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Examining the Content, Quality, and Readability of Online Information on Exercise for Temporomandibular Joint Pain

Temporomandibular Eklem Ağrısı için Egzersizle ilgili Çevrimiçi Bilgilerin İçeriğinin, Kalitesinin ve Okunabilirliğinin İncelenmesi

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ABSTRACT

Temporomandibular joint (TMJ) pain is a widespread health issue causing discomfort, pain, and distress in the jaw joint and surrounding muscles. It significantly impacts daily activities and diminishes the overall quality of life. As individuals increasingly turn to online platforms for health information, the accuracy and reliability of such information become pivotal. The accuracy, quality, and reliability of online information, especially concerning therapeutic exercises like those for TMJ pain, are of paramount importance. This study aims to assess the content, quality, and readability of online information related to TMJ pain exercises in the Turkish language. A total of 54 websites obtained from Google searches using the keyword "jaw pain exercises" were examined. Evaluation criteria included Ateshman Readability Scale, DISCERN, and JAMA, which were employed to assess medical accuracy, content quality, clarity, and suitability for the general readership. The results revealed that the online information on these platforms generally lacked quality and was not sufficiently understandable for the intended audience, particularly patients. Many sites provided incomplete or vague information about the correct techniques for exercises, potentially leading to incorrect applications by patients, adversely affecting their treatment outcomes. These findings highlight the deficiency and inaccuracy of exercise guidelines available on online platforms, posing a potential risk to patients' treatment processes. It emphasizes the importance of healthcare professionals monitoring online resources, ensuring their accuracy, and making them more comprehensible. Access to accurate and reliable information is crucial for patients, empowering them to make informed decisions about their health and treatment options.

Keywords: Temporomandibular Joint, Readability, Exercise, Internet, Education of Patients

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ÖZET

Temporomandibular eklem ağrısı, çene eklemi ve çevresindeki kaslarda rahatsızlık, ağrı ve sıkıntıya neden olan yaygın bir sağlık sorunudur. Bu durum, günlük aktiviteleri olumsuz etkileyebilir ve yaşam kalitesini düşürebilir. Bireyler sağlık bilgileri için giderek daha fazla çevrimiçi platformlara yöneldikçe, bu bilgilerin doğruluğu ve güvenilirliği hayati önem taşımaktadır. Çevrimiçi platformlardaki bilgilerin doğruluğu, kalitesi ve güvenilirliği, özellikle tedavi edici egzersizler gibi sağlık konularında kritik bir öneme sahiptir. Bu çalışmanın amacı, çene eklemi ağrısıyla ilgili çevrimiçi bilgilerin içeriğini, kalitesini ve okunabilirliğini değerlendirerek, hastaların doğru ve güvenilir bilgilere erişimini sağlamak ve tedavi seçeneklerini daha bilinçli bir şekilde değerlendirmelerine yardımcı olmaktır. Türkçe dilinde yapılan "çene ağrısında egzersiz" anahtar kelime aramaları sonucunda Google arama motorunda elde edilen 54 internet sitesi incelenmiş ve değerlendirme için Ateşman Okunabilirlik Ölçeği, DISCERN ve JAMA kullanılmıştır. Bu ölçekler, sitelerin tıbbi doğruluğunu, içerik kalitesini, anlaşılırlığını ve hasta okuyucular için uygunluğunu değerlendirmek amacıyla uygulanmıştır. Değerlendirme sonuçları, çevrimiçi platformlardaki bilgilerin genellikle düşük kaliteli olduğunu ve hasta okuyucular için yeterince anlaşılır olmadığını göstermiştir. Çoğu site, egzersizlerin doğru teknikleri konusunda eksik veya belirsiz bilgiler sunmuştur. Bu durum, hastaların yanlış uygulamalarına neden olarak tedavi süreçlerini olumsuz etkileyebilir. Bulgular, çevrimiçi kaynaklardaki egzersiz yönergelerinin eksikliğinin ve doğruluğunun hastaların tedavi süreçlerini belirsiz kılabileceğini göstermektedir. Doğru ve güvenilir bilgilere erişim için çevrimiçi kaynaklar, sağlık profesyonelleri tarafından kontrol edilmeli ve doğruluklarına özel bir dikkat gösterilmelidir.

