

## **The Quality of information on Anxiety-related Websites: A systematic review about the most online item searched after Covid-19 Pandemics**

Paola Melis<sup>1</sup> [pirimpola@hotmail.com](mailto:pirimpola@hotmail.com)  
Alessandra Perra<sup>1</sup> [alessandra.perra@unica.it](mailto:alessandra.perra@unica.it)  
Antonio Egidio Nardi<sup>2</sup> [antonioenardi@gmail.com](mailto:antonioenardi@gmail.com)  
Thurayya Zreik<sup>3</sup> [thurayya.zreik@gmail.com](mailto:thurayya.zreik@gmail.com)  
Antonio Preti<sup>4</sup> [antonio.preti@unito.it](mailto:antonio.preti@unito.it)  
Mauro Giovanni Carta<sup>1</sup> [maurogcarta@gmail.com](mailto:maurogcarta@gmail.com)

**Corresponding author:** \*Alessandra Perra, Via Sallustio 36 Monserrato (Cagliari, Italy), +393481444501, [alessandra.perra@unica.it](mailto:alessandra.perra@unica.it)

### **Statements and Declarations:**

Melis P., Perra A., Nardi A.E., Zreik T., Preti A., Carta M.G. declare:

- There are no any relevant conflict of interest at any time and during the 36 months prior to publication;
- There are no any patents, wether palenned, pending or issued, broadly, relevant to the work;
- There are no other relationships/conditions/circumstances that present a potential conflict of interest;
- In general the authors have nothing to disclose.

<sup>1</sup>Department of Health Sciences and Public Health, University of Cagliari, Cagliari, Italy (Cittadella Universitaria, S.P. Monserrato-Sestu km 0,700, Cagliari, 09042, Italy)

<sup>2</sup>Federal University of Rio de Janeiro, Brazil (Rua Visconde de Piraja 407/702. Rio de Janeiro. 22410-003. Brazil)

<sup>3</sup>Indipendent Research Consulent, 110772070 Beirut, Lebanon

<sup>4</sup>Department of Neuroscience, University of Turin, Turin, Italy (Via Cherasco 15, Torino, 10126), Italy)

## Abstract

**Background:** The acquisition of health information via the internet has emerged as a prevalent approach within the general population, and is likely to exert an influence on health decision-making processes. This study aims to evaluate the comprehensive quality of online information about anxiety treatment and management using a multidimensional methodology that assesses scientific quality of information; readability of the website; the technological quality of the website and the website's popularity ranking.

**Methods:** We conducted a systematic review on four widely used online search engines. Duplicated, unrelated websites, and scientific papers were excluded. The assessment included the use of several criteria and tools: the DISCERN scale, the JAMA benchmark criteria, adherence to the Health on the Net Code; the Nibbler tool; PageRank; and the Flesch Reading Ease test/the Gulpease readability index.

**Results:** 78 websites in Italian and 60 in English were evaluated. Quality of information of the English websites was higher than that of the Italian ones, but only a small percentage of them reported high level information about all treatment types and shared decision-making process. Technological quality was higher in English websites. In general, all websites were difficult to read, requiring reading skills at the high school level or higher.

**Conclusions:** These results can promote future guidelines to improve online health information. Users should be able to find information about all treatment types (pharmacological and psychosocial) in line with the current guidelines for the treatment and the management of anxiety disorders. This would help internet users to achieve a higher level of quality information.

### Keywords

health literacy; quality indicators; online health information

## 1 Introduction

Obtaining health information online has become the most popular method of acquiring information (Dobransky & Hargittai, 2012; Finney Rutten, 2019). The traditional health information model (printed materials and institutional channels) has been replaced by the abundance of online information in the world wide web. The new information model is characterised by a multiplicity of sources (Brossard, 2013), participants and resources (Keselman et al., 2008) and an incredible information load that is always and limitlessly available to anyone (Thomas & Sheth, 2011). The effects produced by this new information model in the real world are quite pertinent: recent research has shown that online health information has an impact on decision-making process (Li et al., 2022;

Stevenson et al., 2021) and influences patients' behaviour and attitude towards health professionals (Bujnowska-Fedak & Wegierek, 2020). Although evidence of the benefits of seeking health information online is quite contradictory (Brown et al., 2020; de Looper et al., 2021), online health information has the potential to help patients be better-informed about health outcomes, services, resources, and access. However, evidence confirms that a wealth of incorrect information can also be found online (Fahy et al., 2014; Jayasinghe et al., 2020).

