DOI:10.34084/bshr.1696723 e-ISSN 2587-1641

Journal of Biotechnology and Strategic Health Research

Araştırma Makalesi /Research Article

http://dergipark.org.tr/tr/pub/bshr

# Quality Assessment of Online Information on Laryngeal Cancer: A Comparative Analyis of the Most Visited Websites in Turkey and The United Kingdom.

## Larinks Kanseriyle İlgili Çevrimiçi Bilgilerin Kalite Değerlendirmesi: Türkiye ve Birleşik Krallık'taki En Çok Ziyaret Edilen Web Sitelerinin Karşılaştırmalı Analizi

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**Geliş Tarihi / Received :** 13-05-2025 **Kabul Tarihi / Accepted:** 22-07-2025 **Yayın Tarihi / Online Published:** 31-08-2025

Güngör V., Çoluk Y. Quality Assessment of Online Information on Laryngeal Cancer: A Comparative Analysis of the Most Visited Websites in Turkey and e United Kingdom, J Biotechnol and Strategic Health Res. 2025;9(2):107-113

**Abstract**

**Aim** We conducted a cross-sectional study to assess the quality of online information regarding laryngeal cancer and to compare websites from Turkey and the United Kingdom.

**Materials and Methods** Websites were identified using the Google search engine with the keyword "laryngeal cancer," accessed through servers located in Turkey and the United Kingdom. The first 25 eligible websites from each country were selected, and a total of 50 websites were evaluated. The DISCERN tool was used to assess the quality of the information, and two independent otorhinolaryngology specialists conducted the evaluations. Inter-observer agreement was assessed using Cohen's kappa. Differences between Turkish and English sources were analyzed using the Wilcoxon rank-sum test.

**Results** The mean total DISCERN score was 46.13 ± 10.37 for English websites and 43.77 ± 8.97 for Turkish websites, with no statistically significant difference between the groups ($p = 0.414$). The overall mean score was 44.89 ± 9.75. English websites scored significantly higher on Question 1 (clarity of aims, $p = 0.0052$), Question 4 (disclosure of information sources, $p = 0.0466$), Question 7 (availability of additional support resources, $p = 0.0314$), and Question 12 (description of consequences of no treatment, $p = 0.0097$).

**Conclusions** The quality of laryngeal cancer-related information found online was moderate and comparable between Turkish and English websites. However, persistent deficiencies in source-related transparency highlight the need for quality improvement and regulatory oversight in this domain.

**Keywords** Laryngeal neoplasms, health information, internet, quality of health care, patient education.

**Öz**

***Amaç*** *Temporomandibular eklem bozuklukları (TMB), temporomandibular eklemi (TME), çiğneme kaslarını ve ilişkili yapıları etkileyen, sıklıkla şiddetli ağrı ve fonksiyonel kısıtlılıklara yol açan karmaşık hastalıklardır. Bu çalışmanın amacı, üç farklı TMB alt grubunda (osteoartrit [OA], redüksiyonlu disk deplasmanı (DDRlu), redüksiyonsuz disk deplasmanı (DDRsuz) ve Bruksizmde klinik bulguları karşılaştırmak, ayrıca bu gruplarda tinnitusun prevalansını ve karakteristik özelliklerini değerlendirmektir.*

***Gereç ve Yöntem*** *Primer tanısı OA, DDRlu, DDRsuz veya Bruksizm olan toplam 97 hasta üzerinde retrospektif kesitsel bir çalışma gerçekleştirildi. Değerlendirilen klinik parametreler arasında günlük aktivitelerde bozulma, çiğneme sırasında ağrı ve çiğneme etkinliği, eklem sesleri, kas palpasyon skorları, maksimum ağız açıklığı ve tinnitus varlığı yer aldı. Veriler istatistiksel olarak analiz edildi ve anlamlılık düzeyi $p<0,05$ olarak kabul edildi.*