Anahtar Kelimeler: Temporomandibular Eklem, Okunabilirlik, Egzersiz, İnternet, Hastaların Eğitimi

1. Introduction

Temporomandibular joint pain is a common health issue that adversely affects daily life. It manifests as discomfort, pain, and distress in the jaw joint and surrounding muscles. In addition to surgical and traditional treatments, exercise-based therapies have gained increasing recognition in the management of temporomandibular joint pain in recent years [1,2].

In recent years, there has been a noticeable surge in the reliance on online platforms as primary sources of health-related information globally. Patients and individuals seeking guidance for various health conditions, including temporomandibular joint pain, often turn to online resources for insights into treatments and self-care practices [3,4]. The accuracy, quality, and reliability of online information, especially concerning therapeutic exercises, hold significant importance in the realm of healthcare [5,6]. Internet sources serve as vital tools for patients and healthcare researchers, providing easily accessible information. However, for patients seeking treatment, the challenging process lies in accessing accurate and reliable information and differentiating high-quality sources from low-quality and misleading information online [7,8]. Therefore, this article aims to comprehensively examine the content, quality, and readability of available online information on exercise-based treatments for temporomandibular joint pain, catering to individuals coping with this condition.

The objective of this study is to evaluate the information provided on online platforms regarding exercise treatments for temporomandibular joint pain, thereby analyzing the credibility and effectiveness of these resources. This assessment aims to empower patients to make informed decisions about their treatment options by ensuring access to accurate and reliable information. Furthermore, it will provide valuable insights to healthcare professionals and researchers on the optimal presentation of exercise-based treatments for temporomandibular joint pain online. This study is pivotal in enhancing access to accurate information in the healthcare sector, ultimately assisting patients in finding reliable and effective exercise therapies for temporomandibular joint pain.

2. Materials and Methods

Data Collection

Our study was designed as a cross-sectional study. Since only publicly available information was evaluated in this study, ethical approval was not required. This research was conducted based on the results obtained from Google search engine (https://www.google.com/) using the keyword search "exercise in jaw pain" in the Turkish language. The selection of the Turkish language as the search language constituted the universe of the research and included online pages published in Turkish, aimed at patient education. During the search, pages containing information related to "exercise in jaw pain" were selected as the sample. A total of the first 200 online pages in the Google search engine were selected to constitute the sample for the research. Among the examined pages, those that did not contain useful information about jaw pain treatment or management, those that were for advertising and sales purposes, those consisting solely of visual and video content, those with social media extensions, chat and forum sites, and news sites were excluded. Scientific books and articles were also excluded from the study (Figure 1).

