# The Quality of Portuguese Obesity Websites

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## ABSTRACT

*The objective of this study was to evaluate the quality of Portuguese obesity websites. A cross-sectional, quantitative and observational study was designed. The evaluation of 127 sites found using the Google in "Advanced Search" option "pages in Portuguese", country "Portugal" was performed. The quality criteria used in this study resulted from the merger/adaptation from several authors previously published. The information on obesity was evaluated according to the Scottish Intercollegiate Guidelines Network: Management of Obesity, a National Clinical Guideline, 2010. The quality criteria most mentioned in the websites, were the purpose (80.3%) and authority (73.2%). On the other hand, the editorial review (7.9%) and references (15.7%) were mentioned in the narrowest websites. The websites analyzed had a mean quality score of 5.2 points (± 2.1) out of 11. A significant correlation was found between the score of information on obesity and quality score for adults group (0.282) and both ages group (0.437). In Portugal, the websites that provide information on obesity had, generally, a low quality score.*

*Keywords:* *Internet, Nutrition, Obesity, Portugal, Website Quality*

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## INTRODUCTION

The main objective of this study was to evaluate the quality of Portuguese obesity websites. A cross-sectional, quantitative and observational study was designed to fulfill this objective.

The evaluation of 127 sites founded using the Google in "Advanced Search" option "pages in Portuguese," country "Portugal" was performed. The quality criteria used in this study resulted from the merger/adaptation from several authors previously published. The information on obesity was evaluated according to the Scottish Intercollegiate Guidelines Network (2010).

Data analysis was performed using the SPSS 19.0. A "quality score" variable was computed from 11 quality criteria, and each of these criteria was studied alone and in a descriptive way. To verify the influence of moderator variables on the quality score, a statistical analysis was performed using nonparametric testes, namely, *Mann-Whitney-Wilcoxon* and *Kruskal-Wallis* tests. Finally, to verify if the accuracy of obesity information score was correlated to the quality score, it was used the *Spearman* test.

This article is structured as follows: introduction, literature review, materials and methods, results, discussion and conclusion.

## LITERATURE REVIEW

The Obesity is the most common form of malnutrition and is the main health problem of the XXI century and the first cause of chronic non-communicable diseases in the world. This results from an imbalance between energy intake and energy expenditure. It is defined as a body mass index (BMI) > 30 kg $m^{-2}$ and that increased BMI is associated with a high risk of cardiovascular disease and diabetes (Kautiainen, Koivusilta, Lintonen, Virtanen & Rimpela, 2005; Manolopoulos, Karpem & Frayn, 2010).

Today, with the rising of obesity rates, the population tends to seek information on features such as web pages which can be proved by the increasing number of websites that provide information on the disease (Silva, Castro & Cymrot, 2008). This source of information is easily accessible and low cost, however, does not guarantee the quality of its content, so it should not be received passively, but critically analyzed considering its qualitative aspects (Silva, Castro & Cymrot, 2008; Costa, Fuchiwaki, Miranda &, Halpern, 2005). As result, it is necessary to use criteria that ensure quality information, in particular information related to health (Carvalho, Simões & Silva, 2005).

Several specialists have presented criteria or filters for quality assessment (Lopes, 2004; Sales & Almeida, 2007). The instruments for this assessment are being defined and must be constantly reassessed and adjusted (Lopes, 2004). Frequently, cited guidelines for evaluating health quality information are: Health on the Net Foundation (HON) and the Health Information Technology Institute (HITI). HON's criteria define a set of rules related to basic principles of ethics used in the presentation of information, namely, authority, complementarity, confidentiality, credit, justification, authorship, sponsorship, publicity. The HITI proposes seven criteria, including credibility, content, presentation of the site, links, design, interactivity and ads (Lopes, 2004; Santos, 2006).

Therefore, the Internet and aspects such quality of information and its influence on the users' health are very important issues and deserve to be studied.

In this context, the objective of this study was to evaluate the quality of Portuguese websites on obesity.