***Bulgular*** *DDRsuz hastalarında günlük aktivitede bozulma, çiğneme ağrısı ve azalmış maksimum ağız açıklığı en yüksek seviyede bulundu. Bruksizm hastaları ise en yüksek masseter palpasyon skorları ve tinnitus prevalansına sahipti. Eklem sesleri en belirgin olarak DDRlu grubunda gözlenirken, OA hastaları göreceli olarak daha hafif semptomlar gösterdi. Gruplar arasında temporal kas palpasyon skorları açısından anlamlı bir fark bulunmadı.*

***Sonuç*** *Bu çalışma, farklı TMB alt tipleri ile bruksizmin klinik bulgular üzerindeki etkilerini değerlendirmekte ve bu hastalıkların kendine özgü semptom profillerini ve ortak özelliklerini ortaya koymaktadır. Bulgular, TMB tanı ve tedavi süreçlerinde bireyselleştirilmiş yaklaşımların önemini vurgulamaktadır. Özellikle Bruksizm ve tinnitus arasındaki ilişki ile DDRsuz'un günlük yaşam aktiviteleri üzerindeki belirgin etkisi, daha hedeflenmiş tedavi stratejilerinin geliştirilmesine katkı sağlayabilir. Bu tür çalışmaların geliştirilmesi, klinisyenlerin hastaların ihtiyaçlarına daha uygun ve etkili çözümler sunmasına yardımcı olacaktır.*

***Anahtar Kelimeler*** *Bruksizm, klinik bulgular, TME*

## INTRODUCTION

With the increasing accessibility of the internet, more patients are turning to online platforms to obtain information about their health problems, and the internet has become the main foundation of health literacy. Health literacy is linked to patients' capacity to access, understand, and effectively use health information to take appropriate actions concerning their health. It is closely linked to the quality of the healthcare system [1,2] There are also publications suggesting that inadequate health literacy may contribute to various medical issues, such as increased hospitalization rates or mortality.[3,4] At this point, the advantages of the internet in this area may provide a better understanding of medical issues to patients and allow them to have a more active role in their health decisions[5,6]. This interest in digital content also raises concerns about the reliability of these information sources. Especially when serious health conditions such as cancer are considered, accessing accurate information can encourage patients to seek medical attention at an earlier stage or help them better understand their situation emotionally after a diagnosis[7].

The first aim of our study is to evaluate the reliabilityand quality of information in internet about laryngeal cancer. The second aim is to compare the overall quality of medical information websites in Turkey with those from another country. We selected the United Kingdom for comparison because the DISCERN tool, which was used to assess the quality of information, was originally developed there. To our knowledge, no previous study has carried out such a comparison in this context. By doing so, we aim to identify potential areas for improvement in Turkey 's online health information environment and contribute to the overall enhancement of healthcare services.

## MATERIALS and METHODS

Two otorhinolaringology specialists conducted this cross-sectional, observational study on January January 4 and 5, 2024. Approval by the ethics committee was not needed because the information used in the study was publicly available and did not include humans or animals. Similar studies had no ethical approval either. A search was made using the Google search engine with the keyword 'laryngeal cancer' in the native languages of the relevant countries from servers in Turkey and the United Kingdom. Both evaluators were native Turkish speakers with advanced English proficiency, sufficient to accurately assess medical content. We selected the United Kingdom for comparison because the DISCERN tool was originally developed there and two of the evaluators are proficient in English. Most internet users tend to use the first results. Therefore, we decided to include the top 25 internet websites related to laryngeal cancer. A total of 50 internet websites evaluated and compared. Websites were excluded if they appeared as sponsored or paid results intended for commercial visibility in the search engine. We also excluded websites that focused solely on a single treatment method without offering broader medical context (e.g., radiotherapy), those that were academically focused, and those that were not directly related to the topic.

The DISCERN tool, developed by the University of Oxford 8, was employed to assess the overall quality of the content. The DISCERN scoring system comprises 16 questions organized into three main sections. The first eight questions evaluate the reliability of the information source, while the remaining seven questions examine the quality of the presentation of treatment options. Designed specifically to evaluate treatment-related content, the DISCERN tool offers a structured framework for assessing written health materials. In this study, DISCERN scores were categorized into three quality tiers: scores below 40 were classified as low quality, scores between 40 and 55 as moderate quality, and scores above 55 as high quality.

