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ORIGINAL ARTICLE

An Assessment of the Content, Readability, and Reliability of Turkish Websites That Provide Information About Facial Paralysis

Yüz Felci Hakkında Bilgi Veren Türkçe Web Sitelerinin İçeriği, Okunabilirliği ve Güvenilirliği Üzerine Bir Değerlendirme

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ABSTRACT

Introduction: Facial Paralysis, known as Bell's palsy, is a neurological disorder characterized by partial or complete paralysis of the muscles of the face, resulting from impairment or dysfunction of the facial nerve. This study aims to evaluate the readability, content, and quality and determine the level of accuracy and reliability of websites in the Turkish language that provide information about facial paralysis.
Methods: This descriptive, cross-sectional study analyzed the quality, usability, content and readability of Turkish facial paralysis websites using the Ateşman and Bezirci-Yılmaz Readability Formula, reading time, number of images, JAMA Benchmark Criteria, DISCERN Scale and UpToDate topics. Webscore.ai was used to assess the aesthetic appeal and user experience.
Results: After reviewing 200 websites, 110 Turkish sites about facial paralysis were included in the study. The average reading time was 5.5 minutes. Bezirci-Yılmaz score was 13.8. Ateşman readability levels were moderate. News, blog and "other" sites had the most visual content, followed by Health Professionals (HP) sites. The average quality of sites was poor.
Discussion: The DISCERN scale found that 60% of Turkish health websites had poor-to-very poor content quality. UpToDate's benchmarking revealed that 58.2% of sites contained less than half of the basic topics. This indicates inadequate, outdated info for facial paralysis patients. State Institutions and Health Related Associations should provide valid, reliable info on modern websites.

Keywords: Facial paralysis, Turkish websites, internet content, readability, reliability

ÖZ

Giriş/Amaçlar: Yüz felci, yüz sinirinin bozulması veya işlev bozukluğu sonucu yüz kaslarının kısmi veya tam felci ile karakterize nörolojik bir hastalıktır. Bu çalışmanın amacı, yüz felci hakkında bilgi veren Türkçe web sitelerinin okunabilirliğini, içeriğini ve kalitesini değerlendirmek ve doğruluk ve güvenilirlik düzeyini belirlemektir.
Yöntemler: Bu tanımlayıcı, kesitsel çalışmada Ateşman ve Bezirci-Yılmaz Okunabilirlik Formülü, okuma süresi, görsel sayısı, JAMA Benchmark Kriterleri, DISCERN Ölçeği ve UpToDate konuları kullanılarak Türkçe yüz felci web sitelerinin kalitesi, kullanılabilirliği, içeriği ve okunabilirliği analiz edildi. Estetik çekicilik ve kullanıcı deneyimini değerlendirmek için Webscore.ai kullanılmıştır.
Sonuçlar: 200 web sitesi incelendikten sonra yüz felciyle ilgili 110 Türkçe site çalışmaya dahil edildi. Ortalama okuma süresi 5,5 dakikadır. Bezirci-Yılmaz puanı 13,8'dir. Ateşman okunabilirlik seviyesi orta düzeydedir. Haber, blog ve "diğer" siteler en fazla görsel içeriğe sahipken, bunları Sağlık Profesyonelleri siteleri takip etti. Sitelerin ortalama kalitesi düşüktü.
Tartışma: DISCERN ölçeği, Türkiye'deki sağlık sitelerinin %60'ının içerik kalitesinin zayıf-çok zayıf olduğunu ortaya koymuştur. UpToDate içeriği ile kıyaslandığında, sitelerin %58,2'sinin temel konuların yarısından daha azını içerdiği görülmektedir. Bu durum, yüz felci hastaları için yetersiz ve güncel olmayan bilgilere işaret etmektedir. Devlet Kurumları ve Sağlıkla İlgili Derneklerin, modern görünümlü web siteleri ile geçerli ve güvenilir bilgiler sağlaması hastaların daha güvenilir bilgiye ulaşmalarına yardımcı olabilir.

Anahtar Kelimeler: facial paralysis, website, online information, readability

Introduction

Facial paralysis, also known as Bell's palsy, is a neurological disorder characterized by partial or complete paralysis of the muscles of the face. This condition results from impairment or dysfunction of the facial nerve, which is responsible for controlling the movement of the facial musculature. The incidence of facial paralysis varies worldwide, with estimates ranging from 7 to 40 cases per 100.000 individuals (1). It has been known to affect persons of any age, although it is more commonly observed in individuals over the age of 60 and during pregnancy (1, 2). The exact cause of facial paralysis is often unknown, but it has been linked to various factors such as viral infections, vaccines, trauma and autoimmune disorders (1, 3). Medications, as well as physical therapy exercises, may be utilized in the treatment of facial paralysis. Exercise-based therapy, in particular, is effective in improving facial muscle function and reducing the severity of facial paralysis (4).