## MATERIALS AND METHODS

A cross-sectional, quantitative and observational study was carried out to evaluate the quality of Portuguese websites on obesity.

A search was conducted using the Google engine (www.google.pt), in "Advanced Search", option "pages in Portuguese", country "Portugal". Keywords used were "obesity and

nutrition", "obesity and food", "obesity and diet" and "obesity and weight loss".

40 websites were selected for each of the keywords, considering the following exclusion criteria: newspapers (except the area of Health), files in ".pdf" format (Adobe Acrobat) or ".doc" (Microsoft Word) that did not address website-specific area other than obesity and those with technical problems access. Thus, the sample integrated all the 127 websites that meet the inclusion criteria after excluding repeated links.

Data collection was conducted over a period of 5 days in March 2011.

A search of several studies was made on assessing the websites quality that used different evaluation tools with different criteria.

The quality criteria used in this study resulted from the merger/adaptation from different sources, namely, Lopes (2004), Sales and Almeida (2007), Powers, March and Evert (2008), and, Silva, Castro and Cymrot (2008).

The quality of each website was evaluated considering the following criteria: 1) author of the text 2) technical training, 3) contact provided, 4) entity responsible for the site; 5) purpose of the site; 6) date of update, 7) references, 8) availability of external links: 9) editorial review process, 10) existence of sponsors; 11) internal search engines. Each criterion was rated at 0 or 1 point according to the absence or presence, respectively. Thus, the variable "quality score" assumed values between 0 and 11.

It was also aimed to assess specific obesity information, such as, definition, etiology, diagnosis, consequences, physical activity, parental involvement and dietary intervention either for prevention and treatment, self-weighting for prevention, psychological treatment, family involvement during treatment, drug treatment, surgical treatment according to the Scottish Intercollegiate Guidelines Network (2010).

Each item was rated as 0 (absent/incorrect/not applicable), 1 (incomplete) or 2 (correct). The score of obesity information showed maximum values according to different target audience. For evaluation of the websites targeted for adults was considered an item (prevention by self-weighting), which was not considered in websites whose target audience were children and young. In the other hand, the information evaluation targeted at children and young assessed two items that were not considered for adults, including prevention by parental involvement and treatment by family involvement, thus registering a maximum score of 24 and 26 for adults and children, respectively. When websites targeted information for both public, all the items were considered. Thus there was a maximum score of 28.

Variables were also collected for websites characterization, namely, author's technical training, target audience, website's responsible entity, website's purpose and last update date.

Data analysis was performed using the statistical software SPSS 19.0 (Statistical Package for Social Sciences).

The variable "quality score" was calculated from 11 independent variables (quality criteria), and each of these criteria was studied alone and in a descriptive way using the calculation of frequencies and percentages.

To check the influence of moderator variables on the dependent variable (quality score), a bivariate analysis was performed (Boushey, Harris, Bruemmer, & Archer, 2008).

The data normality and equal variances between groups were tested using the *Kolmogorov-Smirnov with the Lilliefors' correction* test and *Levene's* test, respectively. It was found that, at least, one of these assumptions has not been verified, so to check the influence of moderator variables in the quality score, were applied the *Mann-Whitney-Wilcoxon* and *Kruskal-Wallis* tests (Fortin, 1999; Jekel, Elmore, & Katz, 2001). Finally, to verify if the accuracy of obesity information score was correlated to the quality score of Portuguese obesity websites, it was used the *Spearman* test, since the data distribution was not Normal (Castro, Andreolli & Sobrinho, 2009).