We applied Cohen's kappa, a statistical measure used to evaluate the reliability of agreement between two raters assigning categorical or ordinal ratings, to assess interobserver agreement for both the total DISCERN scores and the individual DISCERN items. Statistical analyses were

performed using the R statistical software (version 4.4.2; R Core Team, 2023). Descriptive statistics, including mean, standard deviation, median, minimum and maximum values, as well as frequencies and percentages, were calculated to summarize the data. Differences in DISCERN scores between Turkish and United Kingdom sources were analyzed using the Mann–Whitney U test, given the non-parametric distribution of the data. A p-value of <0.05 was considered statistically significant.

## RESULTS

Regarding the overall agreement between observers in total DISCERN scores, Cohen's Kappa indicated substantial agreement, with a κ value of 0.93 ($p < 0.001$). On a question-by-question basis, most DISCERN items showed substantial to almost perfect agreement, with κ values ranging from 0.75 to 1.00.

The mean total DISCERN score for English sources was 46.13 ± 10.37 (range: 32.0–67.0; median: 42.75), while the mean score for Turkish sources was 43.77 ± 8.97 (range: 30.0–60.5; median: 41.0). The overall mean total DISCERN score was 44.89 ± 9.75. Among United Kingdom sources, 25.0% were classified as high quality, 41.7% as moderate quality, and 33.3% as low quality. Among Turkish sources, 50.0% were classified as moderate quality, 38.5% as low quality, and 11.5% as high quality. The distribution of total DISCERN scores, including mean values, range, and quality classifications, is summarized in Table 1.

A comparison of overall DISCERN scores between Turkish and United Kingdom sources using the Wilcoxon rank-sum test revealed no statistically significant difference between the two groups ($W = 354.5$, $p = 0.414$). Although English sources had a slightly higher mean score, this difference did not reach statistical significance.

When evaluating the individual DISCERN items, both Turkish and United Kingdom websites showed lower scores in several areas. Weaknesses were observed in items related to source transparency, the currency of information, the availability of additional resources, the explanation of consequences of no treatment, and support for shared decision-making (Items 4, 5, 7, 12, and 15, respectively). Statistically significant differences were observed between Turkish and English sources for four specific questions. English websites received significantly higher scores for Question 1, which assesses whether the aims of the publication are clearly stated ($p = 0.0052$). Likewise, Question 4, which examines the transparency regarding the sources of information used to compile the publication (does it indicate where the information came from?), also showed significantly higher scores among English sources ($p = 0.0466$). In addition, significant differences were found in Question 7 (does it list where to find further help or details?, $p = 0.0314$) and Question 12 (does it explain the possible outcomes of not receiving treatment?, $p = 0.0097$)." These results suggest that English-language health information websites tend to provide clearer objectives and more comprehensive disclosure of information sources compared to their Turkish counterparts. Figure 1 illustrates the mean scores for each DISCERN question, comparing Turkish and English sources based on average ratings.

Among the Turkish websites, the content providers included 16 hospitals, seven doctors, and two organizations/associations. Among the English websites, the content pro-

**Table 1.** Summary of DISCERN Score Distribution and Quality Classifications

| Country | Mean ± SD | Minimum | Maximum | High Quality (%) | Moderate Quality (%) | Low Quality (%) |
|---|---|---|---|---|---|---|
| Turkey | 43.77 ± 8.97 | 30.0 | 60.5 | 11.5 | 50.0 | 38.5 |
| United Kingdom | 46.13 ± 10.37 | 32.0 | 67.0 | 25.0 | 41.7 | 33.3 |
| Overall | 44.89 ± 9.75 | 30.0 | 67.0 | 18.0 | 46.0 | 36.0 |

viders consisted of 18 hospitals, three organizations/associations, one doctor, one newspaper, one medical product manufacturer, and one health informatics website.