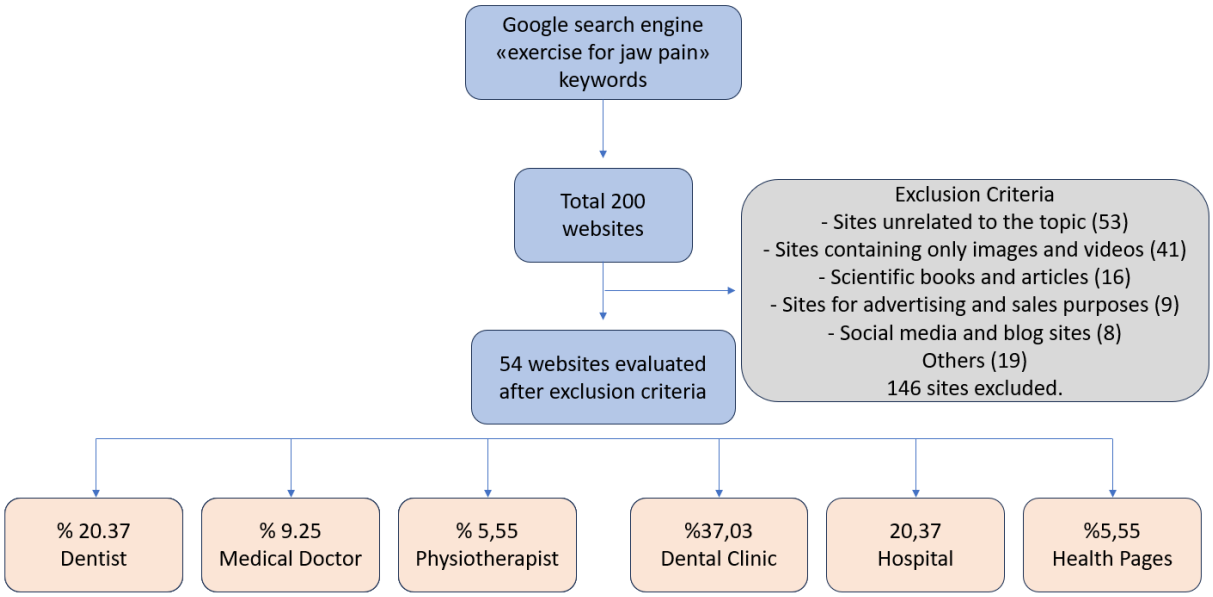

Figure1: Flow diagram of the examined websites

Evaluation Criteria

The selected online pages were evaluated based on their content, quality, and readability.

Evaluation of Textual Content: During the evaluation process of online sites, focus was placed on criteria such as explaining the common causes of jaw pain, providing different recommendations for the treatment or management of jaw pain through exercises, explaining the effects of exercise on jaw pain, containing information about how exercises should be performed correctly, providing visual materials (such as images and videos), including information about the duration and frequency of exercises, and mentioning precautions to be taken while exercising. This evaluation allowed us to assess the comprehensiveness of online information provided about jaw pain and analyze the level of information provided to users.

Analyzed Text Features and Parameters

In the study, various parameters were utilized to analyze the text features in online resources. These parameters were examined to provide detailed insights into the structure of the text, the complexity of the content, and its readability. Among the evaluated parameters were the number of words, the number of characters (including spaces), the count of words not present in the basic 3000-word list, the count of unique and non-repeated words, the number of short words below a certain length, the character count excluding spaces, the number of sentences, the number of paragraphs, the average word length,

and the average sentence length. These parameters were employed to assess the impact of content quality and reader experience in online resources.

DISCERN (Quality Criteria for Consumer Health Information)

The content of online pages was evaluated using the DISCERN scale, which is a widely used tool to assess the quality of information sources. The evaluation was based on criteria such as the page's purpose, the sources used objectivity, clarity of treatments, and providing support for the patient decision-making process [9].

DISCERN is a measurement tool developed to assess the quality of health information provided online. This evaluation tool consists of a total of 16 questions, categorized into three main sections: Questions related to the source of information (1-8) Questions related to treatment options (9-15) Overall assessment of the current information source (16). Scoring is done based on evaluations made among these questions, determining the quality of the information source [9].

Journal of American Medical Association (JAMA)

The compliance of selected online pages with JAMA criteria, including authorship information, citation details, copyright, timeliness, website ownership, sponsorship, advertisements, and potential conflicts of interest, was examined [10].

JAMA criteria identify four essential features that assess the fundamental quality standards of health-related information presented online:

I- Authorship: The authors and contributors providing the information should give clear and detailed information about their affiliations and areas of expertise.

II- Sources: The sources used for all content on the site should be clearly listed, including copyright information.

III- Conflicts of Interest: Potential conflicts of interest arising from the website's owner, sponsors, advertisers, insurance obligations, commercial funding, or other supporting factors should be disclosed openly and comprehensively.

IV- Date: The date when the content was uploaded and the date of the last update should be indicated.

These standards play a crucial role in ensuring the reliability and transparency of websites providing health-related information online [10].

Ateşman Readability Scale

The readability of online pages was assessed using the Ateşman Readability Scale, a tool utilized to evaluate the comprehensibility of texts [11]. This scale relies on a formula developed by Ateşman in 1997, based on the Flesch reading ease formula. It takes into account word and sentence lengths within the text.

Readability Score = 198.825 - 40.175 × (total syllables/total words) - 2.610 × (total words/total sentences).