*Table 1. Websites' characteristics*

| Characteristics | Categories | Percent |
|---|---|---|
| Target | Children and young | 20.5 |
| | Adults | 55.3 |
| | Both age groups | 24.4 |
| Author's technical training | Dietitian/Nutritionist | 11.0 |
| | Other health professional | 8.7 |
| | Multidisciplinary team | 7.9 |
| | Other profession | 4.7 |
| | No profession | 67,7 |
| Website purpose | Educational | 55.9 |
| | Commercial | 18.1 |
| | Other | 6.3 |
| | No purpose | 19.7 |
| Website responsible entity | Society/association | 12.6 |
| | Medical clinics and hospitals | 12.6 |
| | Pharmaceutical companies | 3.1 |
| | Other companies | 26.0 |
| | Private | 18.9 |
| | No Entity | 26.8 |
| Last update date | 2000-2005 | 6.3 |
| | 2006-2011 | 39.4 |
| | No Date | 54.3 |

## RESULTS

Of the 127 websites analyzed, 20.5% targeted children and young, 55.3% adults and 24.4% both age groups.

It was found that 32.3% had authors with technical training from which 11.0% had been written by a Dietitian/Nutritionist, 8.7% by other healthcare professional, 7.9% by multidisciplinary team and 4.7% by other professional.

Regarding the purpose of the website, 55.9% were educational; 18.1% commercial, 6.3% meant other purposes and 19.7% had no purpose.

It was found that 26.8% of websites had no responsible entity, while 12.6% belonged to societies/associations, 12.6% to medical clinics and hospitals, 3.1% to the pharmaceutical industry, 26.0% to other companies and 18.9% to individuals (Table1).

Considering the last update date, it was found that 6.3% of websites had been updated in the period 2000 to 2005, 39.4% in the period 2006 to 2011 and 54.3% of websites showed no update date. (Table1)

Of the 127 websites evaluated, 50.4% identified the text's author. From those, only 32.3% had technical training and 66.1% provided the author's contact. It was found that 73.2% of websites had responsible entity and 80.3% mentioned a purpose. The existence of internal search engines and external links was found in 54.3% and 60.6%, respectively. It was verified that the last update date and references were

mentioned by 45.7% and 15.7%, respectively. Only 7.9% of the texts were subject to editorial review, and 35.4% had a sponsor (Table 2).

The websites quality score varies from a minimum of 1 to a maximum of 11 with an average of 5.2 (± 2.1). About the target audience, it was found that the median quality score, when the websites targeted information for both ages ($\eta = 7$), was statistically, different ($p < 0.05$) to the median of the websites that direct the information to children and young or adults ($\eta = 5$).

The quality score median was, statistically, lower in websites where there was no indication of the author's technical training ($p < 0.001$), in which there was no indication of the purpose ($p < 0.001$); and, there was no indication of last update date ($p < 0.001$). In those websites, whose responsible entity was a society/associa-

*Table 2. Websites quality criteria according to target audience*

| | | | Total | Target Audience | | |
|---|---|---|---|---|---|---|
| | | | | Children and Young | Adults | Both Age Groups |
| Quality Score | Mean<br>Standard Deviation (SD) | | 5.2<br>(2.1) | 5.0<br>(1.6) | 4.9<br>(2.0) | 6.1<br>(2.4) |
| | Median | | 5,0 | 5,0 | 5,0 | 7.0* |
| | Maximum | | 11 | 8 | 9 | 11 |
| | Minimum | | 1 | 2 | 1 | 1 |
| The websites refer to: | Text author | n<br>(%) | 64<br>(50.4) | 13<br>(10.2) | 32<br>(25.2) | 19<br>(15.0) |
| | Technical training | n<br>(%) | 41<br>(32.3) | 6<br>(4.7) | 21<br>(16.5) | 14<br>(11.0) |
| | Author's contact | n<br>(%) | 84<br>(66.1) | 11<br>(8.7) | 49<br>(38.6) | 24<br>(18.9) |
| | Website responsible | n<br>(%) | 93<br>(73.2) | 15<br>(11.8) | 53<br>(41.7) | 25<br>(19.7) |
| | Website's purpose | n<br>(%) | 102<br>(80.3) | 20<br>(15.7) | 55<br>(43.3) | 27<br>(21.3) |
| | Last update's date | n<br>(%) | 58<br>(45.7) | 14<br>(11.0) | 32<br>(25.2) | 12<br>(9.4) |
| | References | n<br>(%) | 20<br>(15.7) | 7<br>(5.5) | 7<br>(5.5) | 6<br>(4.7) |
| | External links | n<br>(%) | 77<br>(60.6) | 18<br>(14.2) | 38<br>(29.9) | 21<br>(16.5) |
| | Editorial review | n<br>(%) | 10<br>(7.9) | 1<br>(0.8) | 6<br>(4.7) | 3<br>(2.4) |
| | Sponsors | n<br>(%) | 45<br>(35.4) | 9<br>(7.1) | 21<br>(16.5) | 15<br>(11.8) |
| | Internal search engines | n<br>(%) | 69<br>(54.3) | 16<br>(12.6) | 30<br>(23.6) | 23<br>(18.1) |