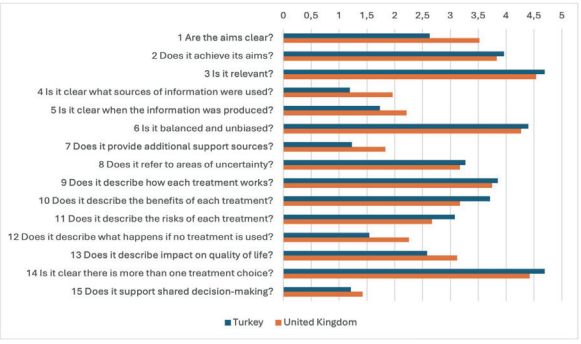


*Figure 1. Mean DISCERN scores by question and country.*

## DISCUSSION

This study assessed the quality of information regarding laryngeal cancer available on websites from Turkey and the United Kingdom. We used the DISCERN tool to evaluate the overall quality. Although there have been studies examining the quality of online medical information on various topics, this is the first study to compare the quality of medical information materials on Turkish websites with those from another country. The mean total DISCERN scores were slightly higher for United Kingdom sources compared to Turkish sources; however, this difference was not statistically significant ($p = 0.414$). When evaluating individual DISCERN items, United Kingdom websites scored significantly better for clearly stating the aims of the publication (Question 1, $p = 0.0052$), disclosing the sources of information (Question 4, $p = 0.0466$), providing details of additional sources of support and information (Question 7, $p = 0.0314$), and describing what would happen if no treatment is used (Question 12, $p = 0.0097$). No statistically significant differences were found for the remaining DISCERN items. Additionally, both groups demonstrated lower performance in Question four, Question five, Question seven, Question 12, and Question 15 .

The Internet is becoming an increasingly popular source of medical information due to factors such as wide accessibility and frequent updating of content.[9-12] However, it is evident that a significant portion of websites does not provide sufficiently reliable information.[13] In addition to the importance of having accurate information in online materials about diseases, it is also crucial to explain how this information is conveyed, its sources, and, if necessary, any conflicting aspects found in the related literature. This approach enables patients to weigh different treatment options independently and, in potentially distressing situations, to approach the subject more objectively and participate more actively in the decision-making process.

Several studies in the literature examining Turkish-language websites related to cancer have reported that DISCERN scores often fall below acceptable standards, indicating concerns about the overall quality of online health information.[14,15] In a study conducted by Zirek et al.[15] (2024), Turkish websites providing information on oral cancers were evaluated in terms of readability and content quality. While DISCERN scores were generally found to be at a moderate level, the study did not specify which criteria received lower ratings. On the other hand, according to the JAMA benchmarks, key areas such as authorship and referencing were found to be significantly inadequate. In the study, only 38.3% of the websites provided authorship information, and 5.3% cited their sources. A study by Turk Akbulut (2024) 14 evaluated Turkish websites providing information on oral cancer in terms of content, reliability, and quality, using validated tools such as the DISCERN instrument and the JAMA benchmark criteria. The reported DISCERN scores indicated generally low to moderate quality across the assessed websites, with a significant proportion categorized as 'very poor' or 'poor'. However, the study did not clearly specify which individual DISCERN items received the lowest ratings. Instead, the analysis focused on comparing overall quality scores across different types of content providers. Notably, websites created by dental clinics and general dentists demonstrated significantly lower DISCERN scores compared to those provided by healthcare institutions and special-

ist physicians. The overall DISCERN scores in our study were higher than those reported in previous evaluations of Turkish-language websites. It may also be argued that the areas in which Turkish sources underperformed compared to UK websitesparticularly those related to the reliability of the informationare partially consistent with the aforementioned deficiencies

Although numerous studies in otorhinolaryngology have focused on the quality of online medical information[16-18], publications on laryngeal cancer are limited. In a study conducted by Enver et al. (2020)[19], it was found that videos uploaded by university-affiliated accounts demonstrated significantly higher accuracy compared to those from non-academic sources. In that study, the accuracy of information was evaluated using a self-designed scoring system, and university-affiliated publications were generally classified as high-quality, whereas non-university sources were found to be of moderate quality. In a study by Narwani et al. (2016)[20], the quality of laryngeal cancer-related online patient education materials was evaluated using the DISCERN tool, and the mean DISCERN score was found to be 49.8 out of a maximum of 80, and only a limited number of websites achieved high overall DISCERN scores. A similar pattern was observed in our results, with a mean DISCERN score of 44.89 ± 9.75, and only 18.0% of websites achieving high scores.