In the last years, one of the most online searched health conditions has been anxiety<sup>1</sup> (<https://twitter.com/GoogleTrends/status/1445823740374183940>). Anxiety is “an emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure” (American Psychiatric Association, 2000). Nevertheless, when it is hard to control and persists and affects daily life, anxiety can be considered a mental health disorder (American Psychological Association, 2023). Anxiety disorders show high prevalence, tendency towards chronicity and frequent comorbidity, and are associated with a significant disability (Saha et al., 2013). They have a considerable economic impact on society, as they are associated with a greater use of health care services and reduced work productivity (GBD 2019 Mental Disorders Collaborators, 2022). The COVID-19 pandemic has dramatically increased the occurrence of mental health problems: the Global Burden of Disease 2020 study estimated a 25.6% increase (95% CI: 23.2–28.0) in the cases of anxiety disorders worldwide in 2020 (Lagey et al., 2022; Carta et al., 2022; Santomauro et al., 2021). In line with this, Google trends record that in 2021 “how to save your mental health” has been searched worldwide more than ever (<https://about.google/stories/year-in-search/>). These numbers are even more impressive if we consider that anxiety disorders are often under-diagnosed and under-treated (DeMartini et al., 2019).

Currently, several international medical organizations have developed guidelines for the treatment of anxiety disorders, which have the following points in common: a) identify and communicate the diagnosis of the anxiety disorder as early as possible to help people understand the disorder and promptly start effective treatment; b) consider the specific population (eg. children/adolescents, pregnant/lactating women, and the elderly) c) evaluate clinical issues in patients with comorbid conditions (National Collaborating Centre for Mental Health UK, 2011; Katzman et al., 2014). The guidelines also underline the importance of adjusting treatment according to the severity of the condition, previous treatment attempts, and the level of self-harm risk (DeMartini et al., 2019). Due to the increased risk of suicide attempts or completed suicide, an explicit evaluation for suicide risk is another consistent recommendation in guidelines. Moreover, guidelines recommend addressing the risk of substance misuse and adopting precautions to reduce the tendency of relapse and chronicity.

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Since anxiety impacts both health and the economy, it is important to better understand the quality of the information available online on this condition. As far as we know, there is no study updated to 2022 after the consequence of the pandemic that systematically addresses the quality of the information about anxiety and its treatment and its management available online. This is especially true when considering the lack of studies adopting a multidimensional approach and utilizing a comparison between different languages in order to understand the linguistic inequalities. Evaluating the quality of the information available on the internet does not only ensure awareness of the quality of the information about anxiety that is currently available online, but it also contributes to developing a critical attitude towards online information and to giving a detailed picture of the available health information to health professionals.

### **1.1 Aims**

This study intended to assess the overall quality of the websites that provide information about anxiety, its treatment, and its management, by investigating the quality of their contents, readability, technological usability and accessibility. In consideration of the increasing utilisation of the internet worldwide, we compared websites that provide this type of information in two different languages: a national language, Italian, and the main language used by the scientific community to convey scientific knowledge, English.

## **2 Methods**

### **2.1 Search Strategy**

A systematic search was conducted across the three most common commercial search engines “Google” ([www.google.com](http://www.google.com)), “Bing” ([www.bing.com](http://www.bing.com)), “Yahoo” ([www.yahoo.com](http://www.yahoo.com)), and one independent search engine, “DuckDuckGo” ([duckduckgo.com](http://duckduckgo.com)). Even if not very popular among internet users, the latter was included because it keeps users’ searches private and out of data profiles and governmental or other legal requests, which can be a relevant factor in the case of mental health conditions, as they are still negatively impacted by social stigma. The selected search engines account for more than 97% of all searches worldwide and across platforms (desktop, tablet, mobile), and are also the top four search engines in Italy (StatCounter Global Stats, 2020). The following key terms were used: “Anxiety”, “Treatment of anxiety” “Management of anxiety” in English and “Ansia”, “Terapia dell’ansia” and “Gestione dell’ansia” in Italian.