Despite the range of available treatment options, facial paralysis may still bring about substantial physical and psychological impediments for those affected. Further, a dearth of knowledge regarding the condition and treatment thereof can compound the difficulties faced. In this regard, e-health literacy - the capacity to obtain, comprehend and evaluate health-related information from electronic sources – should be an important factor in managing conditions such as facial paralysis (5).

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Given the potential unreliability of internet-based health information, it is important to ascertain the accuracy and currency of the data being accessed. Individuals with facial paralysis should be circumspect when using online sources to learn more about their condition, as some may not be reliable (6).

This study aims to evaluate the readability, content, and quality of websites in the Turkish language that provide information about facial paralysis. By examining the content of websites on this topic, we aim to determine the level of accuracy and reliability and to identify any potential gaps in the available information.

Methods

This research constitutes a descriptive, cross-sectional study wherein data was gathered through the internet and analyzed with respect to readability, quality, usability, and content of Turkish websites providing information on facial paralysis.

Study design and data collection

The data acquired during the study did not include any personally identifiable information but rather was anonymous in nature. Consequently, no permission was needed from the ethics committee. In October 2022, the search query "facial paralysis" was entered on the Google search engine page (https://www.google.com.tr) in the Turkish language (yüz felci). According to Statcounter, the Google search engine has 92% of the market share and is the most used search engine in Turkiye (7). Since browsers and Google keep track of the user's behavior through cookies, the search results are affected by the user's previous search behavior. To avoid this bias, all of the searches were performed in "incognito" private window mode. When a query is entered, Google displays the most pertinent results across 20 pages, with 10 results per page. Consequently, 200 websites were evaluated in total (8). Websites that did not contain relevant disease-specific information, were solely for advertising purposes, comprised only visuals or video material, constituted a chat forum, or contained less than ten sentences that could not be accessed in three clicks or fewer were excluded from the study. Websites were analyzed in five categories: 1) Private Health Providers (hospitals, medical centers, universities), 2) State Institutions, 3) Health-Related Associations, 4) Prepared by Health Professionals, 5) Others (news sites, blogs, anonymous, etc.).

Readability

The readability level of the texts was ascertained by utilizing Ateşman and Bezirci-Yılmaz formulas for the measurement of the readability of Turkish texts. Site contents were analyzed utilizing special software and readability formulas, and average reading times were tabulated.

Ateşman readability formula

The Ateşman formula, which was developed by adapting the Flesch Reading Ease formula to Turkish, measures how easy a text is to read. It assigns a score from 90-100 for texts that are very easy to read, 70-89 for texts that are easy to read, 30-69 for medium readings, and 1-29 for extremely difficult readings (9).

Bezirci-Yılmaz Readability Formula

The Bezirci-Yılmaz formula has been developed utilizing international readability scales and taking into account particular characteristics of the Turkish language. This formula, which uses aspects such as sentence length and a syllable count of words, is created to allow for an inference of the educational level of the reader to comprehend the material comfortably according to the complexity of the text. This, thus, indicates the grade level that the reader should have received to read the text comfortably in accordance with the educational system of Turkiye, with a score of 1-8 indicating primary education, 9-12 signifying secondary education (high school), 12-16 indicating university (undergraduate), and 16 showing academic level (10).

Estimated Reading Time

The rate of words read per minute can vary widely based on language, educational attainment, age, attention span, and numerous additional factors pertaining to the reader. For our study, the reading rate per minute was taken as ~110 words (10).

Number of Images

The use of images on websites is a commonplace practice to forestall reader disinterest and to re-engage their absorption in the content. The incorporation of visuals of people with facial features is purported to be instrumental in creating a perception of the website as more visually-appealing, hospitable, or sociable (11). The number of images on websites was analyzed to gain a better understanding of this phenomenon.