* $p < 0.05$

tion, the quality score was, significantly, higher ($p < 0.05$) (Table 3).

## OBESITY INFORMATION SCORE

The websites whose target audience was children and young people had an obesity information score that vary between a minimum of 0 and a maximum of 17 with a mean of 6.4 (± 4.5). For adults, the obesity information score mean was 3.5 (± 3.4), with a maximum of 15 and a minimum of 0. For both ages, the mean score was 7.8 (± 5.9), with a minimum of 0 and a maximum of 21 (Table 4).

When evaluated each item for obesity information score, it was found that, in the item about the disease's consequences, 33.9% of websites did not report this information and, from those that reported, only 1.6% did so correctly. Regarding physical activity treatment, 82.7% did not address this item and only 2.4% did so correctly (Table 5).

## WEBSITE QUALITY SCORE AND OBESITY INFORMATION SCORE

When studied the correlation between the obesity information score and website quality score, it was found that there was no correlation when the target audience was children and young. On the contrary, significant correlations were found between the obesity information score and website quality score for adults group (0.282) and both ages group (0.437). When analyzed

*Table 3. Moderator variables influence on websites quality*

| Moderator Variables | Categories | Quality Score | |
|---|---|---|---|
| | | Mean (± SD) | Median |
| Author's technical training | Dietitian/Nutritionist | 6.0 (± 1.5) | 6.0 |
| | Other health professional | 6.6 (± 1.6) | 6.0 |
| | Multidisciplinary team | 6.8(± 1.4) | 7.0 |
| | Other profession | 7 .0 (± 3.0) | 7.5 |
| | No profession | 4.6 (± 1.9) | 5.0** |
| Website purpose | Educational | 5.6 (± 1.9) | 6.0 |
| | Commercial | 6.0(± 1.4) | 6.0 |
| | Other | 6.3 (± 1.8) | 6.5 |
| | No purpose | 3.1 (± 1.8) | 3.0** |
| Website responsible entity | Society/association | 7.1 (± 1.8) | 7.0* |
| | Medical clinics and hospitals | 4.3 (± 2.4) | 3.5 |
| | Pharmaceutical Industries | 4.3 (± 1.5) | 5.0 |
| | Other companies | 5.3 (± 2.1) | 6.0 |
| | Private | 5.4 (± 1.9) | 6.0 |
| | No Entity | 4.7 (± 1.7) | 5.0 |
| Last update date | 2000-2005 | 6.1(±1.6) | 6.0 |
| | 2006-2011 | 6.1(±1.6) | 6.0 |
| | No Date | 4.5(±2.1) | 5.0** |

*$p < 0.05$
**$p < 0.001$

*Table 4. Correlation between obesity information score and quality score*

| Target Audience | Score Quality | | Score Obesity Information | | Correlation Coefficient |
|---|---|---|---|---|---|
| | Mean (± SD) | Median | Mean (± SD) | Median | |
| Children and young | 5.0 (±1.6) | 5.0 | 6.4 (± 4.5) | 6.0 | 0.254 |
| Adults | 4.9 (±2.0) | 5.0 | 3.5 (±3.4) | 3.0 | 0.282** |
| Both age groups | 6.1 (±2.4) | 7.0 | 7.8 (±5.9) | 7.0 | 0,437** |