### **2.2 Selection criteria**

The websites were selected in order of appearance. Specifically, the first 20 for each key term in each search engine in English and Italian were chosen for review. There is evidence that users tend to not look past the first ten results and rarely go beyond the first page and very rarely beyond the second

page (Jacobsen, 2017). Websites requiring login or containing unwritten contents (video), commentary or discussion websites, out of topic results, vocabulary/dictionary websites and scientific articles were excluded. The search engines were assessed from January 5<sup>th</sup> to May 5<sup>th</sup>, 2022.

### **2.3 Quality Information assessment**

Two researchers conducted a blind evaluation. Three tools were used to evaluate the quality of the information provided by the website: the DISCERN scale, the JAMA benchmark criteria, and the adherence to the Health on the Net code (HONcode). DISCERN is a tool designed to evaluate the reliability and the quality of information on treatment by using specific criteria (Charnock et al., 1999). Appropriate sources of information are expected to score at least 60; websites with serious shortcomings that are not appropriate sources of information are marked by scores of 30 or lower. Following the recommendation by Khazaaal et al. (2012), we used a DISCERN score cutoff of  $\geq 40$  to identify the websites that contained a sufficient amount of information of adequate quality (Khazaaal et al., 2012). The JAMA benchmark criteria are used to critically judge the credibility, reasonability, and utility of medical information on the Internet (Silberg et al., 1997). The JAMA benchmark criteria assess the following core standards: website authorship (authors, contributors, affiliations, and credentials have to be included); attribution (references and sources used for the content, and copyright information have to be included); disclosures (details about sponsorship, advertising, commercial funding, potential conflicts of interests have to be included); currency (the date of posted and updated information have to be included).

The Health on the Net Foundation Code of Conduct (HONcode) issued by the Health on the Net Foundation (Boyer et al., 2011), a Non-Governmental Organisation and a non-State actor in official relations with the World Health Organisation, certifies that the website developers respect basic ethical standards in the presentation of the information and that the sources and the purpose of the data are clearly stated to the readers. The HONcode certification request and annual recertifications are subject to a fee.

### **2.4 Readability assessment**

The Flesh Kincaid Reading Ease (FRE) and the Flesh Kincaid Grade Level (FKGL, at <https://www.webfx.com/tools/read-able/>), have been used to assess readability for the English websites. The FRE and the FKGL are two among the six most commonly used readability analysis tool in the biomedical field (Beaunoyer et al., 2017). A text with a score of 71–100 is considered ‘easy’ to read by an average 11-year-old person; a score of 61–70 is considered of ‘standard’ difficulty to read by children aged 13–15 years; a text scoring 60 or below is considered ‘difficult’ to read (D’Alessandro et al., 2001; Donnelly et al., 2009). Readability for the Italian websites was assessed using the Gulpease readability Index (GRI) at [https://farfallaproject.org/readability\\_static/](https://farfallaproject.org/readability_static/) (Lucisano

& Piemontese, 1988). The index ranges from 0 that marks the lowest readability to 100 that points the maximum readability. Since the FKGL and GRI cannot be directly comparable, we grouped the assessment of the readability by degree of complexity: “easily readable” (11-year-old persons should be able to read); “standard level of readability” (13–15 years old should be able to read); and “difficult to read” (requiring a high school or an even higher level of literacy).

### **2.5 Technological quality and popularity assessment**

The technological quality of the website was checked with Nibbler at <https://nibbler.silktide.com/>, using the following indexes: overall; accessibility; experience; marketing; technology; mobile. As not all websites can be processed by Nibbler, some websites could not be analysed, but we were able to assess most of the websites for their accessibility, user experience, marketing and the quality of the informatics used. Readability is defined as the easiness with which a text can be read (Dubay, 2004). The popularity of the website was checked via Google’s PageRank (PR) at <https://checkpagerank.net/>. PR is a measure from 0 – 10 that ranks websites according to their popularity. The rank is influenced by the number and the importance of the links pointing to the page.