According to this formula, as the score approaches 100, the text becomes more easily readable. The Ateşman Readability Score (Ateşman value) is classified as very easy if it falls between 90-100, easy if between 70-89, moderately difficult if between 50-69, difficult if between 30-49, and very difficult if between 1-29.

Statistical Analysis

Descriptive statistics were calculated using IBM SPSS® 25 software (IBM Inc, USA) for data analysis. Descriptive statistics for categorical data were presented using frequencies and percentages, while numerical data were presented using Mean±SD values.

3. Results

In the study, 54 websites related to temporomandibular joint pain were evaluated. As a result of the evaluation, out of the examined websites, 11 (20.37%) belonged to dentists, 5 (9.25%) to medical doctors, 3 (5.5%) to physiotherapists, 20 (37.03%) to dental clinics, 11 (20.37%) to hospitals, and 3 (5.5%) to other health pages (Figure 2).

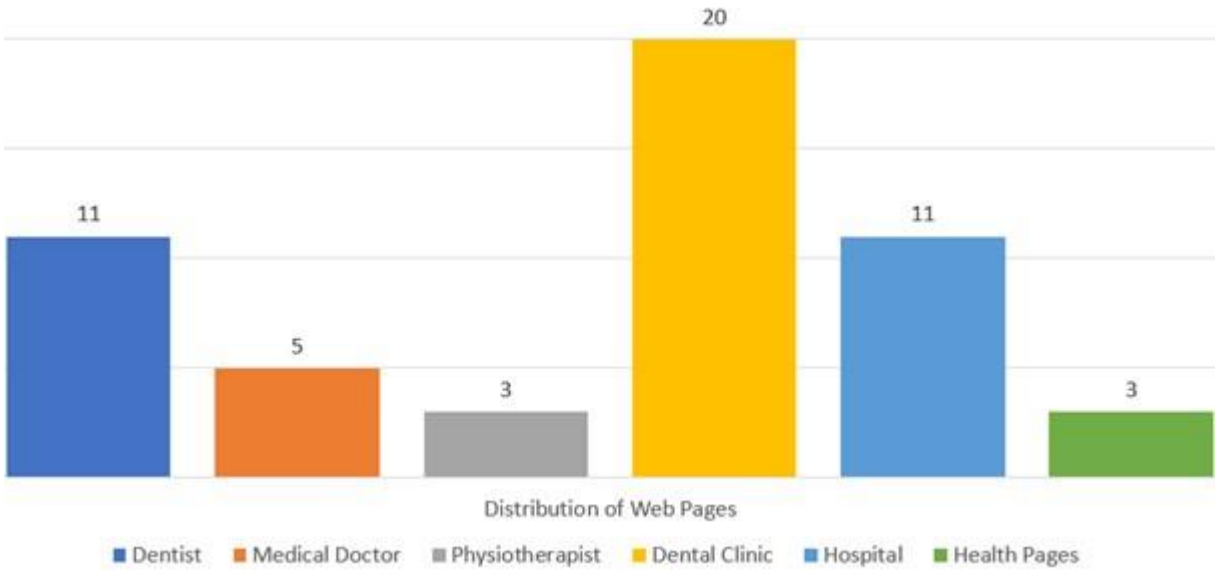

Figure 2: Distribution of Online Resources by Areas of Expertise

Parameters such as number of words, number of characters, number of difficult words, unique words, number of short words, number of characters without spaces, number of sentences, number of paragraphs, average word length and average sentence length of the examined texts are presented in Table 1.

Table 1: Distribution of Text Features in Online Resources by Field of Expertise.

