

## THE CREDIBILITY, COMPLETENESS AND ACCURACY OF INFORMATION ABOUT FIRST AID IN CASE OF CHOKING ON THE ROMANIAN WEBSITES

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**Abstract:** *A large number of studies assessing the quality of medical websites in various languages have shown that the quality of health related information is problematic. Nevertheless, the Romanian medical cyberspace has not yet been systematically evaluated. The goal of our study was to assess the credibility and content quality of information about first aid in case of choking intended for the general population on the Romanian websites. We evaluated a sample of 20 websites selected from the Google's first search results pages. The compliance to the credibility criteria was very low, the coverage of the topic was medium and the accuracy was good but we found frequent omission of important information about the first aid procedure for choking. Websites with high completeness and accuracy scores were rare, therefore, users should check several websites in order to get thoroughly and correctly informed about the topic.*

**Key words:** *First aid, choking, Heimlich maneuver, information quality, Internet*

## Introduction

The use of Internet as a source of health related information has grown continually in the last decade [1]. A large number of studies assessing the quality of English, Spanish and French medical websites have shown that a considerable proportion of them are of poor quality and users are exposed to significant risks by taking wrong decisions about their treatment procedures [2]. Nevertheless, the Romanian medical cyberspace has not yet been systematically evaluated, except for a preliminary study dealing with the general characteristics of the medical websites [3].

The purpose of the present research was to assess the quality of information about first aid instruction for choking on the Romanian websites intended for nonprofessionals. We tried to answer the following questions: (a) What is the degree in which the websites presenting the first aid in case of choking comply with the European credibility criteria? (b) How completely and accurately is the topic covered? (c) Are there any website characteristics associated with poor/high quality information? (d) Is the level of compliance to the European credibility criteria correlated to the quality of the websites' content?

## Data and methods

We included in our sample the first 20 websites listed by Google on the first five results pages [4,5]. We did not use Google's advanced search features but we did limit the search to the Romanian webpages by initiating the search at URL: [www.google.ro](http://www.google.ro). We have used successively the following search terms: "*Manevra Heimlich*" ("Heimlich maneuver"), "*Prim ajutor sufocare*" ("First aid choking"), "*Dezobstrucția căilor respiratorii*" (Airways desobstruction"). The search was done during June-August 2011. We included only those sites that covered the topic in at least 250 words in Romanian language and which targeted the general population. We excluded all sponsored links, discussion forums, infected or unavailable sites and also sites that required registration. If several pages or subdomains belonging to the same top level domain were listed as separate links on the search engine's results page, we examined them as one website.

We classified the websites by their general characteristics (type of ownership, main purpose, genre and medical paradigm) [6,7]. Then, the websites were screened for compliance to a set of 14 quality criteria derived from the eEurope 2002 quality principles [8]. The evaluation included 14 questions along with detailed instructions for the reviewers. (The form is available upon request from the first author). For every criterion that was met, the website was awarded one point. The sum of all points resulted in the eEurope credibility score (eS) of the respective website. Next, the content of each website was checked against a list of expected items that we developed from the first aid guidelines issued by local and international professional organizations. This standard content list was also included in an assessment form along with comprehensive instructions for the evaluators. (This form is also available upon request from the first author). For each standard item covered the website was granted one point, regardless of the accuracy of the information [9]. The total number of items addressed resulted in what we called the absolute completeness score (aCS) of the website. Each item addressed on the site was then rated for accuracy, on a three level scale: totally correct (2 points), mostly correct (1 point), mostly incorrect (0 points) [9,10]. The sum of all points awarded to a site resulted in the absolute accuracy score (aAS). In order to

enable comparison of the results with those of other studies on health topics having different number of items on the standard list, we calculated the relative completeness score (rCS) and, respectively, the relative accuracy score (rAs) as shown below:

$rCS = 10 aCs / mCS$  (where, **mCS** represents the maximum completeness score (identical to the total number of items on the standard list)).

Likewise:

$rAS = 10 aAS/mAS$  (where, **mAS** represents the maximum number of points that a specific site could be awarded supposing all the items addressed were totally accurate (site specific maximum accuracy score). The values of both relative scores could thus vary from a minimum of 0 to a maximum of 10.

We also calculated a risk score (RS) that was measured by counting the total number of items that could pose a health risk for the users, either by omission or by commission [11, 12].