In the discussion section of the study by Narwani et al., it was stated that DISCERN scores showed considerable variability, with lower scores particularly noted in areas such as the discussion of complications associated with treatment, the impact of treatment on patients' quality of life, and the provision of references for additional information. In our study, when specifically examining Turkish sources, lower performance was also noted in Question four (Is it clear what sources of information were used to compile the publication?), which assesses the disclosure of information sources. Additionally, consistently low scores were observed in Question seven (Does it provide details of additional sources of support and information?) and Question 15 (Does the publication support shared decision-making?). These findings indicate a divergence compared to the results of the aforementioned study.

There are also some limitations to our study. Although the DISCERN tool is an accepted tool for evaluating patient information materials, it can be argued that there are few questions focusing on the accuracy of the information. Apart from this, another country other than the United Kingdom could have been selected for comparison, or additional countries could have been included.

In conclusion, this study identified areas for improvement in the quality of laryngeal cancer-related information on both Turkish and United Kingdom internet websites. Overall, the study findings suggest that the quality of online health information is similar and acceptable between Turkish and UK sources. In particular, consistently low scores were observed in Question four (disclosure of information sources), Question five (clarity on when the information was produced), and Question seven (availability of additional sources of support and information), all of which concern the sources from which the information originates, thus directly affecting its reliability. These findings suggest a fundamental deficiency in source-related transparency, highlighting the need for improvements in this domain. At this point, stronger regulatory oversight may help ensure that medical information websites adhere to established quality standards.

Future research should focus on the integration of multimedia tools and other innovative strategies to enhance patient comprehension and ultimately supporting more informed decision-making and better health results. In addition, establishing training initiatives for healthcare professionals and digital content providers on how to produce high-quality health information can play a important role in enhancing the overall effectiveness of online medical resources.

**Ethical consent:**

Approval by the ethics committee was not needed because the information used in the study was publicly available and did not include humans or animals.

**Authorship Contributions**

Concept: V.G., Y.Ç., Design: V.G., Y.Ç., Data Collection or Processing: V.G., Y.Ç., Analysis or Interpretation: V.G., Y.Ç., Literature Search: V.G., Y.Ç., Writing: V.G., Y.Ç.

**Conflict of interest:**

The authors report no conflicts of interest in this work.

**Financial disclosure:**

The authors have declared that there is no financial support for his study.