### **3 Results**

The initial sample consisted of 480 websites (240 Italian, 240 English). We excluded 105 duplicates in Italian and 138 duplicates in English. At the end of the screening, we excluded 57 websites in Italian (1 scientific paper, 3 pdf files or unwritten contents, 5 containing only titles or no article, 34 announcements, 13 that were not relevant, 1 containing contents in another language) and 42 websites in English (21 scientific papers, 4 pdf files or unwritten contents, 4 containing only titles or no article, 7 announcements, 3 that were not relevant, 2 requesting to login, and 1 undergoing maintenance). Finally, we analysed 78 websites in Italian and 60 in English (Figure 1).

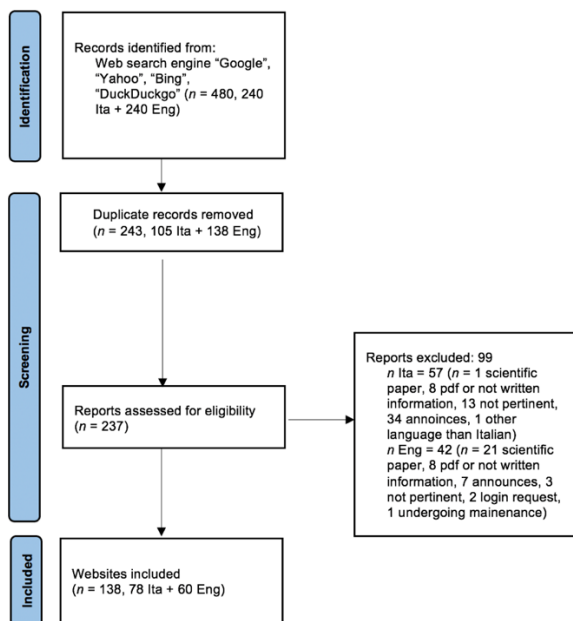


Figure 1. PRISMA Flow diagram of search results

### 3.1 Information quality

The HONCode certification was displayed only by a minority of the assessed websites, and in some cases the certification had already expired. Only 5 websites in Italian out of 78 (6.4%) had a HONCode certification, which had already expired. The websites in English were more likely to display a HONCode certification (16 out of 69 [26.7%]):  $\chi^2=9.27$ ;  $df=1$ ;  $p=0.002$ ). The Intra-rater reliability for the JAMA benchmark criteria was fairly acceptable for the websites in both languages, English (ICC = 0.650; 95% CI = 0.480–0.775) and Italian (ICC = 0.614; CI = 0.452–0.737). The websites in English were more likely than those in Italian to respect the requirements of Authorship ( $\chi^2=11.10$ ;  $df=4$ ;  $p=0.025$ ), and Attribution ( $\chi^2=12.30$ ;  $df=4$ ;  $p=0.015$ ), and much more likely to respect the requirements for Disclosure ( $\chi^2=20.11$ ;  $df=4$ ;  $p<0.001$ ), and Currency ( $\chi^2=22.20$ ;  $df=4$ ;  $p<0.001$ ). Overall, the websites in English (Figure 2) respected the JAMA benchmark criteria more than those in Italian (Figure 3).