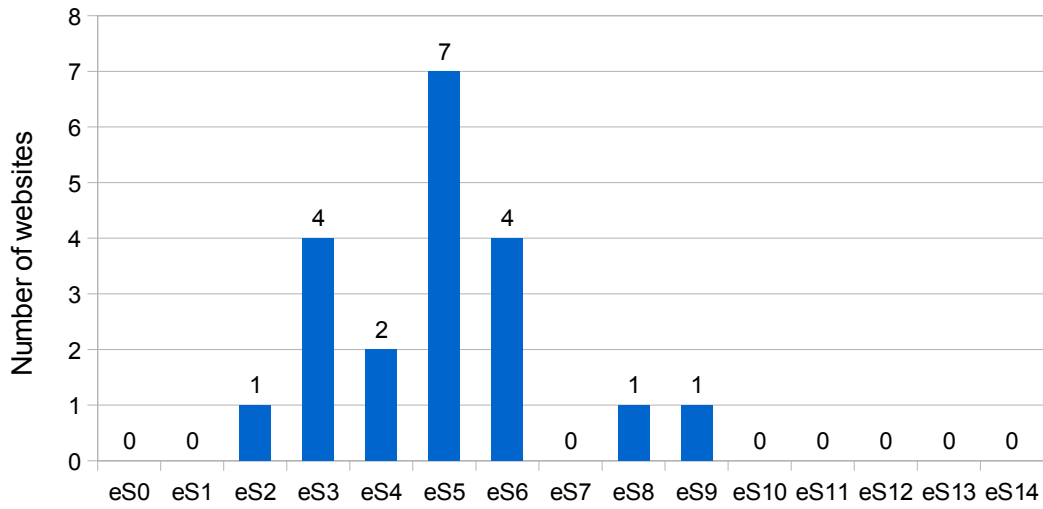
All websites were rated by two independent evaluators who followed the common set of instructions provided in the assessment form. The data were centralized, compared for discrepancies and all disagreements were settled by consensus.

We checked for statistical differences between the quality scores of the websites classified by their general characteristics with the nonparametric Mann-Whitney (U) test or Kruskal-Wallis test (.05 level of significance)[13], and also the correlation between the eEurope credibility score and content quality scores with Spearman rank correlation test [14]. All statistical analyses were carried out using Graphpad InStat Demo 3.06.

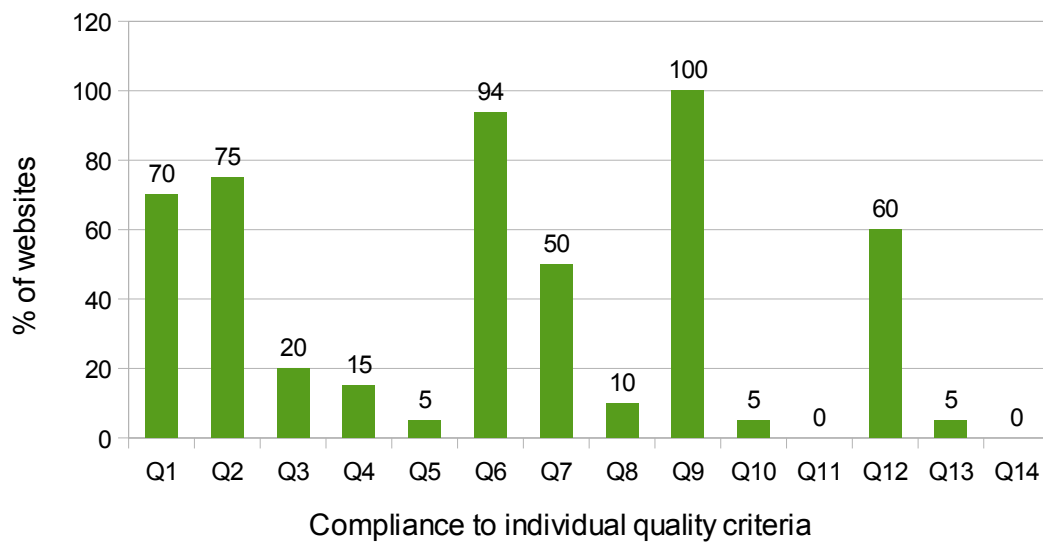
## **Results**

Regarding the type of ownership, most of the websites (12 out 20) were owned by commercial companies, four were owned by a foundation, a private medical institution, a state medical institution and an individual, respectively, and four more had unidentified owners. As far as the main purpose most of the websites (18 out of 20) were educational and two commercial. As far as the genre of the site, the sample included: one blog, one forum, one topical website, three general webportals, three company presentation websites, five medical webportals, and six online magazines/journals. Finely, taking in consideration the medical paradigm, we identified three complementary and alternative medicine websites and seventeen conventional medicine websites.