** $p < 0.01$

*Table 5. Obesity information accuracy*

| | Obesity Information | Percent | | | |
|---|---|---|---|---|---|
| | | Absent | Incorrect | Incomplete | Correct |
| Pathophysiology | Definition | 55.9 | 6.3 | 3.9 | 33.9 |
| | Etiology | 47.2 | 5.5 | 5.5 | 41.7 |
| | Classification | 56.7 | 9.4 | 22 | 11.8 |
| | Consequences | 33.9 | 7.1 | 57.5 | 1.6 |
| Prevention | Diet | 63 | 3.9 | 27.6 | 5.5 |
| | Physical activity | 59.8 | 6.3 | 19.7 | 14.2 |
| | Self weight control [1] | 80.3 | 0.8 | 0 | 1.6 |
| | Parental involvement [2] | 25.2 | 0 | 0 | 23.6 |
| Treatment | Diet | 70.9 | 7.9 | 15 | 6.3 |
| | Physical activity | 82.7 | 5.5 | 9.4 | 2.4 |
| | Psychological | 93.7 | 6.3 | 0 | 0 |
| | Family involvement [3] | 49.6 | 0 | 0 | 17.3 |
| | Drug | 91.3 | 3.9 | 0.8 | 3.9 |
| | Surgical | 82.7 | 3.9 | 5.5 | 7.9 |

[1]In 17.3% of cases, this item were not applicable since, according to Scottish Intercollegiate Guidelines Network (2010), it is applicable to adults only.

[2]In 51.2% of cases, this item were applicable since according to Scottish Intercollegiate Guidelines Network (2010), it is applicable to children and young only.

[3]In 33.1% of cases, this item were applicable since according to Scottish Intercollegiate Guidelines Network (2010), it is applicable to children and young only.

the correlation coefficient, there was a positive correlation, that is, as the obesity information score increases, the quality score increases as well (Table 4).

## DISCUSSION

In the sample analyzed, all the websites mentioned target audience contrary to what was observed in the study conducted by Silva, Castro and Cymrot (2010) in which only 19% of websites displayed the target audience. Further, it was observed that the majority of websites targeted information to adults (55.3%), but the websites that direct information to both public (children and adults) had a higher quality score. No studies were found in the literature that addresses the influence of the target audience in the

information quality. Thus, becomes necessary to develop studies in this area.

The references to the author and to his technical background are essential information. In fact, this information allows the evaluation of the author's technical capability to write about a particular subject and allows the contact between author and user. This way, the user can ask questions, make suggestions or request additional information and the author has the opportunity to clarify any doubts. The author's mention, in this study, was about 50.4%, a value higher than that founded by Silva, Castro and Cymrot (2008), which used a sample of websites that provide information about the pharmacological treatment of obesity. However, this percentage is lower than the percentage presented by Harland & Bath (2007) in a study that evaluated websites containing information on multiple sclerosis. These values and those obtained in this study are unsatisfactory since, according to Silva, Castro and Cymrot (2010), for all health information should be confirmed an author.

About technical background of the author, it was found that, most websites that had referred the author, the text was written by a Dietitian/ Nutritionist (11.0%). No studies were found that studied the influence of technical training on the websites quality. So, it is important to promote studies in this area of knowledge. The expected outcome in this study was that, websites that had text written by a Dietitian/ Nutritionist present higher quality. This was not observed. In fact, significant differences were found, only when the technical training was absent. These websites had a quality score, significantly, lower than the others.

In this study, one of the criteria most noticeable was the disclosure of the website responsible entity (73.2%). This result is higher, but consistent, with the study carried out by Silva, Castro and Cymrot (2010) in which 69.0% of websites displayed this criterion. Galvão, Sawada & Mendes (2003) recommend the use of website linked to universities, government agencies and scientific journals.

However, disclosure of the entity responsible for the website, although related to quality of content, it is not, by itself, sufficient to ensure the full credibility of the texts on health, which should have a nominal author (Shon & Musen, 1999).