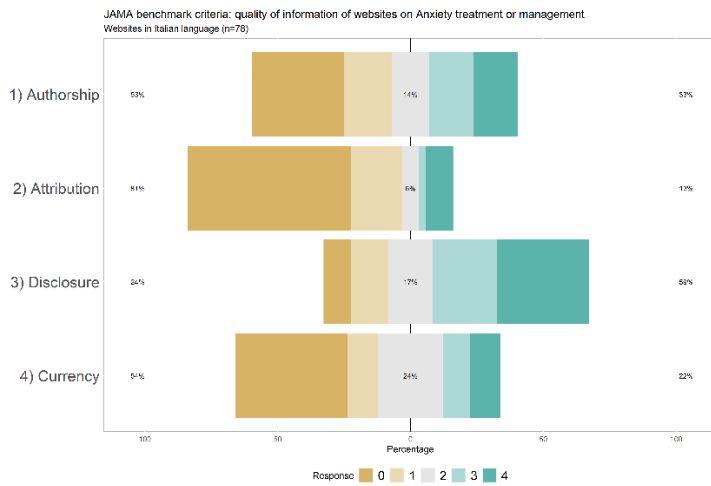


Figure 2. JAMA Benchmark criteria



Figure 3. JAMA Benchmark criteria

Intra-rater reliability for the DISCERN scale was excellent for the websites in both languages, English (ICC = 0.905; 0.871–0.933) and Italian (ICC= 0.947; 0.926–0.965). The websites in English had a higher DISCERN Reliability (Mann-Whitney U=876.5; z=-6.29; p<0.001) and overall Quality of information (Mann-Whitney U=1073.5; z=-5.45; p<0.001), and in the Overall score (Mann-Whitney U=1173.5; z=-5.23; p<0.001) compared to those in Italian. The websites in English were more likely to reach the threshold for acceptable information quality on the DISCERN scale than those in Italian: n. = 36 [60%] versus n. = 9 [12%]; c<sup>2</sup>=34.1; df=1; p<0.001.

The websites in Italian were rather poor at reporting essential information about anxiety treatment or management, especially at describing how the treatments work, what happens if someone does not undertake the proposed treatment, and shared decision-making (Figure 4). The websites in English did a better job according to the DISCERN rating (Figure 5).