The Journal of the American Medical Association (JAMA) Benchmark Criteria

The JAMA has developed a model for assessing the authorship, attribution, disclosure, and currency of medical information, known as the JAMA Criterion. While this model offers a simple way of evaluating the content in question, it does not provide a comprehensive analysis. This evaluation seeks to assess the content of a website or article according to four distinct measures of credibility. These four measures are: (1) the clarity of ownership of the article, (2) the presence of references and citations to the information stated in the article, (3) the disclosure of any advertising, sponsorship or conflicts of interest, and (4) whether the content is time-stamped and its timeliness indicated on the website. Each measure is scored out of one point, and a total score of three or more is considered to demonstrate "high credibility;" a score of two or less is considered to demonstrate "low credibility" (12).

Quality Criteria for Consumer Health Information (DISCERN) Scale

The DISCERN Scale was utilized to evaluate the quality of written health information, wherein the assessment

was comprised of 16 questions (with the 16th item as a general assessment), each allocated a score from 1-5. The total score, thereby, ranges from 15-75. Subsequently, content with a score ranging from 15-26 was considered as very poor quality, while content with a score ranging from 27-38 was deemed to be of poor quality; scores ranging from 39-50 were considered to be fair, scores ranging from 51-62 were considered as good, and scores ranging from 63-75 were rated as excellent (13).

Checking the Information Content

An analysis of the content of pertinent websites was conducted by referencing the topics contained within the "Patient Education: (Beyond the Basics)" Bell's Palsy page of UpToDate (14). It was determined that the patient education articles on Beyond the Basics are of a length and detail that provides a suitable amount of information for individuals wishing to expand upon their knowledge base. A thorough evaluation of 10 main topics pertaining to facial paralysis was conducted on all websites. These topics included "overview, causes, symptoms, diagnostic tests, treatment; eye care, treatment; medications, treatment; exercise and rehabilitation, follow-up of treatment, recovery, referral for further information". The amount of information provided on each topic was recorded as either "absent" or "present" without taking into consideration the length of the text, the level of academic evidence, or the medical accuracy of the content. The existing ones were scored as 1 point and the total score was between 0 and 10 points.

Assessment of Aesthetic Appeal and User Experience of Websites

WebScore AI is a webpage rating tool designed to rate websites based on their technical and user interface capabilities. WebScore AI employed a machine learning model and it takes into account over 1.000 parameters and high-level features typically used by visitors when evaluating the quality of a webpage, scored on a scale of 1 to 10 (15).

Data Analysis

SPSS 26 (Statistical Package for Social Science) package was used to analyze the data related to facial paralysis. Numerical variables such as the number of images, reading time, JAMA, quality (DISCERN), readability, UpToDate, WebScore AI scores were evaluated for normal distribution using skewness values. The suitability of the numerical data for normal distribution was then determined by evaluating the skewness values, which should be between ±1.5 according to normal distribution rules (16). In this context, except for the number of images used, the other data complied with the normal distribution rules. In this study, One Way Analysis of Variance (ANOVA) and Kruskal Wallis H tests were performed to evaluate the number of images, reading time, quality, reliability, readability, popularity, and visibility scores of the websites about facial paralysis. Following the ANOVA and Kruskal Wallis H tests, Post Hoc Tests were used to analyze the differences between groups. Furthermore, the Chi-Square test was applied to compare the JAMA, quality (DISCERN), and readability (Ateşman) levels, as well as to conduct the UpToDate content analysis on the websites related to facial paralysis. The statistical significance of the results was determined by considering 0.05 and 0.01 values.

Results

After reviewing 200 websites, 110 Turkish websites related to facial paralysis were included in the study. The distribution of the website groups related to facial paralysis is shown in Figure 1. Websites were analyzed in five categories, but it was observed that there was only 1 website each in the categories of "Government Institutions" and "Health Related Associations". These two groups were excluded from the analysis, as they would distort the statistical analysis and the quality of inferences.