In the study from Silva, Castro and Cymrot (2010), it was found that only 27.0% of websites had purpose. From these, more than 2/3 had commercial purpose. These results contradict our study. In fact, this criterion was present in 80.3% of websites and, from these, 55.9% and 18.1% had an educational and commercial purpose, respectively. These results contradict the assumption that, on the Internet commercial interests take precedence over the other, as demonstrated in other studies (Black & Penson, 2006; Liu & Liu, 2006; Ipser, Dewing, & Stein, 2007; Silva, Castro & Cymrot, 2010; Evans, Perle & Ndetan, 2011). It was found that when the purpose of the website was absent (19.7%) the quality score was lower and vice-versa. Thus, when the website purpose is not displayed or is not clear, may affect the evaluation of the factors that can interfere with the information disclosed.

On websites that disseminate obesity information, the references citation is essential. This way, according to Silva, Castro and Cymrot (2010), the user has access to the original sources. However, in this study, only 15.7% of the websites refers to any references. This is a very low percentage and similar to that found by Silva, Mello and Mion (2005) in a sample of websites on allergic rhinitis in Brazil (15.6%) as well as that found by Silva, Castro and Cymrot (2010) in a sample of websites on the pharmacological treatment of obesity (17%).

The update date is an essential element for the user to evaluate the information available on the website. In this study, 45.7% of websites had recent updated information. This value is, slightly, higher than that founded by Silva, Mello and Mion (2005) (41%). Such a low percentage puts the responsibility on users to confirm the latest information on other sources, making internet an unreliable resource

for seeking health information (Silva, Castro & Cymrot, 2008; 2010).

The existence of a website internal search engine provides easier navigation and facilitates the interactivity between the user and the author (Evans, Perle & Ndetan, 2011). In this study, this tool was present in 54.3% of the websites.

Only 7.9% of websites had editorial review. However, this result is better than 1% reported by Silva, Castro, & Cymrot (2010). These results are not satisfactory, since the absence of editorial reviewing combined with the commercial motivation, may be responsible for the lower quality registered. The website should, clearly, explain the editorial process by which the content is selected and developed and reviewed (Ullrich & Vaccaro, 2002).

About obesity information, the results were unsatisfactory since the information posted on the websites, when present, were mostly incomplete or incorrect when compared with the Scottish Intercollegiate Guidelines Network (2010).

By studying the correlation between quality score and obesity information score was found a positive correlation when the target audience was children and both groups (children and adults). These results contradict the study from Silva, Castro and Cymrot (2010) in which there was no correlation between the quality and accuracy of information provided on the website.

Owaimrin and Steinbeck (2006) stated that the use of Internet is feasible and effective, not just as a mean of consultation, but as a method for monitoring the weight loss, being a great ally in the treatment of obesity. However, when information about the disease is not accurate or it is incorrect or insufficient, may lead to health consequences on the users.

The poor quality and lack of knowledge may, even, constitute a risk, since users are not able to distinguish correct from incorrect information, which can be considered a public health problem. Against this background of uncertainty and risk, it becomes necessary to adopt strategies to ensure greater safety for the public that search for obesity information on the Internet (Silva, 2009).

## CONCLUSION

This study allows concluding that, in Portugal, the websites that provide obesity information had, generally, a low quality score, which means a lack of care in the preparation of websites on this topic.

Equally, this study permits to conclude that the obesity information quality available on the Portuguese websites must be considered as a concern and be constantly evaluated. These results are consistent with other studies, which showed that the health information presented is incomplete, inaccurate in relation to clinical guidelines and it is not based on evidence. Thus, health professionals must adapt criteria to assess the websites quality and help patients to do a critical analysis of website's health information. Patients must analyze and discuss the Internet information with health professionals, since these have the technical background.

It seems important to continue developing researches on this theme. Comparing qualitative evaluation models of health information on the Internet and including other methodologies, namely, the development of a standardized tool for the evaluation of the websites quality seems to be a future research direction.

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