The average eEurope credibility score (eS) was 4.90 (SD 1.71). The distribution of the credibility scores across the 20 websites is represented in figure 1. The percentage of sites complying to each individual eEurope 2002 credibility criteria is shown in figure 2.

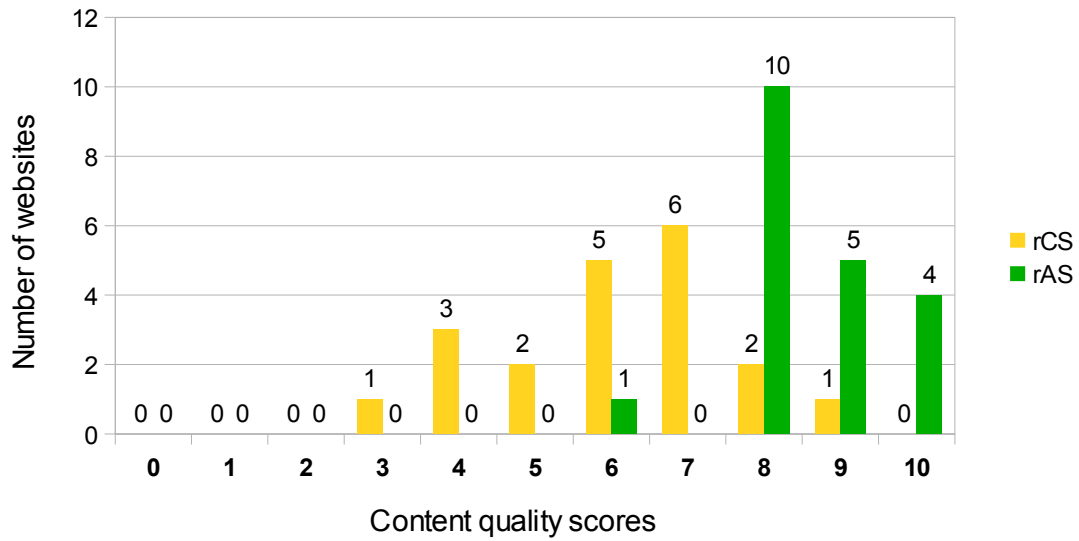


**Figure 1.** Distribution of eEurope 2002 credibility scores (eS)



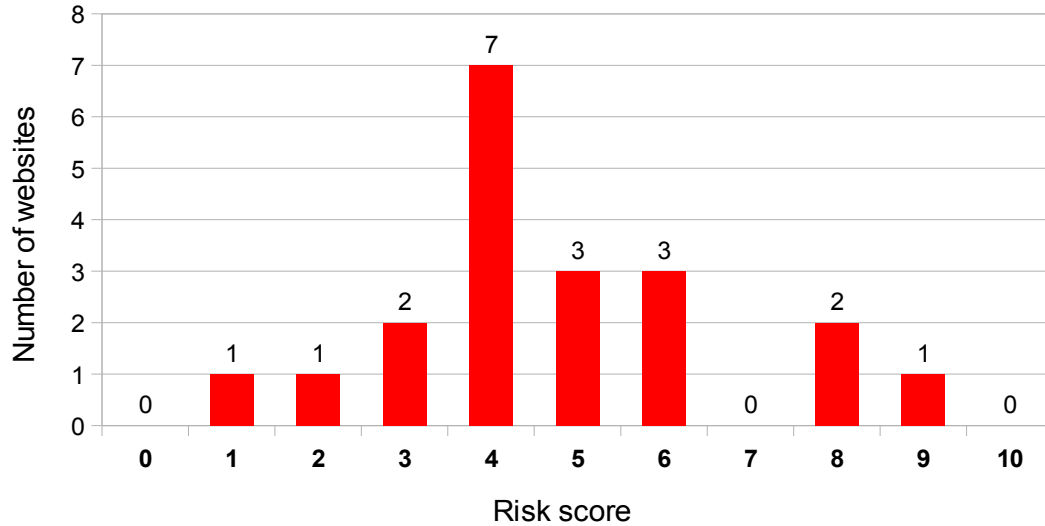
**Figure 2.** Compliance to individual eEurope 2002 quality criteria