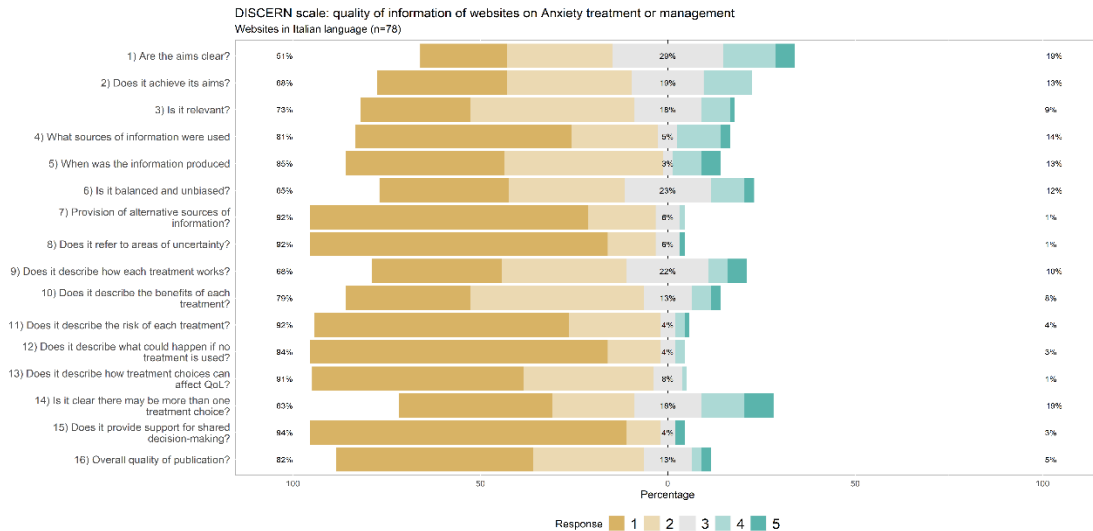


Figure 4. DISCERN scale

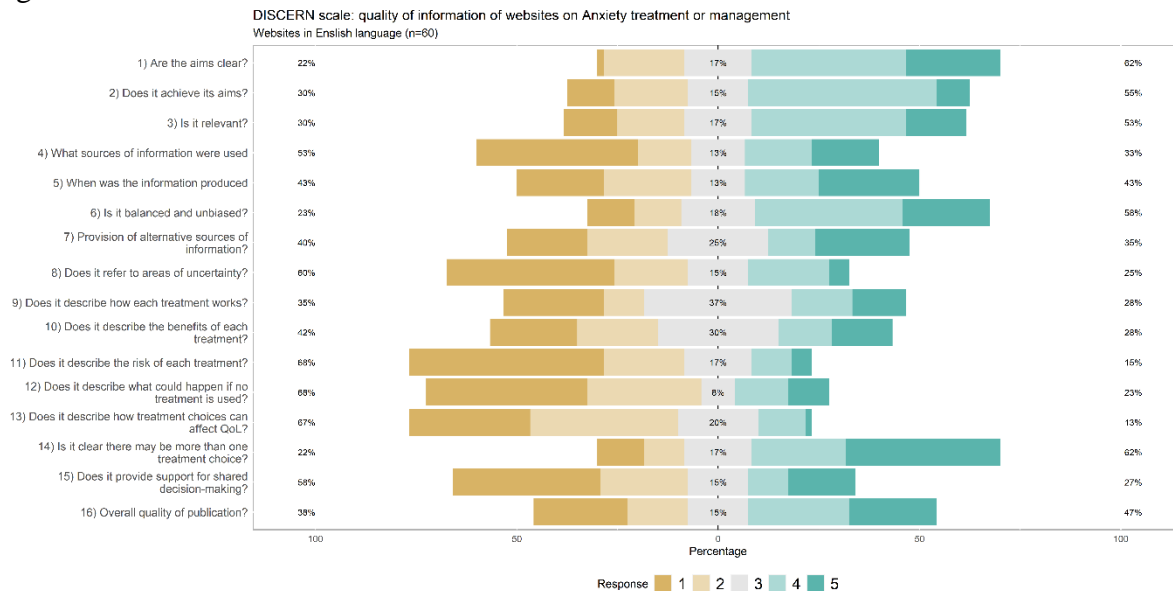


Figure 5. DISCERN scale

### 3.2 Readability

Our data, obtained by using the FKGL and GRI, suggest that the websites were, on average, difficult to read. Most websites required reading skills at the high school level or higher (English: 88.3% of cases; Italian: 79.5% of cases).

### 3.3 Technological quality and popularity

The technological quality of the websites about anxiety was higher in the websites in English than in those in Italian. In fact, the Nibbler score for the websites in English was found to be higher than that for the websites in Italian, with a global average score of 87.6% for the websites in English and 85.0% for the websites in Italian (Mann-Whitney U = 1432.5; z = -3.02; p = 0.002). The difference was

mainly due to the Experience (82.6% versus 80.5%; Mann-Whitney  $U=1621.0$ ;  $z=-2.14$ ;  $p=0.032$ ), and Marketing (80.8% vs. 68.3%; Mann-Whitney  $U=1159.5$ ;  $z=-4.30$ ;  $p<0.001$ ), while suitability of Mobile phones was rated higher in the websites in Italian than in those in English (88.3% vs. 98.8%; Mann-Whitney  $U=1469.5$ ,  $z=-3.87$ ;  $p<0.001$ ). No significant differences were observed in the Accessibility (90.9% vs. 93.1%; Mann-Whitney  $U=1997.0$ ;  $z=-0.38$ ;  $p=0.701$ ), and Technology (88.5% vs. 88.8%; Mann-Whitney  $U=1940.5$ ;  $z=-0.65$   $p=0.516$ ) categories. Most of the retrieved websites in English have a higher Google rank than those in Italian:  $6.6\pm 1.4$  versus  $3.5\pm 1.9$  (Mann-Whitney U test:  $z=7.58$ ,  $p<0.001$ ).

#### **4 Discussion**

This study shows the quality levels of the Internet websites addressing anxiety. Our study replicates a new approach (Perra et al., 2022) that evaluates the quality of health information by comparing websites in different languages and by using different assessment tools in order to generate a more comprehensive view. We decided to focus on the information about anxiety as this is a widespread condition that is the most health item checked on Internet, is increasing in prevalence after the COVID-19 pandemic, is potentially invalidating, and is too often under-recognized and undertreated. We also compared the quality of the information provided by these websites in English, the main language used by the scientific community to convey scientific knowledge, and a national language (Italian). Our results show that the websites in English have a higher Google rank than those in Italian. This means that they are more popular, as English-speaking internet users are greater in number than Italian ones. The technological quality is higher in the websites in English than in those in Italian. The websites in both languages were considered difficult to read (high school level), despite the recommendation of the US National Institute of Health and the American Medical Association for websites with health information to have a readability score within the sixth-eighth grade level (middle school) for the written contents on websites (Grabeel et al., 2018; Rooney et al., 2021). The quality of the information provided by the websites in English about the treatment and management of anxiety is better than the websites in Italian. The websites that display a HONcode certification are mostly in English, and not all of them have an updated certification. Even according to the DISCERN tool, the score of the Italian websites is lower than that of those in English. A lot of websites do not clearly state their purpose and contents or list their references or sources. Moreover, not all treatment types are always described and explained, and little attention is paid to the risks and benefits of each treatment and even less attention to the consequences of missed treatment and to the changes and life routine adjustments required by the different therapeutic approaches. This finding indicates that many online informers on anxiety do not focus on the readers/patients' perspective,

especially in terms of psychosocial treatments, particularly in the websites in Italian, but also in those in English. Our results can be considered consistent with the literature that unveils much unserious and incorrect information available on the internet (Piras et al., 2022; Arts et al., 2020; Ipser et al., 2007).

