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Quality Evaluation of Turkish Websites Providing Information on Orthodontic Treatment Using DISCERN and JAMA Criteria

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ABSTRACT

Background: This research seeks to assess the quality of online information regarding orthodontic treatments by employing DISCERN and JAMA criteria. Materials and Methods: The most frequently used search engines in Turkey—Google, Bing, Yahoo, and Yandex—were utilized between January 28-30, 2025. Searches employed the keywords 'orthodontic treatment', 'orthodontic dental treatment', 'orthodontic braces treatment', and 'orthodontic bracket treatment'. The first 50 websites from each search engine were selected, totaling 200 websites. After excluding duplicates, ads, academic articles, and irrelevant content, 127 websites remained. These sites were evaluated using DISCERN and JAMA criteria. Kruskal-Wallis and Post Hoc Bonferroni tests determined significant differences between group scores. Results: Evaluations based on DISCERN and JAMA criteria revealed significant differences among website categories. Private clinics and health portals achieved the highest DISCERN scores, classified as "moderate," while public institutions received the lowest, classified as "poor." According to JAMA criteria, authorship and patent rights had the highest compliance, whereas source citation was the lowest. The overall quality of online information about orthodontic treatments is generally low and requires enhancement.Conclusion: Findings from this study indicate the quality of online information regarding orthodontic treatments is typically low. Private clinics and health portals received the highest DISCERN scores, classified as "moderate," while public institutions had the lowest, classified as "poor." Authorship and patent rights had the highest compliance according to JAMA criteria, while source citation was the lowest. The study concludes that the overall quality of online orthodontic information is low and requires improvement.

INTRODUCTION

With the extensive spread of the Internet, accessing information in various fields, including health, has become significantly more convenient for users (1). Specifically, obtaining information on disease prevention, diagnosis, and treatment options has become more accessible (2). A study found that 85% of patients conduct online research about their problems before their doctor's appointment (3).

According to the 2022 Household Information Technologies Usage Survey by the Turkish Statistical Institute (TÜİK), 94.1% of households have internet access from home. According to the Turkish Statistical Institute's (TÜİK) 2022 Household Information Technologies Usage Survey, 94.1% of households have internet access. Furthermore, a TÜİK study conducted in the last quarter of 2019 revealed that 69.3% of internet users seek health-related information online (4).

Currently, there are no established standards or limitations for information about health available online. When obtaining information from the Internet, the lack of oversight, undisclosed financial interests, or absence of reliable sources makes it difficult to discern accurate medical information (5, 6).

Orthodontic treatments include conventional orthodontic treatment with metal, ceramic, lingual bracket systems; various clear aligner brands; and removable orthodontic appliances for children, among other subtopics. Patients can acquire information on these topics from clinics, oral and dental health centers, or dental faculties, as well as online; However, the quality, trustworthiness, and accuracy of online information are extremely important (7).

In 1999, a team at the University of Oxford led by Charnock developed the 16-question "Quality Criteria for Consumer Health Information (DISCERN)" index to evaluate the quality of health information (8, 9). This index aids in distinguishing between low and high-quality content and assists content producers in generating evidence-based, high-quality information (8, 9). Another quality index is the Journal of the American Medical Association (JAMA) index, which evaluates four criteria: authorship, references, currency, and conflicts of interest (10).

Research assessing the calibre of online information on orthodontic treatments is limited in the literature. While DISCERN and JAMA criteria have been widely used to evaluate online health information in various medical fields, there is limited research on their application to orthodontic treatments, particularly in non-English contexts such as Turkey. Within this framework, our objective was to evaluate the online information quality regarding orthodontic treatments using both the JAMA and DISCERN indices.

METHODS

Data Collection

The top search engines in Turkey—Google (www.google.com), Bing (www.bing.com), Yandex® (www.yandex.com) and YAHOO!® (www.yahoo.com),—were chosen for this study (11). The location and cookie services of the internet provider (Internet Explorer, Microsoft Inc., Redmond, WA, USA) and computer were disabled. Searches were conducted between 28-30 January 2025 using the keywords 'orthodontic treatment', 'orthodontic dental treatment', 'orthodontic braces treatment', and 'orthodontic bracket treatment'. The initial 50 websites from each search engine were selected for the study. This sample size was chosen because 95% of users focus on the first 50 results on the first three pages (12). The content was assessed using the DISCERN instrument and JAMA standards.