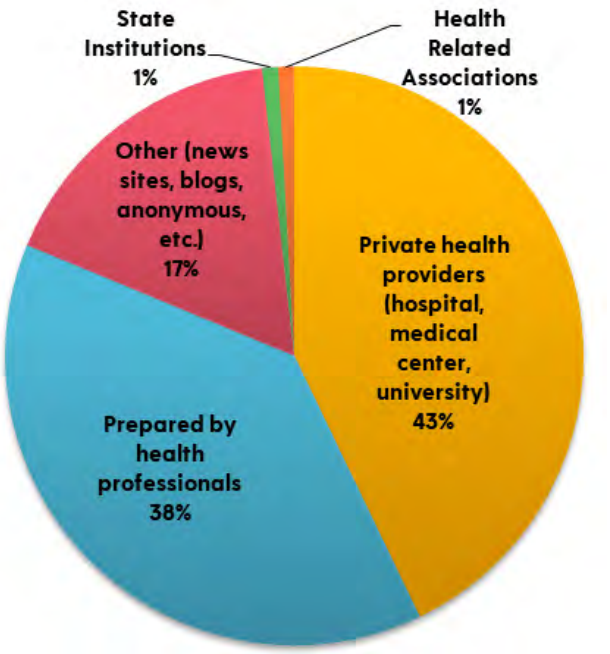

Figure 1. The distribution of the websites groups related to facial paralysis.

Ateşman, Bezirci-Yılmaz, JAMA, DISCERN, UpToDate, WebScore AI scores, reading time, number of images and comparisons of the websites related to facial paralysis are shown in Table 1. The difference between the groups in reading time, quality assessment (DISCERN), Ateşman, Bezirci-Yılmaz and UpToDate scores was not significant ($p>0.05$). It was observed that news, blog and anonymous (Other) websites had the most visual content, followed by the websites of health professionals (HP). This difference was found significant ($p<0.05$). The highest mean JAMA score belonged to other websites. There is a significant difference between the Other group and private healthcare providers (PHP) in terms of JAMA scores ($p<0.05$). It was observed that 79.2% of the sites of PHP, 76.9% of the sites of HP and 57.9% of other sites and 74.5% of all websites had JAMA scores below 2. When the DISCERN, Ateşman and UpToDate scores of the

Table 1. *Ateşman, Bezirci-Yılmaz, JAMA, DISCERN, UpToDate, webscore.ai scores, Reading Time, Number of Images and Comparisons of Websites Related to Facial Paralysis*

Evaluation criteria	**All Websites**	**PHP** [A]	**HP** [B]	**Other** [C]		
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	*p*	*The Difference*
Readability (Ateşman score)	61,44±7,34	61,20±7,94	60,81±6,40	63,46±7,79	0,409	-
Readability (Bezirci-Yilmaz score)	13,79±3,59	13,90±3,41	14,01±3,65	13,04±3,97	0,603	-
Reading time (minute)	5,35±3,10	5,27±3,20	5,41±2,75	5,42±3,69	0,973	-
Number of images	1,15±1,35	0,69±0,55	1,26±1,03	2,05±2,50	**0,000****	**C>B>A**
JAMA score	0,81±0,93	0,54±0,87	,88±1,00	1,32±0,67	**0,006***	**C>A**
Quality assessment (DISCERN) score	33,55±12,08	35,25±12,12	31,84±12,22	33,16±11,74	0,403	-
UpToDate score	4,09±2,32	4,50±2,45	3,76±2,29	3,79±2,02	0,270	-
webscore.ai score	6,17±1,03	6,43±0,96	5,97±1,19	5,98±0,62	**0,019***	**A>B,C**

p<0.05, **p<0.01, **SD: *Standard deviation,* **The Difference:** *Post Hoc Tests,* **PHP**: *Private health providers' websites,* **HP**: *Health professionals' websites,* **Other**: *other websites (news, blog and anonymous)* **JAMA**: *The Journal of the American Medical Association Benchmark Criteria,* **DISCERN**: *Quality Criteria for Consumer Health Information Scale*

Table 2. *JAMA, DISCERN, Readability (Ateşman) and UpToDate Levels of All Sites Evaluated Related to Facial Paralysis*

		All Websites		**PHP**		**HP**		**Other**		
Evaluation criteria		n	%	n	%	n	%	n	%	*p*
JAMA Scores (0-4; higher is better)	0-1.9 points	82	74,5	38	79,2	33	76,7	11	57,9	0,261
	2-2.9 points	27	24,5	10	20,8	9	20,9	8	42,1	
	3-4 points	1	0,9	0	0,0	1	2,3	0	0,0	
Quality level (DISCERN) scores (15-75; higher is better)	Very weak (15-27)	40	36,4	17	35,4	17	39,5	6	31,6	0,183
	Weak (28-38)	26	23,6	8	16,7	13	30,2	5	26,3	
	Medium (39-50)	38	34,5	18	37,5	12	27,9	8	42,1	
	Good (51-62)	5	4,5	5	10,4	0	0,0	0	0,0	
	Excellent (63-75)	1	0,9	0	0,0	1	2,3	0	0,0	
Readability level (Ateşman)	Very difficult (1-29)	0	0,0	0	0,00	0	0,00	0	0,00	0,496
	Difficult (30-49)	7	6,4	5	10,40	1	2,30	1	5,30	
	Moderate (50-69)	94	85,5	40	83,30	39	90,7	15	78,90	
	Easy (0-89)	9	8,2	3	6,30	3	7,00	3	15,80	
	Very easy (90-100)	0	0,0	0	0,00	0	0,00	0	0,00	
UpToDate scores (0-10; higher is better)	<5	64	58,2	23	47,9	28	65,1	13	68,4	**0,017***
	5-7	25	22,7	13	27,1	9	20,9	3	15,8	
	>7	21	19,1	12	25,0	6	14,0	3	15,8	