The average relative completeness score (rCS) of the sample was 6.10 (SD 1.55) and the average accuracy score (rAS) was 8.56 (SD 0.99). The distribution of the rCS and rAS among the 20 websites evaluated for information on first aid in case of choking is represented in figure 3.



**Figure 3.** Distribution of relative completeness scores (rCS) and relative accuracy scores (rAC)

The average risk score (RS) of the websites was 4.75 (SD 2.00). The distribution of the RS among the examined websites is represented in figure 4.



**Figure 4.** Distribution of the risk scores (RS)

The P values found after checking the statistical differences between the eEurope 2002 compliance scores, completeness, accuracy and risk scores of the websites classified according to their general characteristics, are shown in table 1.

**Table 1.** The P values for differences between the scores of the sites classified according to their general characteristics

Variables		Test	P value	Interpretation
<b>Ownership*</b>	eS	Kruskal-Wallis	0.0581	Not significant
	rCS	Kruskal-Wallis	0.3032	Not significant
	rAS	Kruskal-Wallis	0.6570	Not significant
	RS	Kruskal-Wallis	0.5756	Not significant
<b>Purpose</b>	eS	Mann-Whitney	0.4479	Not significant
	rCS	Mann-Whitney	0.7527	Not significant
	rAS	Mann-Whitney	0.6570	Not significant
	RS	Mann-Whitney	0.6570	Not significant
<b>Genre*</b>	eS	Kruskal-Wallis	0.0145	Significant
	rCS	Kruskal-Wallis	0.8901	Not significant
	rAS	Kruskal-Wallis	0.6158	Not significant
	RS	Kruskal-Wallis	0.3307	Not significant
<b>Medical paradigm</b>	eS	Mann-Whitney	0.5584	Not significant
	rCS	Mann-Whitney	0.3958	Not significant
	rAS	Mann-Whitney	0.6684	Not significant
	RS	Mann-Whitney	0.9999	Not significant

eS = eEurope credibility score      rCS = relative completeness score

rAS = relative accuracy score      RS = risk score

\* Some of the original categories were merged to meet testing conditions.

The Spearman "r" statistics and the corresponding P values found after checking for correlations between the eEurope credibility scores and the content quality scores are presented in table 2.

**Table 2.** Spearman statistics for correlations between credibility and content quality scores

Variables	r*	P value	Interpretation
eS      rCS	0.3081	0.1863	Weak positive correlation; P value considered not significant.
eS      rAS	-0.2465	0.2947	Very weak or no correlation; P value considered not significant.
eS      RS	-0.1240	0.6026	Very weak or no correlation; P value considered not significant.

\* r values were corrected for ties

## Discussions

To the best of our knowledge this is the first study assessing the quality of information about first aid instructions in case of choking on the Romanian websites intended for non-professionals.

The average credibility score (4.90 out of 14) suggests that the overall compliance of the Romanian websites addressing the topic under evaluation to the European quality criteria is very low. Of all the website categories, we found that only medical portals seem to have a significantly higher compliance score compared to the other genre of websites with health related information. The compliance to the eEurope credibility criteria varies greatly from one criterion to the other. Providing a feedback form and differentiating the advertising from editorial content have the highest rate of compliance (100% and 94% respectively). Other criteria with fairly good compliance are the statement of purpose (75%) and the disclosure of ownership (70%). At the opposite end, several important criteria have low or

very low compliance levels: disclosure of sponsorship (15%), financial interest (5%), authors name and credentials (5%), providing the date of the last update (5%), references (0%), and editorial review policy (0%). Compared to the data reported by Eysenbach et al. in one of the most comprehensive systematic reviews, the Romanian medical websites seem to have a higher level of compliance to the following credibility criteria: statement of purpose (75% vs. 48%), disclosure of sponsorship (15% vs. 6%), differentiation of advertisement from editorial content (94% vs. 69%), providing a feedback mechanism (100% vs 86%), and disclosure of the first publication date (60% vs. 17%). On the other hand, the health related websites in our sample seem to have lower level of compliance to some other credibility criteria such as: disclosure of authorship and their credentials (5% vs. 30%), providing references (0% vs. 31%) and disclosure of the editorial policy (0% vs. 13%) [9].