However, online health information has many potentialities, as it can enhance patients' and caregivers' health knowledge and can be a reliable source to develop an informed healthcare decision when health information is evidence-based and unbiased. Nevertheless, several internet websites analysed by this study can be listed as direct-to-consumer marketing channels. As already shown by literature, online health information is associated with commercial purposes. Online information about anxiety has facilitated patient-physician discussion about medication (Bell et al., 2010), but the pharmaceutical industry has used it to try to increase the use of psychotropic drugs (Mintzes, 2006). If we take into account that our results show a poor quality of the internet information related to anxiety and its treatment and management, the ambivalence shows itself as a Gordian knot. This study has also been enlightening to the different mean level of quality of the websites on anxiety treatments and management in English versus those in Italian. This data can have various explanations: the long history in health marketing information (especially in the US with respect to pharmaceutical products and, more recently, to psychological and psychotherapeutics interventions) could have prompted a better quality of health information. Our results, together with the findings that show that less than 15% of people with diagnosed anxiety receive treatment, which conforms with evidence-based recommendations (Roberge et al., 2015; Kasteenpohja et al., 2016), prospect the need to make the information about the quality of online information on anxiety a widespread, common and accessible data by any user. All types of treatments (pharmacological and psychosocial) should be better described according to severity as well, in line with the different guidelines (National Collaborating Centre for Mental Health UK, 2011; Katzman et al., 2014).

#### **4.1 Implications for clinics and research**

The great availability of online health-related information is useful when it meets the needs of patients and communities. This goal is achievable given: reliable, accurate, appropriate/understandable information, and capacity to obtain, process, and understand basic health information and services. The last condition is described by the concept of health literacy that also involves the capacity to evaluate and to use the information in order to make decisions about health-related issues (Sørensen et al., 2022; Mackert et al., 2014). The low quality of online information about anxiety can be seen as a further obstacle to these goals (Alonso et al., 2018). We also have to note that empirically-supported psychological treatments, for example, are still underused and disliked by many clinical psychologists and allied professionals (Lilienfeld, 2013; Gallao et al., 2013). In the field of research,

we believe that the implementation of a normative framework and the referral to ethical guidelines could serve to discriminate trustworthy health information, and, also, that digital health educational programs could represent the real weapon against misinformation and deception.

#### **4.2 Strengths and limitations**

This study cannot evaluate all the various elements of health-related online content. Yet, in pursuing the aim to evaluate the appropriateness and understandability of online health-related material, <sup>[27]</sup> we combine various methodologies, included the classical readability tools and the more experimental medical content assessment questionnaires (Beaunoyer et al., 2017). Nevertheless, due to the still recent research in the field and to the complexity of the issue, the methodology to approach it is still under development, and there is still some degree of uncertainty about the process of attribution of the score for some of the tools used in this study (Perra et al., 2022).

#### **5 Conclusion**

The poor quality of the information on anxiety and its treatment and management available on the internet represents a serious health issue and, also, an ethical challenge. In fact, these factors can lead to a false sense of knowledge and security, particularly in the case of low levels of health literacy found in many countries and among disadvantaged people. It is recommended to make information about the quality and accessibility of online health resources available in order to better guide health-related decision-making.

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## Declaration of Interest Statement

All the authors Paola Melis, Alessandra Perra, Antonio Egidio Nardi, Thurayya Zreik, Antonio Preti, Mauro Giovanni Carta declare:

- There are no any relevant conflict of interest at any time and during the 36 months prior to publication;
- There are no any patents, wether palenned, pending or issued, broadly, relevant to the work;
- There are no other relationships/conditions/circumstances that present a potential conflict of interest;
- In general the authors have nothing to disclose.