Analysis Methods

The DISCERN criteria, established by Charnock et al., are employed by both patients and information providers to assess the calibre of written health information (8). The criteria include 16 questions that are divided into three sections. (Table 1).

Each question is rated on a scale from 1 to 5, where 1 denotes non-compliance, 2-4 indicates partial compliance, and 5 represents full compliance.

The evaluation questions are categorized as follows:

I. Questions assessing the reliability of the information source (1-8) [DISCERN 1].

II. Questions evaluating the quality of treatment options (9-15) [DISCERN 2].

III. A question assessing the overall quality of the information source (16).

The total DISCERN score spans from 16 to 80. Scores of 16-26 indicate very poor quality, 27-38 indicate poor quality, 39-50 indicate moderate quality, 51-62 indicate good quality, and scores of 63 and above indicate excellent quality (9, 12).

Table 1. DISCERN Instrument.

DISCERN Questions	Max-Min. Score (1-5)
Are the objectives clearly stated?	1-5
Does it fulfil its objectives?	1-5
Is the information pertinent?	1-5
Is it evident what sources of information were utilized to compile the publication (besides the author or producer)?	1-5
Is it evident when the information used or reported in the publication was created?	1-5
Is the information unbiased and impartial?	1-5
Does it offer details on additional sources of support and information?	1-5
Does it address areas of uncertainty?	1-5
Does it explain how each treatment functions?	1-5
. Does it outline the benefits of each treatment?	1-5
. Does it outline the risks of each treatment?	1-5
. Does it describe the consequences of not using any treatment?	1-5
. Does it discuss how treatment choices impact the overall quality of life?	1-5
. Is it apparent that there may be multiple treatment options?	1-5
. Does it support shared decision-making?	1-5
. Based on the answers to all of the above questions, how would you rate the overall quality of the publication as a source of information on treatment choices?	1-5

JAMA Criteria: Developed by Silberg et al., the JAMA criteria assess the transparency and reliability of information based on four key attributes (10). Each criterion receives a score of 1 if the attribute is met, or 0 if it is not met. The four criteria are as follows:

I. Authorship: Authors and contributors should be specified.

II. Sources: The sources of information, references, and copyright status should be indicated.

III. Patent rights/conflicts of interest: The ownership, sponsorship, advertisements, commercial supporters, and conflicts of interest of the website should be clearly stated.

IV. Currency: The dates when the content was initially uploaded and subsequently updated should be clearly specified.

Statistical Analysis

Descriptive statistics (number, percentage, mean, standard deviation, median, minimum and maximum) are provided for the data in this study. The Shapiro-Wilk test was utilised to verify normal distribution. The Kruskal-Wallis test was applied to compare three or more independent groups in cases where normal distribution was absent. Post Hoc Bonferroni tests were conducted to identify the groups or groups causing the difference. Analyses were conducted using IBM SPSS 27.

RESULTS

A total of four different search engines were used for this study. Fifty websites were included from each search engine. Duplicate pages, pages presenting academic publications, advertisements, videos, and discussion groups were excluded. Out of the total 200 scanned pages, 73 were excluded, and 127 websites were included in the study. Figure 1 and Table 2 present the percentage distribution of these 127 sites (Figure 1) (Table 2).

Table 2. Numerical distribution of evaluated websites according to their content source.

Category	n
Private Clinics	85
Private Universities	7
Private Hospital	11
Health Portals	12
Public Institutions	4
Total	127