	Dentist (Mean ± SD)	Medical Doctor (Mean ± SD)	Physio-therapist (Mean ± SD)	Dental Clinic (Mean ± SD)	Hospital (Mean ± SD)	Health Page (Mean ± SD)	Total (Mean ± SD)
Number of Words	921.2 ± 140.5	1018.2 ± 416.7	394.0 ± 248.9	662.2 ± 325.9	643.9 ± 329.5	712,5 ± 277,5	733 ± 380.1
Number of Characters	7344.4 ± 3791.1	7995.2 ± 3179.5	3084.6 ± 1898.0	5254.1 ± 2558.6	5125.7 ± 2523.6	5519 ± 2043,6	5806.6 ± 2995.9
Number of Difficult Words	915.6 ± 463.9	1009.2 ± 412.0	383.6 ± 232.9	655.9 ± 324.2	639.2 ± 327.4	691 ± 261,8	725.6 ± 377.4
Unique Words	531.1 ± 256.6	588.0 ± 207.1	198.6 ± 62.6	400.7 ± 155.4	403.6 ± 173.3	417,5 ± 98,5	435.2 ± 196.5
Number of Short Words	144.0 ± 73.3	175.6 ± 73.3	57.6 ± 34.2	100.4 ± 49.5	100.5 ± 52.4	115,5 ± 47,7	115 ± 62.9

Number of Characters without Spaces	6399.8 ± 3308.0	6954.2 ± 2757.8	2679.6 ± 1648.8	4573.1 ± 2222.1	4461.3 ± 2189.1	4783 ± 1757,2	5053.2 ± 2606.1
Number of Sentences	106 ± 51.4	92.2 ± 38.0	48.0 ± 33.9	69.9 ± 36.6	72.0 ± 36.6	79,5 ± 40,8	79.2 ± 42.1
Number of Paragraphs	60.7 ± 36.6	48.8 ± 20.8	33.6 ± 28.5	36.7 ± 27.6	42.3 ± 19.8	33 ± 9.2	43.4 ± 27.6
Average Word Length	2.7 ± 0.1	2.8 ± 0.1	2.7 ± 0.1	2.8 ± 0.1	2.8 ± 0.1	2.7 ± 0.1	2.8 ± 0.1
Average Sentence Length	8.7 ± 2.2	11.3 ± 1.8	8.5 ± 0.6	9.8 ± 2.3	9.1 ± 1.9	9.3 ± 1.5	9.5 ± 2.1

SD: Standard Deviation

Each text was evaluated in detail. The proportion of texts discussing the common causes of jaw pain is 90.9% for dental websites, 100% for medical websites, 33.3% for physiotherapist websites, 100% for dental clinic websites, 100% for hospital websites, and 75% for other health pages. The proportion of websites providing recommendations for the treatment or management of jaw pain is 100%, 100%, 33.3%, 100%, 100%, and 75%, respectively. Websites providing information about the effects of exercise on jaw pain are 54.5%, 40%, 0%, 55%, 45.5%, and 75%. The proportion of sites explaining how exercises are done correctly is 9.1%, 0%, 66.7%, 10%, 18.2%, and 75%. Websites supported by visual materials for exercises have a ratio of 9.1%, 0%, 33.3%, 9.1%, and 25%. The proportion of sites providing information about the duration and repetition of exercises is 9.1%, 0%, 33.3%, 5%, 9.1%, and 50%. The sites explaining the precautions to be taken during exercises have a ratio of 18.2%, 0%, 33.3%, 5%, 9.1%, and 75% (Table 2).

Table 2: Content Distribution of Online Resources by Areas of Expertise

		Dentist n (%)	Medical Doctor n (%)	Physio-therapist n (%)	Dental Clinic n (%)	Hospital n (%)	Health Page n (%)	Total n (%)
Is there mention of common causes of jaw pain?	Yes	10 (90.9)	5 (100)	1 (33.3)	20 (100)	11 (100)	3 (75)	50 (92.6)
	No	1 (9.1)	0	2 (66.7)	0	0	1 (25)	4 (7.4)
Have different suggestions been provided for the treatment or management of jaw pain?	Yes	11 (100)	5 (100)	1 (33.3)	20 (100)	11 (100)	3 (75)	51 (94.4)
	No	0	0	2 (66.7)	0	0	1 (25)	3 (5.6)
Is there information about the effects of exercise on jaw pain?	Yes	6 (54.5)	2 (40)	0	11 (55)	5 (45.5)	3 (75)	28 (51.9)
	No	5 (45.5)	3 (60)	3 (100)	9 (45)	6 (54.5)	1 (25)	26 (48.1)
Are the correct techniques for	Yes	1 (9.1)	0	2 (66.7)	2 (10)	2 (18.2)	3 (75)	10 (18.5)