***n**: number,* **PHP**: *Private health providers' websites,* **HP**: *Health professionals' websites,* **Other**: *other websites (news, blog and anonymous)* **JAMA**: *The Journal of the American Medical Association Benchmark Criteria,* **DISCERN**: *Quality Criteria for Consumer Health Information Scale*

Table 3. *Comparisons of Evaluation Criteria's According to Topics on the UpToDate Patient Information Page*

		All Websites		**PHP**		**HP**		**Other**		
Topics		n	%	n	%	n	%	n	%	*p*
Overview	(-)	3	2,7	2	4,2	1	2,3	0	0,0	0,818
	(+)	107	97,3	46	95,8	42	97,7	19	100,0	
Etiology (Causes)	(-)	52	47,3	21	43,8	21	48,8	10	52,6	0,779
	(+)	58	52,7	27	56,3	22	51,2	9	47,4	
Symptoms	(-)	59	53,6	23	47,9	26	60,5	10	52,6	0,485
	(+)	51	46,4	25	52,1	17	39,5	9	47,4	
Diagnostic Tests	(-)	71	64,5	26	54,2	29	67,4	16	84,2	0,064
	(+)	39	35,5	22	45,8	14	32,6	3	15,8	
Treatment; Eye Care	(-)	62	56,4	23	47,9	25	58,1	14	73,7	0,152
	(+)	48	43,6	25	52,1	18	41,9	5	26,3	
Treatment; Medications	(-)	47	42,7	19	39,6	21	48,8	7	36,8	0,572
	(+)	63	57,3	29	60,4	22	51,2	12	63,2	
Treatment; Exercise and Rehabilitation	(-)	66	60,0	27	56,3	28	65,1	11	57,9	0,675
	(+)	44	40,0	21	43,8	15	34,9	8	42,1	
Follow-Up	(-)	91	82,7	37	77,1	37	86,0	17	89,5	0,367
	(+)	19	17,3	11	22,9	6	14,0	2	10,5	
Recovery	(-)	94	85,5	43	89,6	37	86,0	14	73,7	0,248
	(+)	16	14,5	5	10,4	6	14,0	5	26,3	
Referral for Further Information	(-)	110	100,0	48	100,0	43	100,0	19	100,0	-
	(+)	0	0,0	0	0,0	0	0,0	0	0,0	

***(-)**: that topic has not mentioned ,* **(+)**: *that topic has mentioned, n: number,* **PHP**: *Private health providers' websites,* **HP**: *Health professionals' websites,* **Other**: *other websites (news, blog and anonymous)*

websites related to facial paralysis were categorized, 60% had a DISCERN quality score of poor or very poor (with a mean score of all sites was 33.55±12.08), Ateşman readability levels were moderate, and only 19.1% of the websites met more than seven of the topics on the UpToDate patient information page (Table 2). According to this result, it is seen that the average quality of the sites is poor.

The average UpToDate score of the sites was 4.09±2.32 out of 10 points. It was observed that 47.9% of PHP, 65.1% of HP and 68.4% of Other sites had UpToDate scores below 5. Compared to UpToDate topics, all sites included overview information about facial paralysis. Half of the websites did not mention "causes", 60.5% of the HP websites did not mention symptoms of the disease and 67.9% did not mention tests related to the disease. It was observed that 65.1% of HP websites and 60% of all websites did not provide information on exercise and rehabilitation. The areas of guidance on what to pay attention to in the follow-up of the treatment, the recovery processes and where to apply in which situations were the biggest missing information areas on the websites. The WebScore AI scores of the websites of PHP were the highest and the difference with the other two groups was significant ($p<0.05$) (Table 3).