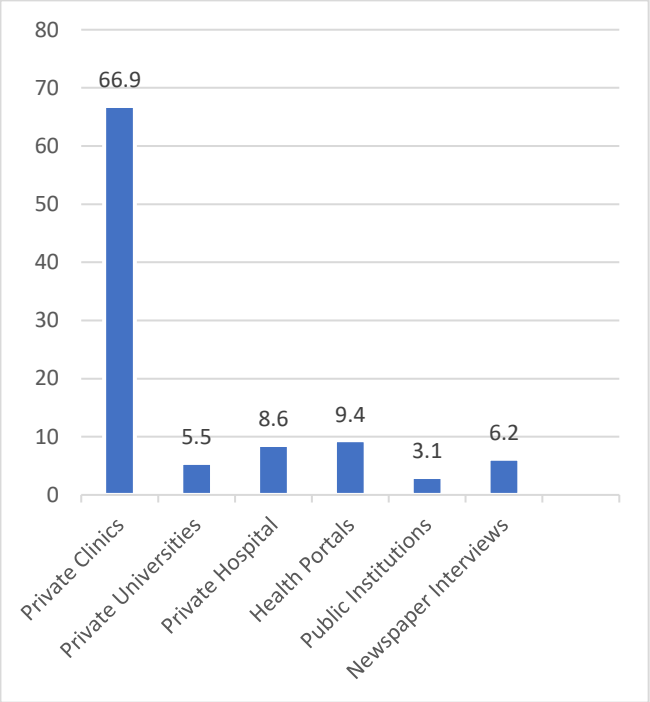

Figure 1. Distribution of evaluated websites by category (%).

The table shows the minimum and maximum values of DISCERN and JAMA scores for the study groups (Table 3).

Table 3. Min. and max. values of DISCERN and JAMA scores for the study groups.

	Public Institutions	Newspaper Interviews	Private Hospital	Private Clinics	Private Universities	Health Portals
	Min.-Max.	Min.-Max.	Min.-Max.	Min.-Max.	Min.-Max.	Min.-Max.
DISCERN I	13-18	16-29	18-24	14-26	17-25	16-28
DISCERN II.	10-13	9-22	9-22	8-28	13-21	9-22
DISCERN Q & A 16	1-2	2-4	2-3	1-4	2-4	1-3
DISCERN Tot. Score	25-32	29-54	30-49	23-51	33-48	27-50
JAMA Tot. Score	2-3	2-3	3-4	0-3	1-4	0-4

The study groups' DISCERN and JAMA score distributions are presented, with comparisons made using Kruskal-Wallis tests. The analyses revealed statistically significant differences in DISCERN Part 2 scores, DISCERN 16th question scores, total DISCERN scores, and total JAMA scores among institutions ($p<0.05$). According to the Bonferroni tests for DISCERN Part 2 scores, there was a statistically significant difference found between public institutions and private clinics ($p=0.039$), with private clinic scores being higher than those of public institutions. For the DISCERN 16th question, Bonferroni tests identified statistically significant differences between public institutions and private clinics and health portals ($p=0.036$ and $p=0.005$), with private clinics and health portals scoring higher than public institutions. Regarding total DISCERN scores, Bonferroni tests indicated a statistically significant difference between public institutions and private clinics ($p=0.016$), with

private clinics scoring higher. For total JAMA scores, Bonferroni tests found statistically significant differences between private clinics and private universities and private hospitals, and between health portals and private hospitals ($p=0.002$ / $p<0.001$ / $p=0.009$). Private university and private hospital scores exceeded those of private clinics, and private hospital scores surpassed those of health portals (Table 4).

Table 4. Distributions and comparison of DISCERN and JAMA scores according to study groups [Mean±Standard deviation (Median)].

	Public Institutions	Newspaper Interviews	Private Hospital	Private Clinics	Private Universities	Health Portals	Test Statistics	p
DISCERN I	15.75±2.06 (16)	20.25±4.23 (19.5)	19.82±2.4 (19)	20.26±2.81 (20)	20.14±3.44 (18)	21.33±4.29 (21.5)	8.854	0.115
DISCERN II.	11.25±1.5 (11)	14.00±5.63 (11)	15.91±3.62 (16)	17.41±3.73 (17)	17.14±2.73 (18)	15.33±3.82 (15.5)	14.021	0.015*
DISCERN Q & A 16	1.75±0.50 (2)	2.38±0.74 (2)	2.27±0.47 (2)	2.66±0.57 (3)	2.57±0.79 (2)	2.50±0.67 (3)	13.610	0.018*
DISCERN Tot. Score	28.75±2.99(29)	36.63±9.66(32)	38.00±4.92 (36)	40.33±5.34 (41)	39.86±6.12 (37)	39.17±6.34 (39.5)	14.564	0.012*
JAMA Tot. Score	2.50±0.58 (2.5)	2.50±0.53 (2.5)	3.18±0.40 (3)	1.96±0.42 (2)	2.86±0.90 (3)	2.25±1.06 (2)	54.762	<0.001*

No statistically significant difference was found for DISCERN Part 1 scores across different institutions ($p>0.05$).