performing exercises explained?	No	10 (90.9)	5 (100)	1 (33.3)	18 (90)	9 (81.8)	1 (25)	44 (81.5)
Have visual materials (pictures, videos) been provided to explain the exercises?	Yes	1 (9.1)	0	1 (33.3)	0	1(9.1)	1 (25)	4 (7.4)
	No	10 (90.9)	5 (100)	2 (66.7)	20(100)	10(90.9)	3 (75)	50 (92.6)
Is there information about how long the exercises should be done and how many times they should be repeated per week?	Yes	1 (9.1)	0	1 (33.3)	1(5)	1(9.1)	2(50)	6 (11.1)
	No	10 (90.9)	5 (100)	2 (66.7)	19(95)	10(90.9)	2(50)	48 (88.9)
Is there mention of precautions to be taken while exercising?	Yes	2(18.2)	0	1 (33.3)	1(5)	1(9.1)	3 (75)	8 (14.8)
	No	9 (81.8)	5 (100)	2 (66.7)	19(95)	10(90.9)	1 (25)	46 (85.2)

n: number of online resources, %: percentage

When the readability levels of the analyzed texts were evaluated, the content of the websites was found at the following levels: 1 text at the 5th-6th-grade level, 5 texts at the 7th-8th-grade level, 26 texts at the 9th-10th-grade level, 19 texts at the 11th-12th-grade level, and 3 texts at the 13th-14th-grade level. Additionally, 1 text had a readability level equivalent to college level (Figure 3).

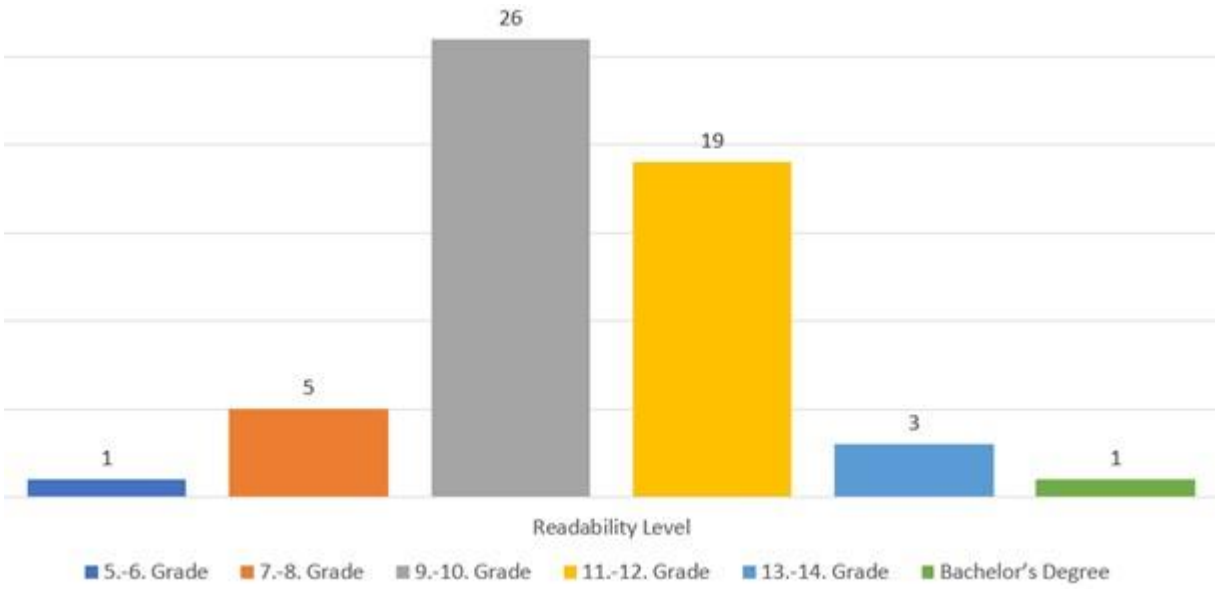

Figure 3: Readability Levels in Online Resources

Additionally, the DISCERN1, DISCERN2, total DISCERN scores, and readability scores of the texts are presented in Table 3, and the distribution according to JAMA criteria is provided in Table 4.

