). Ultimately, the results cannot be applied to other languages, since the study sample included only Romanian websites.

Conclusions

Overall, the study has shown no improvement in the credibility and completeness of Romanian websites containing influenza-related information, and a decrease in terms of accuracy over a 7-year period.

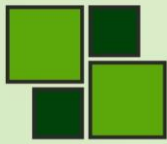
There were some improvements of the evaluated Romanian websites regarding particular credibility standards, with a significant difference with respect to two important criteria: referencing the sources and authorship disclosure.

As far as the content quality, the treatment section of influenza-related information was the only improved chapter on Romanian websites in a 7-year period of time.

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¹ Corresponding author