Discussion

This study was conducted to evaluate the quantity of images, reading time, breadth of information, readability, credibility and design features of 110 Turkish websites containing information about facial paralysis. User experience research indicates that the average duration of a user's stay on a web page ranges from 36 to 52 seconds (17). Our study found that the average needed reading time of the corresponding web pages was 5 and a half minutes, with one image per page. This research revealed that almost all sites (99%) met less than half of the JAMA criteria (low credibility). Furthermore, according to the DISCERN scale assessing content quality, 60% of the websites had poor or very poor quality. To further explore this issue, UpToDate's patient information page content benchmarking by topics was applied; it showed that 58.2% of the sites contained less than half of the basic topics.

In 2021, the average daily time spent online per person worldwide is estimated to be around 192 minutes, with 155 minutes attributed to mobile usage (18). Also, a typical internet user is exposed to almost 7 hours of internet usage across all devices each day (19). The internet has become an essential platform for a wide range of activities, including shopping, tax payment, membership management, working from home, online meetings, accessing news and information, education and more. Furthermore, many individuals are utilizing the internet for medical purposes, such as researching diseases and seeking advice for the diagnosis, examination and treatment (20).

Cyberchondria is an unfounded increase in the patient's concerns about the symptoms based on analyzing search results on the internet. Internet sources with inaccurate information content and inaccurate treatment of the disease may trigger cyberchondria in individuals who access this information (21). Facial paralysis has been known to incite anxiety due to its sudden onset and dramatic impairment of one's appearance, regardless of the severity of the paralysis (22). In this respect, online access to accurate and sufficient information may improve patients' anxiety and prevent the development of cyberchondria (5, 21).

Using Ateşman's formula, it has been determined that the readability of Turkish websites providing information about facial paralysis is at a moderate level of difficulty. According to the Bezirci-Yılmaz formula, however, the readability is considered understandable with 13.8 years of education (undergraduate). Nevertheless, given the reported low health literacy rates, it is advised to adhere to a sixth-grade reading level for educational resources (23). A recent study conducted on 78 English-language websites related to facial paralysis in terms of their readability and usefulness for patient education reported that the Flesch-Kincaid grade level and Flesch reading ease scores (Ateşman and Bezirci equivalent) were found below the recommended standards (24). Readability formulas are based on the calculation of both the number of syllables in words and the number of long words in a sentence, allowing for a numerical score to be determined. Unfortunately, this system is biased as medical terms tend to have either short syllables or abbreviations that are difficult to comprehend by the average reader. As such, solely relying on Ateşman and Bezirci scoring to evaluate medical content may not be enough as it fails to appropriately account for readability levels due to its lack of consideration towards these specialized words.

The United Nations Human Development Report 2022 reported that the average years of schooling in Turkiye is 8.6 (25). Our research examined the online resources using the Bezirci-Yılmaz formula and found them 5.2 years higher than the national education average. This finding indicates that for individuals with average educational attainment, understanding the texts may be quite challenging, which is similar to a study on the readability of English websites related to facial paralysis (24).

The inclusion of images on websites is a frequent approach to preclude reader ennui and re-engage them with the content. It is claimed that the use of images can create a more visually appealing, welcoming or social atmosphere on a website, which can ultimately have an impact on user experience. Studies have reported that the design features, technology, number of images, and user experience offered by a website have a significant effect on people's behaviors when it comes to shopping decisions, willingness to donate to charities or even choosing a surgeon (15, 26, 27). Upon analysis, it was determined that websites created by HP did not exceed any of the review standards. Interestingly, the Other group (news, blog and anonymous) had the

most number of images on their sites and PHP sites had the highest WebScore AI score, which evaluates factors such as technology, design and how user-friendly a website is.

Upon comparison of the content quality of the analyzed websites with the topics featured on the UpToDate patient information page, it was determined that approximately 20% of the pages had an adequate level of content (that have a minimum of seven topics). Although numerous studies (1, 4, 28) have recommended exercise and rehabilitation techniques to expedite the duration of treatment and disease in cases of facial paralysis, 65.1% of the HP websites did not include any mention of these proven practices.

Conclusion

The current findings suggest that Turkish websites do not provide adequate, comprehensive and up-to-date information on facial paralysis patients about their disease. In particular, there is insufficient information content on recovery, follow-up of treatment and guidance on where to apply. Inadequate information can lead to confusion, anxiety and maladaptive behaviors. State Institutions and Health Related Associations should be more proactive in providing valid, reliable and up-to-date information through modern websites.

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