## References

1. Berkman ND, Sheridan SL, Donahue KE, et al. Low health literacy and health outcomes: an updated systematic review. Annals of internal medicine. 2011;155(2):97-107. doi: 10.7326/0003-4819-155-2-201107190-00005
2. Baker DW, Parker RM, Williams MV, et al. The relationship of patient reading ability to self-reported health and use of health services. American journal of public health. 1997;87(6):1027-1030. doi:https://doi.org/10.2105/AJPH.87.6.1027
3. Berkman ND, Sheridan SL, Donahue KE, et al. Low health literacy and health outcomes: an updated systematic review. Ann Intern Med. 2011;155(2):97–107. doi:10.7326/0003-4819-155-2-201107190-00005
4. Baker DW, Gazmararian JA, Williams MV, et al. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. American journal of public health. 2002;92(8):1278-1283. doi:https://doi.org/10.2105/AJPH.92.8.1278
5. Robinson TN. Community health behavior change through computer network health promotion: preliminary findings from Stanford Health-Net. Comput Methods Programs Biomed. Oct-Nov 1989;30(2-3):137-44. doi:10.1016/0169-2607(89)90065-5
6. Muhtaroglu A, Uygur FA, Ozdemir K. Navigating the depths of digital knowledge: Assessing the seas of YouTube for reliable and high-quality information on appendicitis. Medicine Science. 2023;12(3) doi: 10.5455/medscience.2023.05.065
7. Coluk Y, Senocak MI. Patient education in the digital age: An analysis of quality and readability of online information on rhinoplasty. Medicine (Baltimore). Aug 9 2024;103(32):e39229. doi:10.1097/MD.0000000000039229
8. Charnock D, Shepperd S, Needham G,et al. an instrument for judging the quality of written consumer health information on treatment choices. J Epidemiol Community Health. Feb 1999;53(2):105-11. doi:10.1136/jech.53.2.105
9. van Heijningen RI, Mannaerts GH, Blondeel PN, et al. PLink, plastic surgery and the Internet. Br J Plast Surg. Mar 1998;51(2):86-9. doi:10.1054/bjps.1997.0110
10. Alkurdi E, Li R, Alkurdi D, et al. Comparative Quality Analysis of Bullous Pemphigoid Information Across Six Social Media Platforms. Cureus. Mar 2025;17(3):e81163. doi:10.7759/cureus.81163
11. Riestra-Ayora J, Vaduva C, Esteban-Sanchez J, et al. ChatGPT as an information tool in rhinology. Can we trust each other today? Eur Arch Otorhinolaryngol. Jun 2024;281(6):3253-3259. doi:10.1007/s00405-024-08581-5
12. Nielsen JPS, Christian vB, and Grønhøj C. Validity of the large language model ChatGPT (GPT4) as a patient information source in otolaryngology by a variety of doctors in a tertiary otorhinolaryngology department. Acta Oto-Laryngologica. 2023/11/01 2023;143(9):779-782. doi:10.1080/00016489.2023.2254809
13. Daraz L, Morrow AS, Ponce OJ, et al. Can Patients Trust Online Health Information? A Meta-narrative Systematic Review Addressing the Quality of Health Information on the Internet. J Gen Intern Med. Sep 2019;34(9):1884-1891. doi:10.1007/s11606-019-05109-0
14. Akbulut ET. Analysis of Content, Readability, Reliability, and Quality of Turkish Websites on Oral Cancer. Adv Health Sports Technol Sci. 2024;1(1):28–34. doi:10.14744/ahsts.2024.62849
15. Zirek T, Tassöker M. Ağız Kanserleri ile İlgili Bilgi Sunan Türkçe İnternet Sitelerinin Okunabilirliği ve İçerik Kalitesi: Metodolojik Çalışma. Turkiye Klinikleri Journal of Dental Sciences. 2024;30(3) doi: 10.5336/dentalsci.2023-100518
16. Alseheimi AM, Alseheimi SM, Alhysoni KA. Quality Assessment of Online Health Information on Thyroid Cancer in the Arabic Language: A Cross-Sectional Study. Cureus. Dec 2024;16(12):e76526. doi:10.7759/cureus.76526
17. McKearney TC, McKearney RM. The quality and accuracy of internet information on the subject of ear tubes. Int J Pediatr Otorhinolaryngol. Jun 2013;77(6):894-7. doi:10.1016/j.ijporl.2013.03.021
18. Daines BS, Idicula W. Quality and Readability of Online Patient Education Materials Related to Branchial Cleft Cysts. Cureus. Apr 2022;14(4):e24287. doi:10.7759/cureus.24287
19. Enver N, Doruk C, Kara H, et al. YouTube as an information source for larynx cancer: a systematic review of video content. Eur Arch Otorhinolaryngol. Jul 2020;277(7):2061-2069. doi:10.1007/s00405-020-05906-y
20. Narwani V, Nalamada K, Lee M, et al.Readability and quality assessment of internet-based patient education materials related to laryngeal cancer. Head Neck. Apr 2016;38(4):601-5. doi:10.1002/hed.23939