DISCUSSION

Today, the internet has become a universal platform for disseminating health information, similar to other fields (13). There are no specific standards for online health information (14). Consequently, while some websites may appear educational, they are actually promotional; others may contain inefficient, incomplete, difficult-to-understand, or contradictory information (15, 16). Therefore, it is crucial to have trustworthy sources from which patients can obtain accurate information online.

Numerous studies in the literature have evaluated websites providing health information using DISCERN or JAMA criteria (17-19). Nevertheless, only a few studies have assessed the quality of information provided on websites regarding orthodontic treatments. This research aims to evaluate the caliber of internet-based information regarding orthodontic treatments using the DISCERN and JAMA tools.

In this study, four search engines were utilised. Fifty websites were included from each search engine. Out of the total 200 pages scanned, 73 were excluded based on the criteria previously mentioned, resulting in 127 websites for further analysis.

Our results indicate that there are very few websites with high standards of information quality. When examining the median DISCERN scores for each group, private clinics scored 41, health portals 39.5, private universities 37, private hospitals 36, newspaper and magazine interviews 32, and public institutions 29.

While DISCERN Part 1 includes questions assessing the reliability of information sources, DISCERN Part 2 focuses on the quality of treatment options. Based on the median DISCERN Part 1 scores, public institutions unfortunately had the lowest score at 16.

In terms of DISCERN criteria, public institutions, newspaper and magazine interviews, private hospitals, and private universities were classified as "poor" quality, while health portals and private clinics were rated as "moderate" quality.

Aghasiyev et al. stated that individuals have more trust in official institutions compared to private ones providing promotional content (20). However, our scoring revealed that public institutions, which are generally trusted, obtained the lowest DISCERN scores. In his study, Ozturk (7) found that the quality of information provision on websites was low according to DISCERN criteria.

As emphasised in a study on lingual orthodontics, it is crucial to clearly cite the sources referenced and the dates when the information was uploaded and updated (9). In this regard, private clinics received the lowest scores according to JAMA criteria, which assess authorship, sources, patent rights, and currency.

DISCERN Part 2 includes questions such as "Are the risks of the treatment described?" and "Does it explain what would happen if the treatment is not administered?". These questions require answers addressing potential negative outcomes. In this context, private institutions must balance the responsibility of providing accurate medical information to the public while also

attracting patients and advertising. The potential failure reasons for treatments and the possible consequences of unsuccessful treatments should be communicated in an impartial and transparent manner.

Like previous studies on the quality of online information, this study also provides results based on a snapshot of the internet at a particular moment. Given the dynamic nature of the internet, the information available on websites continuously changes and updates. Thus, it should be recognised that the scores in this study are subject to constant updates. This is one limitation of our study. Another limitation is that the study was conducted using Turkish keywords and Turkish websites. Future studies could expand the parameters by including more languages and different websites, potentially enhancing the results obtained from these parameters.

CONCLUSION

It is crucial that websites providing health information undergo detailed scrutiny regarding usability, accessibility, and content quality before being made available to the public. This evaluation ensures that the information on the internet is comprehensive, accurate, and easy to understand, thereby creating a reliable source for users. Additionally, incorporating feedback from patients can make these websites more user-friendly and contribute to the clearer presentation of information. This is especially important for specific health services such as orthodontic treatments, where access to accurate and high-quality information is increasingly necessary.

The findings highlight the need for national standards and oversight mechanisms to ensure that online health information, particularly in orthodontics, is accurate, reliable, and accessible to all users.

Creating high-quality internet content designed to be easily understood by individuals from all walks of life, based on scientific evidence and devoid of commercial concerns, will be highly beneficial for patient education. National-level standards and government-supported oversight mechanisms can ensure that such websites become more reliable and effective sources of information. Finally, utilising these platforms as continuous educational tools can play a critical role in enhancing public health awareness and facilitating access to accurate information.

Conflict of Interest

There are no potential conflicts of interest associated with this study, such as memberships or relationships with scientific or medical committees, consultancy roles, expert opinions, employment at any company, shareholding, or similar affiliations.

Author contributions

Study design: İOY(%60) İEG(%40); Data collection: İOY(%70) İEG(%30); Data analysis: İOY(%60) İEG(%40); Draft preparation: İOY(%60) İEG(%40); Critical review for content: İOY(%30) İEG(%70); Final approval of the version to be published: İOY(%30) İEG(%70).

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