Table 3: Quality and Readability Scores of Online Resources Evaluated According to Various Fields of Expertise

	DISCERN 1 (Mean ± SD)	DISCERN 2 (Mean ± SD)	DISCERN Total (Mean ± SD)	Readability (Mean ± SD)
Dentist	24.63 ± 5.42	23.27 ± 5.04	51.27 ± 9.92	63.85 ± 8.61
Medical Doctor	21.40 ± 2.88	16.00 ± 3.46	40.00 ± 4.00	56.72 ± 5.41
Physiotherapist	26.33 ± 7.50	17.66 ± 4.50	47.00 ± 11.35	64.56 ± 4.70
Dental Clinic	24.20 ± 3.96	22.75 ± 7.38	50.40 ± 10.43	59.66 ± 7.83
Hospital	24.81 ± 5.03	20.54 ± 7.60	48.72 ± 12.92	60.22 ± 9.02
Health Page	23.25 ± 2.50	16.75 ± 2.21	43.25 ± 1.70	63.77 ± 5.32
General	24.20 ± 4.50	21.05 ± 6.62	48.55 ± 10.36	60.93 ± 7.84

SD: Standard Deviation

Table 4: JAMA Scores of Online Resources Evaluated by Various Specialties.

	Authorship n (%)	Attribution n (%)	Disclosure n (%)	Currency n (%)	Total (Mean ± SD)
Dentist	2 (18.2)	1 (9.1)	7 (63.6)	2 (18.2)	1.72 ± 1.10
Medical Doctor	5 (100)	0	5 (100)	1 (20)	2.20 ± 0.44
Physiotherapist	3 (100)	0	3 (100)	1 (33.3)	2.33 ± 0.57
Dental Clinic	3 (15)	0	17 (85)	4 (20)	1.20 ± 0.76
Hospital	2 (18.2)	0	10 (90.9)	5 (45.5)	1.54 ± 0.82
Health Page	1 (25)	0	3 (75)	0	1.00 ± 0.81
General	16 (29.6)	1 (1.8)	45 (83.3)	13 (24.1)	1.51 ± 0.88

n: number of online resources, %: percentage, SD: Standard Deviation

4. Discussion and Conclusion

The current study aimed to evaluate online resources regarding exercise treatments for temporomandibular joint pain. The obtained results highlight the deficiencies in quality and patient education in online platforms, emphasizing the need for healthcare professionals to guide patients towards accurate and reliable information and the necessity of producing high-quality content on online platforms. This study is the first research in our country that comprehensively evaluates and analyzes online resources related to exercises for temporomandibular joint pain. This evaluation provides a detailed examination of the content, quality, and readability of online resources for individuals dealing with temporomandibular joint pain.

As a result of our research, we found that the average sentence and word lengths in the informative texts about jaw pain exercises on the examined websites were quite long. Considering the general educational level of our country, this indicates that the readability level of these texts is low [12,13]. To overcome these challenges and make patient information texts more understandable to a wider audience, we propose some strategies. Firstly, limiting sentence length to the range of 8-10 words in internet patient information texts is an important step [13,14]. Short and concise sentences can help readers digest information more easily. Additionally, opting for more commonly used and understandable synonyms instead of long and complex words can enhance the clarity of the text. Minimizing the use of medical terminology and using simple expressions whenever possible is also an important strategy [15]. These suggestions can contribute to writing health content on the internet in a way that a broader audience can comprehend. These approaches can be applied to ensure effective communication in patient information texts and contribute to raising awareness among the public about health issues.

In the context of the findings of the study, the lack of exercise guidelines and their accuracy on online sources can lead to uncertainty among patients when applying self-treatment methods. Incorrect implementation of exercises can exacerbate patients' conditions and negatively impact their treatment processes [16,17]. Therefore, the accuracy of information on online platforms is of paramount importance. Most of the examined websites have explained the causes of jaw pain and provided recommendations about treatment methods. However, the number of websites providing sufficient information about the effects of exercises on jaw pain is limited. The lack of explanations on how to perform exercises correctly and the absence of visual materials are noteworthy.