The average relative completeness score (6.10 out of 10) indicates that the Romanian websites coverage of the investigated topic is, at best, medium. Although rigorous comparison of results would be difficult because of some methodological reasons, many of the published papers on the quality of medical information on the English and Spanish websites about a wide range of health topics such as scoliosis[15], cervical disc herniation[16], breast cancer, childhood asthma, depression, obesity[14], cocaine addiction[17], diabetes[18], nutrition[19], arrive to the conclusion that the coverage of these topics is problematic. Eysenbach et al. also note in their review of the literature that „most authors who evaluated content, found significant problems, criticizing lack of completeness” and specifically mention that five of eight studies reviewed, reported that around 90% of the websites were „incomplete” [9].

The accuracy of information about first aid instructions for choking on the Romanian Web seems good if judged by the average relative accuracy score of 8.56. In contrast, most of the published literature about the quality of information on various health or disease related topics in English language shows a low level of accuracy [14-19]. The percentage of inaccurate websites reported by Eysenbach et al in their review varies widely (4-9% among cancer websites up to 45-88% among diet and nutrition websites) [9]. However, the notable methodological heterogeneity of the studies permit only a very loose comparison.

It is important to note that the completeness and accuracy scores as applied in our study must not be interpreted independently because the completeness score was intended to measure exclusively the coverage of the topic and the accuracy score the correctness of information without any reference to completeness. As such, websites with extremely low coverage of the topic, can get high or very high accuracy scores if the information they present, as little as may be, is correct.

Only three of the twenty sites had both high completeness and accuracy scores (rCS and rAS > 8 points). Therefore the probability of finding exhaustive and simultaneously correct information about the topic is rather low unless the users are looking for information on more than one site.

The risk score indicates that omissions of important facts are frequent. Some of the websites fail to warn the users on as many as 7 items of critical importance for the victims of choking. The most notable deficiency is that all the websites except for one, are missing step number one of the first aid procedure in case of choking namely, the delivery of five back blows between the person's shoulder blades with the heel of the hand. Apparently, many websites describing the first aid procedure make extensive use of outdated information promoted by the Heimlich Institute.

None of the correlations between the eEurope credibility score and the content quality scores (rCS, rAS, RS) reached statistical significance, therefore, our study suggests that the credibility criteria are not helpful for the general users in identifying scientifically accurate websites. Our results seem to be in line with the previous reports on this issue [13,20].

The main limitations of the study are those inherent to Internet research. First of all, the extreme dynamics of the cyberspace makes the exact replication of any study virtually impossible. Substituting the search terms could also significantly change the components and structure of the sample and thus the quality scores as well.

The relatively small number of websites included in our sample should not be necessarily regarded as a limitation, because more than one study has revealed that most typical Internet users don't look beyond the links on the first results page of the search engine anyway [4,21].

Although we tried to minimize the subjectivity of the assessment by providing to the evaluators all the elements that could possibly be anticipated, and also by carrying out the examination by two independent evaluators, we assume that results of our assessment suffer in a certain degree because of this factor. The score most likely to be dependent on the evaluators' subjectivity is the risk score and it has to do with those items that cannot be included a priori in the assessment form and are to be identified and judged by the evaluator based on their own medical knowledge.

Our study focused on an important but narrow domain of the Romanian medical cyberspace. In order to get a more comprehensive picture about the quality of health related information on the Romanian Internet, the spectrum of investigation should include the assessment of websites addressing a wide diversity of topics.

## Conclusions

1. The level of compliance of the Romanian websites addressing the topic of first aid in case of choking to the credibility criteria was very low.
2. Overall, the coverage of the topic was medium while the accuracy of the addressed information was good. However, exhaustive and accurate websites about the investigated topic were rare and many websites were characterized by frequent omission of important information.
3. We found no statistically significant correlation between the credibility score and the content quality scores which makes unpractical the attempt to identify accurate websites based on their credibility features.

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