The study has shown that the content on online platforms is generally of low quality and not comprehensible enough for patients and readers. This situation complicates the ability of individuals unfamiliar with health-related terminology to derive accurate meanings from online sources [15]. Healthcare professionals and content creators should generate explanatory content written in a language that the target audience can understand. According to the DISCERN scores, dental and physiotherapist websites received higher scores, indicating that these sites provide more reliable and accurate information.

The assessment of the readability levels of the examined texts has revealed the overall comprehensibility of the content on jaw joint pain exercise treatments. According to these evaluation results, the content on the examined websites is generally written using language understandable at the high school level. According to the Turkish Statistical Institute (TÜİK) data, the average education period for the population aged 25 and over was 7.3 years in 2011, and it increased to 9.2 years in 2022, representing a 26% increase. In 2022, the average education period for women was 8.5 years, whereas it was 10.0 years for men [18]. The findings of the research indicate that the target audience is generally at the 9th-10th and 11th-12th-grade levels. This suggests that young adults and teenagers researching treatment methods related to jaw joint pain generally do not have difficulty understanding the information they obtain from online sources. In this context, online resources related to jaw joint pain exercise treatments appear to be prepared in a manner suitable for the young adult and adolescent patient population.

However, considering the instances where the content reaches the middle school level, simplifying the content to cater to a broader audience and addressing a wider level of understanding could be essential. This is an important consideration for content creators in the future content development processes of online health resources. By doing so, raising health awareness among a broader audience and facilitating access to accurate health information can be achieved.

The results of the study indicate that online resources in the field of health are generally filled with unverified and unregulated information. Access to accurate and reliable information on health-related topics plays a critical role in patients' self-management processes. Therefore, individuals and organizations creating health content should equip their resources with reliable information, paying attention to their accuracy. According to JAMA criteria, most websites provided authorship information, but reference and conflict of interest information was lacking. Our findings align with existing studies in the literature [7,19,20]. This emphasizes the uncertainty regarding the scientific basis and reliability of online health resources.

These findings suggest that online resources related to jaw joint pain are generally inadequate and can limit users' access to accurate, reliable, and understandable information. This highlights the need for healthcare professionals and websites to pay more attention to online health resources to improve content quality and enhance patient awareness.

The study has some limitations. Firstly, the number of evaluated online sources is limited, potentially restricting the generalizability of the results. Using a broader sample could yield more comprehensive findings. Additionally, there might be a time gap between when the study was conducted and the current status of online sources, implying that updated information not considered in the evaluations could exist. Language limitations should be noted as the study only assessed Turkish content, not providing a comprehensive overview of the quality of online sources in other languages. The continuous updates of internet websites and the changeability of their content pose another limitation. Therefore, the content evaluated during the study might have changed over time. Future research could benefit from similar studies assessing the quality of online health resources in various languages to evaluate accurate information accessibility for patients from different cultures. Moreover, conducting follow-up studies evaluating updated content over time alongside focusing on user satisfaction, comprehension levels, and treatment experiences of patients utilizing online health resources can provide valuable insights. Lastly, establishing international standards and guidelines for content creators could contribute to enhancing the quality and accuracy of online health resources. Implementing these measures can potentially lead to more robust and reliable results in future studies.

In conclusion, the study identified that the information regarding exercises for temporomandibular joint pain available on online platforms is of poor quality and incomplete. Healthcare professionals should contribute to creating verified, understandable, and comprehensive content to effectively guide patients

to reliable sources. Content creators and organizations involved in healthcare should consider the health literacy of the public and use easily understandable language accessible to everyone. Future studies should focus on establishing national standards and regulations for content creators, ensuring adherence to these standards to enhance the quality of online health content.

Declaration of Ethical Code

In this study, we undertake that all the rules required to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with, and that none of the actions stated under the heading "Actions Against Scientific Research and Publication Ethics" are not carried out.

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